THE JOINT FORCE COMMANDER (JFC) - WARFIGHTER OR BATTLEFIELD MANAGER?

A Monograph
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ABSTRACT

The Joint Force Commander (JFC) - Warfighter or Battlefield Manager? by MAJ Michael T. Miklos, USA

This study examines the issue of fighting with operational fires at the theater level. Specifically, it examines the question how can the JFC best integrate airspace control measures, fire support coordination measures, and ADA control measures to fight with operational fires. Two major events have effected the way in which the JFC can look at conducting his campaign plan. The first is the 1986 Goldwater-Nichols Department of Defense Reorganization Act. The second is recent technological developments which changed the dynamics on the battlefield.

The Goldwater-Nichols Act shifted the military's focus on joint warfighting and interoperability. This change placed the responsibility for the development of joint doctrine on the Chairman of the Joint Chiefs of Staff. It also placed more autonomy in the theater commanders-in-chief.

Recent technological developments have enabled the branches of the service to more accurately engage enemy targets at ranges greater than ever before. This capability was first manifested during the Persian Gulf War. The use of ATACMS, Patriot, and cruise missiles changed the role of the JFC from a battlefield manager to an active warfighter.

At the foundation of this examination is the interaction between doctrine, technology and organizational structure at the theater level. Each of the services provides different capabilities to the JFC. Currently the doctrine and organizational structure do not support technological capabilities.

The Army's TRADOC Pamphlet 525-5 provides a conceptual framework for how to think about the elements required for success in future conflicts. Central to the concept are five battlefield dynamics. The dynamic that directly applies to the JFC in this study is depth and simultaneous attack.

In accordance with the Golwater-Nichols Act, future conflicts will require an organizational structure and doctrine that effectively and efficiently synchronize service capabilities at the theater level. Currently, the organizational structure and doctrine do not support the JFC as a warfighter. This study offers a solution to the doctrinal and organizational deficiency.

The monograph consists of five chapters. Chapter one frames the problem. Chapter two examines the current service and special operations forces capabilities, doctrine and organizational control measures. Chapter three discusses the role of future warfighting trends in fighting with operational fires. Chapter four examines joint doctrine and organization structure. It offers a solution to the integration of FSCMs with airspace command and control measures, and air defense control measures under a joint organizational structure. This solution allows the theater commander to maximize his deep fires capabilities. Lastly, chapter five addresses the conclusions of the study.

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CHAPTER 1

INTRODUCTION

...[D]octrine reflects the adaptation of technology to new weapons systems and capabilities, organizations, missions, training, leader development, and soldier support.
Field Manual 100-5[1]

The U.S. military's approach toward warfighting is reflected in its doctrine. The military works to improve its warfighting potential through a systems approach toward doctrinal development, technological capabilities, and organizational structure to accomplish assigned [roles and] missions.[2] Each branch of service approaches doctrinal development from a different point of view.

The U.S. military's doctrinal development evolves primarily from three stimuli: internally, from the lessons learned during operations and training; from the development and infusion of new technologies; or externally, from the influence of hostile threats or external pressures, such as attack by Warsaw Pact forces during the Cold War or the passage of laws by the Congress. Arguably, military doctrine is developed and promulgated to increase combat potential, to promote interoperability amongst the services, and ultimately to win the nation's wars.

Technological capabilities have been heavily influenced by improvements in the computer industry. The recent emphasis within each of the services on information dominance, digitization, and deep battle is a demonstrated example of the impact of technology.

The Goldwater-Nichols Department of Defense Reorganization Act of 1986 has had a significant influence. It served as a benchmark in the evolution of the American military's approach to warfighting. It vested the overall responsibility for the development of joint doctrine with the Chairman of the Joint Chiefs of Staff (CJCS). Prior to the implementation of the Act, military emphasis was predominantly on individual service, specific doctrine rather than a coherent, joint doctrine for operations. This made interoperability more difficult.

The Army and Air Force attempted to improve interoperability through the development of multi-service doctrine. In July, 1975 the Army's Training and Doctrine Command (TRADOC) and

the Air Force's Tactical Air Command (TAC) established the Directorate of Air-Land Forces Application (ALFA) in an attempt to resolve tactical and procedural issues regarding air-ground interface on a highly lethal battlefield. The limitation in this initiative was that TAC was not able speak for the Air Force in the development and promulgation of Air Force doctrine. Through its work ALFA accomplished a number of initiatives. However, "ALFA was not able to bridge the gap between Army and Air Force views on air-ground operations at the operational level."[3]

Since 1986, joint doctrine has evolved slowly under the auspices of the Joint Staff. Issues for joint doctrinal development were mandated in a top-down approach (from the Joint Staff). Doctrinal publications were then developed from the bottom-up through the collaboration of the services.[4] The resulting development of joint doctrine, tactics, techniques, and procedures (TTP) has been slow in some cases. The most common reason for delays in drafting publications was differing philosophical beliefs toward the conduct of operations by each of the services. For example, the keystone document Joint Publication 3-0, Doctrine for Joint Operations, was not published until 1993. The bottom line in the delay is that "development of U.S. joint doctrine is a process based upon consensus. Thus, many joint publications reflect the lowest common denominators upon which the services do not disagree."[5]

The Act played a critical role in shifting more autonomy to the theater commanders-in-chief (CINC), in prosecuting conflict. Prior to the Goldwater-Nichols Act, theater commanders primarily employed armed fixed-wing aircraft, special operating forces (SOF), electronic warfare, and field artillery assets -- Pershing or Lance missiles -- through subordinate units to develop and shape the battlefield to accomplish operational objectives. Since the passage of the Act, technological developments have heavily influenced the role the theater commander plays as a warfighter.

The CINC prosecutes conflict at the operational level of war. Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms, defines the operational level of war as

> "[t]he level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed

to accomplish strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time and space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives."[6]

The CINC or Joint Force Commander's (JFC) goal is to generate and apply combat power within the theater. Joint Force Commanders use command and control systems to focus the requisite combat power at the decisive place and time to achieve the desired operational end state.[7]

According to FM 100-5, Operations, "Joint operations are the integrated military activities of two or more service components -- Army, Navy, Air Force, Marine Corps -- of the US military." In conducting joint operations, each branch of the military provides different capabilities on the battlefield. The challenge for the joint commander is to synchronize the capabilities each service provides in available combat power to achieve a synergistic effect. Under current doctrine, the joint commander sets the conditions through his staff and subordinate commanders to focus combat power to ultimately accomplish his campaign plan objectives. One way to set the conditions is the employment of effective control measures. Control measures, if properly employed, increase responsiveness and simultaneity, expand depth, and allow the commander to manage his battlespace.

Technological developments have further enhanced the joint commander's ability to employ and control combat power. Specifically, the technological developments in tactical missiles (ATACMS), cruise missiles -- tactical land attack missile (TLAMS) and conventional air-launched cruise missile (CALCM) -- and armed aircraft have provided the joint commander with the necessary combat power to conduct operations at theater-level in order to set the conditions for subordinate units.

The Gulf War was the first opportunity in which the JFC could apply combat power at significant distances. It was also the first conflict in which all four branches of the military had the technological capability and requisite quality of weapons systems to conduct sustained engagements and battles to effect deep operations. In previous conflicts, the major element of combat power directly available to the joint commander was armed fixed-wing aircraft; however,

during the Gulf War, aircraft of the Air Force, Navy, and Marine Corps conducted sorties against deep targets during the first two phases of the four phase air operation. The Navy and Air Force launched 317 cruise missiles and the Army conducted 21 fire missions with Army Tactical Missiles (ATACMS).[8] These capabilities required the joint commander to establish control measures, at his level, for the successful integration of the resources from all four branches of service.

In light of the experiences gained from the Gulf War, with increased weapons systems capabilities, the JFC must now be prepared to conduct deep operations with the combined resources of all four branches of the military. These capabilities require a coherent, integrated doctrine for the control of the indirect fire of tactical ballistic and cruise missiles, and the direct fires from armed aircraft. Unfortunately, the doctrine for the control of these resources lags behind the technological developments.

Currently, each service employs weapons systems based on their philosophical approach to warfighting. For air power, the Army uses the Army Air Ground System (AAGS). The Air Force uses the Theater Air Control System (TACS). The Navy uses the Naval Tactical Air Control System (NTACS). And the Marine Corps uses the Marine Air Command and Control System (MACCS). All are integral parts of the overall Theater Air Ground System (TAGS) used to manage airspace.[9] "TAGS is not a formal system in itself, but the actual sum of various component air-ground systems. The TAGS mission is to enable the delivery of the maximum amount of combat power to the desired place at the right time."[10] The TAGS, however, does not incorporate fire support coordinating measures (FSCMs) required for the synchronization of tactical ballistic missiles and cruise missiles, or air defense artillery control measures.

Doctrinally, FSCMs perform one of two functions for the commander. They either restrict the access to the terrain, the formations, or structures located within the boundaries of the FSCM, or they open the terrain to permit unrestricted fire into the area. The former are restrictive measures that function as a method of force protection or security while the latter are permissive measures that provide increased surprise and responsiveness. The only fire support coordinating measure that applies specifically to air power is the airspace coordination area (ACA). The Fire Support

Coordination Line (FSCL), the most contentious FSCM, is a permissive measure that enables air-to-surface and surface-to-surface fires without additional coordination. Joint doctrine addresses the requirements for synchronization of the operational missile fires with armed aircraft; however, it does not offer solutions for the successful synchronization of these fires.[11] For example, it does not address the synchronization of sub-surface launched Tomahawk cruise missiles and Air Force armed aircraft to attack operational level targets. The impact of this doctrinal gap for the JFC is decreased responsiveness, ineffective use of resources, a lack of synergy, and an unnecessary risk to aircrews -- in short, reduced interoperability.

Senior Army leaders have already recognized that "in future operations, emerging technologies in precision weapons, target acquisition, information systems and unmanned aerial vehicles (UAVs), at multiple levels of command will require new perspectives on command and control (C^2) of airspace at Army and joint use level."[12] These perspectives include an understanding of the maximum effective employment of ATACMS with ranges to 300Kms[13] and cruise missiles, both of which provide the joint commander with the resources of all weather, day-night munitions. The JFC will have the capability to acquire targets farther out on the battlefield and conduct operations against the enemy at ranges greater than previously considered. This change will make the JFC an active warfighter rather than a battlefield manager.

This monograph will examine the need to integrate fire support coordinating measures with air space command and control measures, and air defense artillery control measures. Specifically, it will answer the question, how can the theater commander best integrate fire support coordinating measures with airspace command and control measures in conducting operational fires? It is the thesis of this paper that, as the military becomes more joint in its operational warfighting focus, developing technology in tactical ballistic and cruise missile systems will mandate a more efficient use of air space and the orchestration of control measures by the theater commander.

To address the thesis question, the monograph consists of five chapters. Chapter one frames the problem. Chapter two examines the current service and special operations forces capabilities, doctrine and organizational control of fire support coordinating measures and airspace

command and control measures. Chapter three discusses the role of future warfighting trends in fighting with operational fires using Training and Doctrine Command (TRADOC) Pamphlet 525-5, Force XXI Operations. Chapter four examines joint doctrine and organization. It suggests a solution to the integration of FSCMs with airspace command and control measures, and air defense control measures under a joint organizational structure. This solution allows the theater commander to maximize his deep fires capabilities. Lastly, chapter five addresses the conclusions.

CHAPTER 2

CAPABILITIES AND DOCTRINE

In Modern war, the new high ground belongs to the side that controls the air-and space.

Brigadier General Robert H. Scales, Jr.[14]

The Department of Defense Dictionary of Military and Associated Terms, Joint Publication 1-02, defines doctrine as "the fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgement in application."[15] It further defines capability as "the ability to execute a specified course of action."[16] Capabilities, therefore, include the weapons systems, doctrine and controlling organizations that provide the services with the ability to prosecute conflict as the National Command Authority specifies and the theater commander directs.

ARMY

CAPABILITIES

The Army, through the land component commander (LCC), provides the JFC with rotary-wing aviation, and rocket and missile field artillery systems to engage enemy targets beyond the corps forward boundary, or beyond the FSCL in the absence of a corps forward boundary. Additionally, the Army furnishes air defense missile systems for counterair operations and for theater missile defense.

Aviation

Aviation provides the JFC with

> a highly flexible maneuver force capable of performing a variety of combat, combat support (CS), and combat service support (CSS) missions across the entire range of operations. Aviation units can rapidly maneuver to provide the decisive component of combat power throughout the depth of the battlefield during day, night, or adverse weather conditions. The aviation brigade can operate independently or, when properly augmented, become the controlling headquarters for other combined arms elements conducting ground operations.[17]

At the theater level there are no aviation units directly available to the JFC. Assets for direct use by the JFC must come from corps and division aviation brigades. "The aviation brigade is

a maneuver force of organic attack, air assault, reconnaissance, electronic warfare, and general support aviation units."[18] The Corps aviation brigades contain three attack battalions with 24 Apache helicopters (AH-64) per battalion for a total of 72 attack helicopters. The Army's most robust aviation brigade is located in the air assault division. It has three attack battalions with a total of 54 AH-64, 125 AH-58D, and 16 AH-1 attack helicopters. Heavy division (armored and mechanized) aviation brigades have two attack battalions with 24 Apache helicopters (AH-64) per battalion, and 16 Kiowa attack helicopters (AH-58D) in the division cavalry squadron for a total of 64 attack helicopters. Light division aviation brigades, depending on the table of organization and equipment (TOE), may have 40 AH-64, AH-58D, or AH-1 attack helicopters.[19]

Generally, the JFC will task the corps headquarters for the aviation brigade's attack helicopter assets before he will task the divisions. The attack helicopter battalions are a formidable weapons system with significant day and night capabilities, including electro-optic suites and laser range finders, to engage and destroy armored vehicles and soft skin targets at long range.[20] They carry Laser HELLFIRE missile system as the primary armament.[21]

The Laser HELLFIRE is an air to-ground missile system designed to defeat individual hard point targets. "During Operation Desert Storm, HELLFIRE earned the reputation of being the U.S. military's most formidable tank killer."[22] It has a maximum range of 7.0Km direct fire and 8.0Km indirect fire.[23]

> Aviation units destroy enemy forces by fire and maneuver, perform target acquisition and reconnaissance, enhance command and control, and move combat personnel, supplies, and equipment in compliance with the scheme of maneuver.... In the area of fire or ground support, Army aviation functions in the following roles:
>
> Aerial forward observation
> Air reconnaissance
> Electronic warfare (EW)
> Aerial mine delivery
> Air assault
> Air movement of weapons systems and/or ammunition
> Attack helicopter operations
> Command and control for joint air attack team (JAAT) operations[24]

While rotary-wing assets are capable of flying in adverse weather conditions, their

performance is degraded. The only system that is all weather capable is the field artillery.

Field Artillery

As with aviation, the JFC has no organic field artillery assets to fight. For indirect fires, he must task subordinate corps field artillery (FA) brigades or division artilleries for assets. While the corps and division artillery contain cannon, rocket, and missile artillery firing units, only the missile artillery attains the range for the JFC fight. The Army tactical missile system (ATACMS) provides the JFC with an all-weather, precision, indirect fire weapons system. Because all multiple launch rocket launch systems (MLRS) and the High Mobility Artillery Rocket System (HIMARS) are capable of firing ATACMs, the JFC has great flexibility in planning and engaging targets.

The ATACMS is currently planned for fielding in four blocks. "The ATACMS Block I replaces the conventional Lance system. It is a ground-launched, semi-ballistic, deep fires missile system consisting of a surface-to-surface guided missile with an anti-personnel/anti-materiel (APAM) warhead consisting of 950 M-74 bomblets... [and] a range of 165Km"[25]

"The Block IA missile is an extended range variant of the Block I missile... with a range of 300Km."[26] It includes an onboard Global Positioning System (GPS) and an inertial navigation system. These additions reduce the payload to 310 bomblets to achieve the extended range and accuracy.[27] Because of the reduced payload the area of coverage of the Block IA is slightly less.[28]

"The Block II variant is a preplanned product improvement (P3I) to the ATACMS Blocks I and IA missile systems specifically designed to kill moving armored targets and surface-to-surface missile (SSM) transporter erector launchers (TELS)."[29] The Block II carries a payload of either 13 brilliant anti-armor (BAT) submunitions or BAT P3I brilliant submunitions, and has a range of 140Kms.[30] "The BAT (P3I) is a preplanned improvement of the BAT submunition to provide enhanced acquisition capability and an improved warhead for use against an expanded target set to include moving or stationary, and hot or cold targets."[31]

"The Block IIA is the extended range version of the Block II system."[32] The Block IIA delivers a payload of six BAT (P3I) submunition to 248Kms.[33] The area of coverage for both BAT and BAT (P3I) is a radius of four kilometers.[34]

Air Defense Artillery

"Air defense operations provide the force with protection from enemy air and missile attack. They prevent the enemy from separating friendly forces while freeing the commander to fully synchronize maneuver and firepower."[35] Army air defense contributes to theater counterair operations and to theater missile defense. "Theater counterair operations protect the force from attack by enemy fixed-wing and rotary-wing armed aircraft and by unmanned aerial vehicles (UAVs). Theater missile defense protects the force and critical assets from attack by... ballistic missiles, cruise missiles (CMs), and tactical air-to-surface missiles (TASMs)."[36]

The JFC employs Patriot and Hawk missile battalions, from theater and corps air defense brigades, to establish a high- to medium-altitude air defense (HIMAD) air defense umbrella against tactical ballistic missiles (TBM) and air breathing threats (ABT). "The Patriot system is a mobile air defense system that is effective against aircraft, UAVs, cruise missiles, anti-radiation missiles, and tactical ballistic missiles. It has a radar that can detect aircraft from near ground level up to altitudes in excess of 80Kms, and it can acquire targets out to 160Kms, depending on the terrain."[37] Each Patriot battalion has six firing batteries with eight launchers.[38] The Patriot's effectiveness, as a theater ballistic missile deterrent, was proven during the Gulf War. This was the first time a tactical ballistic missile was intercepted and destroyed in combat.[39] The exact number of Scud missiles destroyed by Patriot units during the Gulf War is unknown; however, its contribution was a significant influence in Israel's decision not to intervene in the war.[40]

"The Hawk missile system is found only in the Army National Guard. Currently, there are only three National Guard Hawk Battalions."[41] "The Hawk is effective against targets from 100 feet to more than 45,000 feet in altitude to a maximum effective range of 40Kms."[42] The Hawk battalion has three firing batteries of six launchers each, totaling 18 launchers for a corps ADA battalion, and 24 launchers in a theater hawk battalion.[43]

DOCTRINE

These technological capabilities are applied through the Army's doctrine. "Within the Army, doctrine is seen as essential. It is accepted as the basis of the organization as well as the engine

of change."[44] The Army' keystone Field Manual 100-5, Operations, states that "doctrine is the statement of how America's Army, as part of a joint team, intends to conduct war."[45] It goes on to state that "[d]octrine should reflect new technology and its potential for the future, as well as its effects on Army operations."[46] At the theater level, the Army control system that turns weapons technology into combat power is the Army Air-Ground System (AAGS) for air power, Fire Support Coordinating Measures (FSCMs) for indirect fires, and weapons control and air defense procedures for air defense fires.

AAGS

"The AAGS provides the means to initiate, receive, process, and execute requests for air support and to disseminate information and intelligence produced by aerial assets."[47] The Army elements of AAGS consist of operations, fire support, air defense, command and control, liaison and coordination.[48] The Army's employment of control and coordination is conducted through Army Airspace Command and Control (A^2C^2). Army Airspace Command and Control allows for the concurrent employment of airspace working toward the accomplishment of assigned missions.[49] Doctrine defines A^2C^2 as those actions that ensure the synchronized use of airspace and enhance the command and control of those forces using airspace. The A^2C^2 system accomplishes the four basic functional activities of airspace control -- C^2, air defense, fire support coordination, and air traffic control. The system includes the organizations, personnel, facilities, and procedures required to perform the airspace control function.[50]

> The Army places emphasis on the dynamics of maneuver and firepower in all dimensions of warfighting. While [the] doctrine clearly articulates the procedures necessary to synchronize operations in the ground regime, the third dimension of the battlespace -- "airspace" has not been fully addressed. Technological advances on the battlefield give [friendly forces] the capability to detect and engage enemy targets at far greater ranges and at increasingly shorter times. The ability to deconflict all Army users of the airspace and provide for their simultaneous utilization is of paramount importance.... The current A^2C^2 system does not provide the ARFOR Commander with the capability to interface his requirements with those of other airspace users. This lack of interconnectivity within the Army... currently prevents synchronized operations.[51]

Doctrinally, the A^2C^2 system employs positive and procedural control measures to manage airspace and to shape the battlefield. "Positive control is [defined as] a method of airspace control which relies on positive identification, tracking, and direction of aircraft within an airspace conducted

with electronic means by an agency having authority and responsibility therein."[52] Positive control measures include radars using IFF, and ground and air forward air controllers (FACs). "Procedural control is [defined as] a method of airspace control which relies on a combination of previously agreed and promulgated orders and procedures."[53] "Procedural control measures must be employed when positive control measures cannot be used or are inappropriate for the situation."[54] Procedural control measures include: "air control orders (ACOs), special instructions (SPINS) in the air tasking order (ATO), airspace control authority (ACA) techniques, procedures, and rules in the airspace control plan (ACP),"[55] the coordinating altitude, the High-Density Airspace Control Zone (HIDACZ), the Minimum Risk Route (MRR), the Restricted Operations Zone (ROZ), and Standard-Use Army Aircraft Flight Routes (SAAFR). (see appendix 01)[56]

FSCM

Current Army and Marine Corps doctrine for FSCMs are the same.

> Fire Support Coordinating Measures strike a balance between the need for rapid execution of fire support missions and protection of the friendly force from its own fires. Within their boundaries, land and amphibious commanders employ permissive and restrictive FSCMs to enhance the expeditious attack of targets; to protect forces, populations, critical pieces of infrastructure, and sites of religious or cultural significance, and to set the stage for future operations.[57]

Permissive FSCMs include: the Fire Support Coordination Line (FSCL), Coordinated Fire Line (CFL), Free Fire Area (FFA).[58] Restrictive FSCMs include: the Restricted Fire Line (RFL), the Restricted Fire Area (RFA), the No Fire Area (NFA), and the Airspace Coordination Area (ACA).[59] (see appendix 02)[60]

ADA

"The object of air defense is to limit the effectiveness of enemy offensive air efforts and permit freedom of action by friendly forces."[61] Air defense control measures include both positive and procedural methods. Positive methods include IFF/SIF On/Off Line, and procedural methods include the joint (JEZ), fighter (FEZ), high-altitude missile (HIMEZ), low-altitude missile (LOMEZ), and short-range air defense engagement zones (SHORADEZ) and the base defense zone (BDZ).[62]

ORGANIZATIONS

The Army's representation, at the theater level, is provided through the battlefield coordination detachment (BCD). The name was recently changed from the battlefield coordination element (BCE). Depending on the source, both terms are still used.

> The BCE is collocated with the JFACC's senior air operations control agency, normally the AOC. It is responsible to the Army component commander and coordinates with and receives objectives, guidance, and priorities from the operations officer (G3). The guidance and priorities are sufficiently clear that the BCE is able to prioritize and adjudicate the land force needs of subordinate units for air support. The BCE is organized into six sections: *plans, intelligence, operations, fusion, air defense artillery and airspace command and control,* and *airlift.*[63]

The BCD represents the interests and desires of the land component commander (LCC) in the air operations center (AOC). It serves as the interface with the Air Component Commander (ACC) for the Land Component Commander (LCC). The combination of ground and air representatives establishes a connectivity to facilitate unity of effort and synchronization in both mediums (air and ground). "It monitors and analyzes the land battle for the JAOC and provides the interface for the exchange of current intelligence, operational data, and operational support requirements between the ARFOR, the JFACC, and participating multinational forces."[64] The Army's doctrine, Field Manual 100-13, for the BCD is presently being written. The doctrine for these organizations has largely been based on standard operating procedures. Currently, there are four BCEs established in the Army.[65] "Activities in the BCE are joint by virtue of the joint coordination."[66]

During World War II the ground commanders realized that air and ground resources had to work together to achieve victory.[67] Since then, ground and air-power advocates have rediscovered the need for complementary operations. "The requirement for the BCD [organization] grew out of the requirement in the 1980's in Europe to deal with the then Soviet capability to attack in successive echelons, overwhelming the ground defense."[68]

AIR FORCE

CAPABILITIES

The Air Force provides the JFC, normally through the joint forces air component commander (JFACC), with significant air power assets. Air Force Manual 1-1, Basic Aerospace

Doctrine of the United States Air Force, specifies that platforms used to exercise aerospace power include fixed- and rotary -wing aircraft, ballistic and cruise missiles, and satellites."[69] In today's force structure most aerospace platforms can perform multiple roles and missions.

FIGHTERS

The Air Force structure is currently built around 20 fighter wing equivalents (FWEs). The term fighter wing denotes an organizational unit comprising varying numbers of fighter aircraft, depending on the unit's mission. The fighter wing equivalent is 72 combat-coded fighter aircraft. Currently, the Air Force has five types of fighter airframes:

F-15A/B/C/D -- air superiority aircraft
F-15E -- long range attack aircraft
F-16C/D -- multirole (air-to-air and air-to-ground) aircraft
F117 -- attack aircraft
A-10 -- close air support aircraft.[70]

BOMBERS

For striking power the Air Force provides long range bombers that can fly from the United States if need be. The Air Force has three main line bombers: B-2 (stealth), B-1B, B-52.[71] "At the end of 1995 the U.S. long-range bomber force included 95 B-1s, 94 B-52s, and eight B-2s."[72] These three airframes alone can provide the JFC a significant combat potential for any adversary.

The B-2 is scheduled for production in three blocks. Each block improves on stealth characteristics and munitions delivery. The B-1 is scheduled to be the backbone of the bomber force. Scheduled upgrades in the airframe will enable the bomber to carry several types of advanced weapons including the entire family -- three types -- of cluster munitions. The B-52 can serve as a nuclear or nonnuclear platform. It can carry unguided weapons, the Conventional Air-Launched Cruise Missile (CALCM), the Harpoon antiship missiles, and planned advanced weapons systems.[73]

The Air Force provides the JFC with the majority of combat power for conducting deep attacks. The combination of fighter and bomber aircraft provides the JFC with a suite of weapons systems for conducting his campaign plan. During the Gulf War, General Schwarzkopf viewed his

air power as his most responsive strategic and operational instrument to cover the entire theater.[74]

DOCTRINE

The Air Force's approach to doctrine is encapsulated in Air Force Manual 1-1 which states,

> "Aerospace doctrine is, simply defined, what we hold true about aerospace power and the best way to do the job in the Air Force...doctrine is a guide for the exercise of professional judgement rather than a set of rules to be followed blindly...Doctrine should be alive -- growing, evolving, and maturing. New experiences, reinterpretations of former experiences, advances in technology, changes in threats, and cultural changes can all require alterations to parts of our doctrine even as other parts remain constant. If we allow our thinking about aerospace power or stagnate, our doctrine can become stagnant."[75]

The philosophical view on doctrine is reflected in how the Air Force approaches warfighting. Air Force Manual 1-1, Basic Aerospace Doctrine of the United States Air Force, lists four basic roles that are performed by aerospace forces: "aerospace control, force application, force enhancement, and force support."[76] The manual goes on to explain that the roles define broad purposes for aerospace forces; whereas, missions define specific tasks not capabilities or organizations. The table breaks out roles and missions. The structure suggests a sense of linearity between roles and missions; however, Air Force doctrine indicates that the connectivity is nonlinear. For example a bomber may be used to conduct strategic attack or close air support.[77]

ROLES	**TYPICAL MISSIONS**
AEROSPACE CONTROL (Control the Combat Environment)	Counterair Offensive and Defensive Counterspace
FORCE APPLICATION (Apply Combat Power)	Strategic Attack Interdiction Close Air Support
FORCE ENHANCEMENT (Multiple Combat Effectiveness)	Airlift Air Refueling Spacelift Electronic Combat Surveillance and Reconnaissance Special Operations

FORCE SUPPORT
(Sustain Forces)

Base Operability and Defense
Logistics
Combat Support
On-Orbit Support

In order to match equipment capabilities to assigned tasks, Air Force planners use several employment methods to build a composite package to accomplish the mission. Some of the methods are listed below:

Sweep
Combat Air Patrol (CAP)
Escort
Air-to-surface attacks against specified targets
Air-to-surface Attacks using specialized weapons
Armed reconnaissance[78]

Depending on the target, air planners work backwards from target-to-airfield in order to determine the most effective means to engage the target. This approach implies that the Air Force may use the same aircraft for different types of mission packages. It also offers flexibility to the JFC in considering theater priorities to achieve operational objectives.

ORGANIZATIONS

"The Air Force believes its positive-control philosophy best supports a unified [campaign] plan in a complex and fast-changing battle for air supremacy."[79] At the theater level the Air Force Control System (TACS) is intended to provide maximum flexibility to the commander. "It is the backbone of the AFFOR contribution to TACS." It consists of the Air Operations Center (AOC) which hosts the BCD and liaisons from the Navy and special operations. It employs centralized planning and control, and decentralized execution. Additionally, it has subordinate TACS agencies, down to battalion level, that perform coordination, monitoring, liaison, and reporting. In the event the JFACC is from another branch of the service the AOC remains the AFFOR's command and control center.[80]

During the execution of a mission the airspace is controlled by a number of actors. The Airborne Warning and Control System (AWACS) provides radar control and surveillance. The Control and Reporting Center (CRC) which is the senior radar element that directs air defense

activities, provides airspace control, and manages the Air Force's subordinate radar systems. The Joint Surveillance and Target Attack Radar System (JSTARS) provides air-to-ground surveillance. The JSTARS is instrumental in establishing situational awareness and real-time target intelligence.[81]

In addition to the positive control established by the previously mentioned actors, the Air Force follows the ACP established by the ACA. "Operations throughout the Air Force are designed to leave little to chance or interpretation at the air wing, squadron, or cockpit level. The virtue of this approach is that it lends familiarity to each operation and gives each wing and squadron commander and each air crewman confidence in the overall plan and the performance of each component."[82]

NAVY and Marine Corps

CAPABILITIES

The Navy and Marine Corps provide the JFC, normally through the joint forces maritime component commander (JFMCC), with maritime forces in building blocks of Carrier Battle Groups (CVBGs), Amphibious Ready Groups (ARGs), and Marine Expeditionary Forces (MEFs). Because of their inherent flexibility, maritime units can be employed in varying combinations and can undertake missions in conjunction with other forces. Maritime forces -- Navy-Marine Corps -- "deploy in carrier battle groups (CVBG) and amphibious ready groups (ARGs) with an embarked special operations capable Marine expeditionary unit."[83]

The Navy deploys seven types of battle force ships that contribute to the combat power available to the JFC: aircraft carriers, ballistic-missile and attack submarines, surface combatants, amphibious ships, mine warfare ships, and logistics force ships. The CVBG-ARG can maintain dominance over an area, project combat power ashore, and contribute to the deployed force ashore. Maritime forces project lethal fire-power ashore through the following:

AV-8B Harrier -- Close Air Support aircraft
F-14 A/B -- Multirole (air superiority, tactical strike, reconnaissance, close air support)
F-14D-- Multirole
F-18A/C/D/E/F -- Multirole[84]
Tomahawk Land Attack Cruise Missile
Trident II D5 submarine launched ballistic missile[85]

In addition to the CVBG-ARG, the Navy provides submarines which can serve as strike

platforms for ballistic and cruise missiles, intelligence collection and surveillance, and antisubmarine and antisurface warfare, special warfare, mine warfare, and battlegroup support.

Marine expeditionary forces extend the landward reach of littoral power-projection operations through Marine air-ground task forces (MAGTFs). The MAGTF is a combined arms expeditionary force. It contains four elements: ground combat, air combat, command, and service support. The combat forces available will depend on the size of the MAGTF. As a package, Naval strike and MEF, the JFC has a significant combat power projection capability at his disposal. This force can dominate littoral regions or deny the enemy access to the sea -- surface, subsurface, and airborne.[86]

DOCTRINE

"The limited emphasis the Navy has historically placed on doctrine can be, at least partially, attributed to its culture, particularly in its focus on technology and independent operations. Traditionally, the Navy has viewed doctrine as procedures for applying capital systems."[87]

"The Marine Corps considers doctrine to be a philosophy of warfighting."[88] FMFM1, Warfighting, posits that "Marine Corps doctrine sets forth a particular way of thinking about war and a way of fighting, a philosophy of leading Marines in combat, a mandate for professionalism and common language."[89] "In short, it appears that the Marine Corps views its doctrine as a codification of its essence, its *raison d'etre*, rather than a body of knowledge to be consulted in the preparation for, and conduct of, war."[90]

Naval Doctrine Publication 6 (signed by the Chief of Naval Operations and the Commandant of the Marine Corps), Naval Command and Control, states that "command and control is the foundation upon which the planning and executions are built. It is the tool the naval commander uses to cope with the uncertainty of combat and direct his forces to accomplish the assigned mission. Naval command and control reflect the way we organize, train, and fight."[91]

The naval tradition represents a history of independence and initiative on the part of the ship's captain. Since the development of the radio, the autonomy of the ship's captain has gradually changed. The Goldwater-Nichols Department of Defense Act worked as a catylst forcing the Navy

to catch up to the rest of the services. The development of the Naval Doctrine Command has begun to develop a core body of doctrine. The tradition, mentioned, is dovetailed with ship and fleet SOPs and TTPs. For Naval forces to operate as part of a joint force there must be a core body of doctrine for all ships to follow. Carrier battle groups and ARGs will have to work for joint commanders from different services as well as different carrier battle groups in future operations. The ultimate impact for the JFC is the requirement to accomplish operational objectives as well as the effectiveness and survival of the joint forces. This mandates that the Navy overcome this historical bias. Within the Navy the mentality of the captain's autonomy will take time to change.

The Marine Corps has had a body of doctrine for much longer. The Commandant of the Marine Corps, General Charles C. Krulak, supports the Navy's efforts to develop its doctrine.[92] The Marine Corps as an organization follows the belief that once you become a Marine you are always a Marine. The belief is reflected in its doctrine and philosophy.

ORGANIZATIONS

The Navy uses composite warfare to maximize the each ship's warfighting capabilities. This concept prevents the enemy from saturating a single command node with massed resources.[93] The same approach is taken for control of air forces. "The Navy practices command by negation. Tactical decisions are made at the lowest appropriate level. This philosophy is a natural consequence of the Navy's tradition of placing a trust in officers in command at sea. The Navy believes control by negation allows its forces the flexibilty and autonomy required in a high-jamming environment."[94]

The maritime component commander (MCC) will designate warfare commanders who will play a role in the JFC's operational fires. They are the antiair warfare commander (AAWC), the strike warfare commander (STWC) , and the air resource coordinator (AREC). The STWC coordinates the strike capabilities of the force which is usually cruise missiles and aircraft. The STWC is usually the carrier's air wing commander. The AREC is usually the carrier commander. The AAWC coordinates the fleet's air defense capabilities and airspace control.[95] In the event of an amphibious operation the Navy employs the Navy Tactical Air Control System (NTACS).The

commander of the amphibious task force (CATF) organizes and executes air operations within the AOA. From a ground perspective this operation is, very much in theory, similiar to a forward passage of lines. The difference in this case is that the stationary unit is afloat. The CATF runs the NTACS through his tactical air control center which is usually on his ship. During the preparation and landing the Navy TACC controls the anti-air and air support forces within the AOA. Positioned near the TACC ship is the supporting arms coordination center (SACC) which is the equivalent to the FSE on land. The SACC controls all fire support into the AOA. During the landing the Marine FSE is backed up by the SACC and the Marine TACC is backed up by the Navy TACC. While both the Marine Air Command and Control System (MACCS) and the NTACS are operational they form the Amphibious Tactical Air Control System (ATACS).[96] The NTACS can augment TAGS or run an entire TAGS if required. Once ashore , the MACCS assumes control of operations on land. The MACCS runs through a tactical air command center (TACC). The combination of the SACC/FSE and the TACC/TACC function in principle like the AOC and the BCD for the Air Force and the Army; however, there are two differences.

The first is the habitual relationship the MAGTF will usually have with the Naval force. The second is that the AOC/BCD are normally operating at echelons above corps. The TACC/SACC usually operates at corps-level and below. In both cases there are two separate organizations (air oriented and ground oriented) trying to integrate and synchronize operations.

SPECIAL OPERATING FORCES

CAPABILITIES

"Special operations are a form of warfare characterized by a unique set of objectives, weapons, and forces."[97] Special operating forces provide the JFC with unique equipment and capabilities designed to address those missions, regardless of where they are conducted. The capabilities are routinely not present in conventional forces. They are joint forces with assets from active and reserve components of the Army, Navy and Air Force. Other forces as deemed necessary for SOF related missions may receive training and equipment.

Army SOF consists of forces that include special forces, rangers, special operations

aviation, psychological operations units, and civil affairs units. Navy SOF consists of forces that include SEAL, SEAL delivery vehicle (SDV) teams, and Special Boat Units (SBUs). Air Force SOF consists of forces that include fixed-wing and vertical-lift aircraft and aircrews, and composite special tactical teams.[98]

SOF conduct five principal missions: unconventional warfare (UW), direct action (DA), special reconnaissance (SR), foreign internal defense (FID), and counterterrorism (CT).[99] Unconventional warfare is a broad spectrum of usually long duration operations. They include guerrilla warfare, sabotage, subversion and other low visibility missions. Direct action operations are habitually short duration, offensive actions to destroy, capture, recover, or inflict damage on a specified target. These missions may include raids, ambushes, stand-off attacks from air or naval platforms, terminal guidance for precision munitions or other actions. Special reconnaissance missions are used to obtain or verify information concerning capabilities or intentions of actual or potential enemies or areas. Foreign internal defense missions consist of training and assitance to indigenous military and paramilitary forces to reestablish security within the country. Counterterrorism missions are offensive actions taken to preempt or resovle terrorist actions abroad.

DOCTRINE

"Special operating forces use a combination of their own service-unique, joint, and other services' tactics, techniques, and procedures (TTP) to carry out assigned tasks."[100] The SOF approach toward doctrine is one of flexibility and agility. Basically, it is a philosophy of 'use what works and then adjust as required.'

CHAPTER 3

TRADOC Pam 525-5 and Force XXI

Force XXI will represent a new way of thinking for a new wave of warfare.[101]
General Gordon R. Sullivan
Chief of Staff, U.S. Army

The decision on how to prepare for future military operations is contentious at best. The Army's Training and Doctrine Command (TRADOC), published TRADOC Pam 525-5 as a think piece for future Army operations. The current TRADOC Pam 525-5, Force XXI Operations, identifies trends for the 21st century. It is a conceptual view of future joint military operations. "It describes, in general terms, how the Army will function in the future as the primary land force executing joint, multinational operations in War and Operations Other Than War (OOTW) to achieve established objectives in operations where domination of terrain or control of populations is central to victory."[102]

While an Army publication, TRADOC Pam 525-5 offers concepts and approaches toward the prosecution of conflict across the threat spectrum that are useful for all branches of the service. The concepts promulgated through TRADOC Pam 525-5 recognize the opportunities available from the recent changes in world affairs. "Even though in the mid-1990s no credible near-term threat exists for the United States, the nation's vital security interests may not go unchallenged during this period of great strategic reordering."[103] The pamphlet continues that "there can be no single, prescribed, authoritative... doctrine for this period.... [and postulates] a concept built on principles that must be translated to action in specific scenarios that cannot be predicted with enough certainty to warrant a return to prescriptive doctrine."[104]

The counter-argument for not changing warfighting doctrine is that the same technology may pose a threat to the United States when it is controlled by hostile forces. There are some who would argue that the old adage "if it ain't broke don't fix it" applies at this time. They further argue that the adage applies to the United States as the world's sole superpower. However, history does

not support this assertion.

Assuming the foundations of the pamphlet are correct, the changing situation in world affairs affords the military the opportunity to readjust its warfighting doctrine from the symmetrical approach against the former Warsaw Pact forces in Europe to a coherent, joint doctrine that maximizes rapidly advancing technological capabilities. The days of the general-purpose doctrinal threat template are gone.[105] "The most serious challenge to U.S. military superiority will not come from any one state or group but from a process -- the proliferation of weapons and technology."[106] Previously the military was a threat-based force structure that focused on combined arms operations, and changed to a capabilities-based force structure shortly after the fall of the Berlin Wall in 1989.[107]

Brigadier General Leo Baxter, Deputy Commandant of the Field Artillery School, opined that "combined arms is the 20th century endstate for warfighting. The dominant trend has been to achieve synchronization of fire and maneuver through a range of doctrinal, materiel, training and organizational innovations."[108] This observation follows the assertions of Dr. James J. Schneider, Professor of Military Theory at the Army's School of Advanced Military Studies, US Army Command and General Staff College. Dr. Schneider's article The Theory of the Empty Battlefield states that a phenomenon evolved on the battlefield through the influence of three characteristics: the dispersion of formations, the increase in weapons lethality, and the decrease in casualties.[109] The causal relationship in the phenomenon was based on technological development. The increase in weapons technology caused the dispersion of troops thus giving the perception of an empty battlefield. The expected result from more lethal technology was an increase in casualties; however, the opposite occurred. Casualty rates dropped. General Baxter's comments offer a marking point in the process of the expanding battlefield that Dr Schneider describes.

The marking point is reflected in the maximization of available technology with current doctrine. At each point, a change occurs in the development of doctrine, training and organizational structures. Earlier examples in the 20th century include the development of mechanization and the internal combustion engine, the combination of the airplane and the aircraft carrier, the development

of nuclear weapons, and the combination of jet propulsion and computers.

Mechanization increased the tempo and the size of the battlefield. The airplane and aircraft carrier caused a paradigm shift away from the battleship as the predominant capital ship. This shift resulted in surface forces fighting without ever "seeing" each other. This occurred in the battle of Leyte Gulf during World War II. The combination of nuclear weapons with jet propulsion posed an increased threat to population centers of countries. The addition of computer technology with missile technology pushed the battlefield beyond continental boundaries.

Students of military art attempted to explain the apparent disparity between decreased casualty rates and technological changes. One such noted student was Brigadier General S.L.A. Marshall. General Marshall postulated, in his book Men Against Fire, that soldiers felt psychologically isolated as they began to fire and maneuver in the face of the enemy. While General Marshall's observations were the source of study and debate for years, technology continued to evolve. The interaction between technology, doctrine (how troop formations and equipment move on the battlefield), and organizational structure is a dynamic process.

A cause and effect relationship will continue between technological development and the boundaries of the battlefield. As technological capabilities are enhanced, boundaries of the battlefield will expand which is what Dr Schneider alluded to in his article. Commanders, now and in the future, will have the ability to acquire the enemy at greater ranges, faster, and more accurately than ever before. This capability provides commanders freedom of action to engage the enemy -- with precision -- and with more combat power. This developing capability is at the heart of TRADOC Pam 525-5.

The concepts of FORCE XXI are built on five characteristics: *doctrinal flexibility, strategic mobility, tailorability* and *modularity, joint* and *multinational connectivity,* and *the versatility to function in War.*[110] Dovetailed with the characteristics are five battle dynamics that define significant areas of change from current operations to Force XXI operations. The dynamics are battle command, battlespace, depth and simultaneous attack, early entry, and combat service support.[111] The battle dynamic that most significantly affects the capability of the Joint Force Commander is

depth and simultaneous attack.

Simply stated, depth and simultaneous attack will enable the commander to directly influence the enemy throughout the width, height, and depth of his battlespace to stun, then rapidly defeat an enemy... By massing the effects of long- and short-range area and precision fires, integrating information operations designed to blind, demoralize, and deafen the enemy, concurrent with rapid combined arms maneuver, ground and from the air, a larger and less agile enemy force can be quickly and decisively defeated. Although these attacks may not be simultaneous in application from the enemy's perspective, they will appear seamless and nearly simultaneous in effect.[112]

Fighting at depth is a key aspect of operational and tactical force protection. Successful deep operations take away the enemy's ability to hold our centers of gravity and critical functions at risk by disrupting and destroying his attack capabilities, RISTA, and command and control.... Simultaneous attack rapidly denies the enemy the ability to conduct military operations throughout a given battlespace. The enemy is attacked from what appears to be all directions, blinding his RISTA and command and control in the process. As a result, the enemy commander is overwhelmed to the point where he is unable to concentrate on any single thrust and can no longer cope. Soon, his combat power is disintegrated and his entire force is disarrayed. Decisive defeat is imminent.[113]

Two broad capabilities are imperative for successful execution of depth and simultaneous attack. First, commanders must have a high degree of situational awareness. They will be able to find and identify the elements of an enemy's order of battle in near-real-time. Secondly, commanders must have the ability to strike and defeat located enemy elements with precision and highly lethal effects, in near-real-time, and at the times and places of their choosing.[114]

While the endstate of Force XXI is undetermined, the implication is clear. Depth and simultaneous attack will be a key characteristic of future military operations. New technologies will be at the center of developing military operations. "Technologies as drastically different from those of today have always created the need for a doctrinal review: doctrine before the tank, radio, and airplane for example differed significantly from that prior to those technologies."[115] The application of combat power against the enemy using continuously new technologies mandates the next logical step in how the military plans to fight -- the development of an improved doctrine.

This includes the doctrine for joint warfare at the operational level. Current attempts to adjust to a changing environment include the development of deep operations cells at divisions and corps, and battlefield coordination detachments at echelons above corps. These organizational structures may be interim solutions. The evolutionary process requires a long term solution that matches capabilities with a coherent, workable doctrine. With the advent of Force XXI, the short term solutions are in place. It is time to adjust the doctrine to match emerging capabilities.

The trend is clear -- a joint, capabilities based force, with enhanced information dominating capabilities, needs to overcome parochial differences and achieve the next level of synergistic potential with a coherent joint doctrine. That doctrine includes the seamless prosecution of conflict at the operational level with integrated FSCMs, airspace command and control, and air defense control measures.

Force XXI provides the methodology to achieve the next step in the evolution of military art. For the military to remain a credible force in the future it must reassess its doctrine during this time. Failure to do so offers a missed opportunity like those marking points that occurred earlier in this century. This missed opportunity will result in future military misfortunes caused by the failure to learn, the failure to adapt, and the failure to anticipate.[116]

CHAPTER 4

INTEGRATION

The nature of modern warfare demands that we fight as a team.... The resulting team provides joint force commanders the ability to apply overwhelming force from different dimensions and directions to shock, disrupt, and defeat opponents. Effectively integrated joint forces expose no weak points or seams to enemy action, while they rapidly and efficiently find and attack enemy weak points. ***Joint warfare is essential to victory.***"
Joint Pub 1[117]

The JFC and Joint Doctrine

"The services provide the forces; unified commands put them together for operations. Each service's forces have distinctive qualities deriving from culture and tradition."[118] Within the context of joint doctrine the JFC "may establish functional components to provide centralized direction and control of certain functions and types of operations to fix responsibility for certain normal, continuing functions, or when it is appropriate and desirable to establish the authority and responsibility of a subordinate commander."[119] Functional component commanders may include (see appendix 3)[120]: the Joint Force Air Component Commander (JFACC), the Joint Force Maritime Component Commander (JFMCC), the Joint Force Land Component Commander (JFLCC), and the Joint Force Special Operations Component Commander (JFSOCC).

The JFC will normally designate a JFACC; however, "in cases where a JFACC is not designated, the JFC may plan, direct, and control joint air operations. If this option is exercised by the JFC, the JFC's staff will assist to provide direction and coordination of the capabilities/forces assigned to the joint force."[121] The JFACC will usually be the commander with the preponderance of air forces. The JFACC derives authority from the JFC, who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The JFACC's responsibilities will be assigned by the JFC (normally these would include, but not limited to, planning, coordination, allocation, and tasking [of air sorties] based on the JFC's apportionment decision). Using the JFC's guidance, the JFACC will recommend to the JFC apportionment of air

sorties to various missions or geographic areas.[122] "The JFC will normally designate a JFACC to exploit the capabilities of joint air operations. The JFACC directs this exploitation through a cohesive joint air operations plan (centralized planning) and a responsive and integrated control system (decentralized execution)."[123] Additionally, "based on the combat situation, the JFC may delegate an Airspace Control Authority (ACA) and/or an Area Air Defense Coordinating (AADC) authority to the JFACC."[124]

The JFMCC is usually the commander with the preponderance of maritime forces. The commander within a unified command, subordinate unified command, or JTF is responsible to the establishing commander for making recommendations on the proper employment of maritime forces and assets, planning and coordinating maritime operations, or accomplishing such operational missions as may be assigned. The JFMCC is given the authority necessary to accomplish missions and tasks assigned by the establishing commander. He has responsibility for all maritime forces within the area of operations. The JFMCC may employ various maritime warfare assets to support the theater campaign and subordinate operations including strike warfare, anti-air warfare, mine warfare, electronic warfare, amphibious operations, and special operations.[125]

The JFLCC will usually be the commander with the preponderance of land forces. The JFLCC is the commander within a unified command, subordinate unified command, or JTF responsible to the establishing commander for making recommendations on the proper employment of land forces, planning and coordinating land operations, or accomplishing such operational missions as may be assigned. The JFLCC is given the authority necessary to accomplish missions and tasks assigned by the establishing commander.[126]

The JFSOCC will normally be the commander with the preponderance of special operations forces and the requisite command and control capabilities. The JFSOCC exercises operational control (OPCON) over assigned special operations forces (SOF) within the area of operations. He is the commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of special operations forces and assets, planning and coordinating special operations, or

accomplishing such operational missions as may be assigned. The JFSOCC is given the authority necessary to accomplish missions and tasks assigned by the establishing commander.[127]

While each of these component commanders works to achieve the JFC's concept of operations through the authority, responsibility and concept of support relationships assigned by the JFC, there is still a struggle to overcome service parochialism in the application of combat power.

The challenge of service parochialism is not a new obstacle to effective and efficient interoperability. In his testimony before the House Armed Services Committee in 1949, General Omar N. Bradley identified the same challenge within the branches of the service. He stated that

> [o]ur military forces are one team in the game to win regardless of who carries the ball. This is no time for "Fancy Dans" who won' t hit the line with all they have on every play, unless they can call the signals. Each player on this team whether he shines in the spotlight of the backfield or eats dirt in the line must be an all-American.[128]

General Bradley's insightful comments, gained through four years of fighting experience during World War II, are correct. Almost 50 years later the military is still trying to resolve the same fundamental issues. These issues center around how the military can fight more efficiently and effectively, and not lose individual service identity.

The Goldwater-Nichols Act mandates change that may address General Bradley's observations. "Joint doctrine guides the employment of joint forces and facilitates the use of operational capability to achieve strategic and operational endstates."[129]

> The development of joint doctrine can be contentious from the perspective of the services for different reasons. Disagreement exists among the services concerning the actual role to be played by joint doctrine.... To the extent that there is not a common view of the purpose and utility of joint doctrine and that its development process permits the infusion of service parochialism, the effectiveness of the process is constrained.[130]

The resulting differences in the perception by the individual services toward the application of combat power causes suboptimal solutions in the employment of joint forces. The JFC is the catalyst that ensures service parochialism is set aside and unity of effort is attained in achieving the operational endstate. The JFC must balance doctrine with his judgement and experience in the application of his forces. In an effort to mitigate the previously mentioned service parochialism, the JFC, can influence the outcome of campaigns by:

assigning missions
designating the priority efforts(s)
prioritizing and allocating resources
assessing risks to be taken
deciding when and how to make adjustments
committing reserves
seeing, hearing and understanding the needs of subordinates and seniors
guiding and motivating the organization toward the desired end state[131]

The stated influences illustrate an apparent disparity between joint doctrine and the capabilities available to the JFC. While doctrine addresses the ways in which the JFC can influence the outcome of conflict at his level, it falls short in meeting his needs as a warfighter. General John H. Cushman stated that "joint operations are too often portrayed as a matter of management, with the senior joint commander 'allocating forces' and 'providing strategic direction,' the joint task force is a transient organization where the effect of leadership is fleeting at best and the fighting heart, if noted at all, is at service echelons only."[132] The identified influences make the JFC a battlefield manager who fights through his subordinate commanders. The capabilities available through recent developments in technology allow the JFC to take on the active role of a warfighter. The JFC can employ weapons systems through operational maneuver and operational fires.

Operational Maneuver and Operational Fires

Field Manual 100-7, Decisive Force: The Army in Theater Operations, defines *Operational Maneuver* as "the means by which the commander sets the terms of battle, declines battle, or acts to take advantage of tactical situations."[133] This implies that the commander has the time to tactically maneuver subordinate forces so that they are in the proper position to achieve operational endstates. At the theater level, the JFC has positioned armed rotary and fixed-wing air forces, EAC air-defense brigades, SOF units, and missile artillery units to interdict the enemy.

Interdiction has both air and surface aspects. Joint doctrine defines interdiction as "an action to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces."[134] Air interdiction is defined as "air operations conducted to destroy, neutralize, or delay, the enemy's military potential before it can be brought to bear effectively against friendly forces at such distance from friendly forces that detailed integration of

each air mission with the fire and movement of friendly forces is not required."[135]

The approach toward destroying the enemy between the air and surface interdiction is different. The aim of air interdiction is to achieve the desired effects through separate and distinct operations that focus on the operational objective without the active role of ground forces. This operation may or may not include the attack of ground targets. The aim of surface interdiction is to achieve the pre-emption of surface forces, which causes geographic separation between friendly and enemy ground forces. It also requires an element of timing to achieve the desired effects before the enemy can react. It does not limit surface interdiction to just surface combatants, which suggests that air interdiction may be a subset of interdiction. " While interdiction destroys enemy forces, its primary contribution to the operation is curtailing the enemy's freedom of movement and information flow and influencing the enemy's battle tempo."[136]

Operational fires refer to a commander's application of lethal and nonlethal firepower to achieve a decisive impact on the conduct of a campaign or major operation. They are a separate element of the commander's concept of operations but must be closely integrated and synchronized with the commander's concept of maneuver.[137] Operational maneuver and operational fires may occur simultaneously within a commander's battlespace, but may have very different objectives. Operational fires are *not* fire support, and operational maneuver is not necessarily dependent on operational fires.[138]

In a paper written while at the Naval War College, General Crosbie E. Saint opined that "operational fires should be a product of using air interdiction, battlefield air interdiction and ground launched or helicopter fire allocations."[139] The general's observations reflect the role of the battlefield manager as opposed to the warfighter. They also suggest the synchronization of fires and maneuver forces, or based on the proximity of friendly forces, synchronization of interdiction and maneuver. However, synchronization between fire and maneuver is not operational fires. Operational fires are more than *deep* fire. They achieve operational objectives by extending the battlefield in both space and time. Integrated properly with operational maneuver, fires can help achieve a decisive impact on the operation. Examples of operational fires include theater missile

defense, counterreconnaissance, surveillance and target acquisition, counterfire, and joint suppression of enemy air defenses (JSEAD). They focus on one or more of three general tasks: facilitating maneuver, isolating the battlefield, or destroying critical enemy functions and facilities.[140]

The JFC, to be more effective, should have an agent to synchronize the operations across the combat zones. Currently there is no one individual on the staff that coordinates and synchronizes the efforts of the component commanders. In corps and below units there are fire support elements that serve this function for fires. In echelons above corps the closest comparable agency to the FSE is the BCD which is collocated with the Air Operations Center (AOC). The staffs do not have a long standing working relationship like a corps headquarters.

The command and control measures of military power on the expanding battlefield that Dr. Schneider suggested requires closer working interfaces among staffs at this level. Failure to develop a working organization will result in unnecessary tension.

FSCL

One of the most significant philosophical differences that exists between the Army and Air Force is the interpretation and purpose of the FSCL. The FSCL is intended as a land oriented control measure which largely eliminates the Navy's interest in the development of this measure as a truly joint measure. Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms defines the FSCL as

> a line established by the appropriate ground commander to ensure coordination of fire not under the commander's control but which may affect current tactical operations. The fire support coordination line is used to coordinate fires of air, ground, or sea weapons systems using any type of ammunition against surface targets. The fire support coordination line should follow well-defined terrain features. The establishment of the fire support coordination line must be coordinated the appropriate tactical air commander and other supporting elements. Supporting elements may attack targets forward of the fire support coordination line without prior coordination with the ground force commander provided the attack will not produce adverse surface effects on or to the rear of the line. Attack against surface targets behind this line must be coordinated with the appropriate ground force commander.[141]

Additionally, Joint Publication 3-0, Doctrine for Joint Operations, states that

> forces attacking beyond an FSCL must *inform* [emphasis added] all affected commanders in sufficient time to allow necessary reaction to avoid fratricide, both in the air and on the ground....

> Coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and special operations forces.... Such coordination is also important when employing munitions with delayed effects. Finally, this coordination assists in avoiding conflicting or redundant attack operations. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL.

The Army's doctrinal approach toward fires and their effects beyond the FSCL is that affected commanders must be informed as stated in Joint Publication 3-0. The requirement for coordination is a two way dialogue which takes longer than a message which is the requirement for informed. A message is a one way communication. From a land combat perspective, this ensures the ground forces freedom of action and increased responsiveness to quickly engage time-sensitive, high-payoff-targets.

The Air Force position is opposite to the Army's. The FSCL should serve as a forward boundary in which the fires and their effects must be coordinated. As a service, they believe that air power is primarily designed to conduct operational and strategic level operations beyond the FSCL. This philosophical approach follows the Air Force methodology of controlling air frames. The Air Force maintains positive control of aircraft through the use of the airborne battlefield command and control center (ABCCC), airborne warning and control system (AWACS), forward air-controllers (FACs) and other systems. This view of the use of the FSCL as a forward boundary for ground forces and requiring coordination provides the Air Force JFACC with freedom of action for armed aircraft and a method of force protection for those air frames. By requiring coordination before firing surface to surface munitions, the Air Force can ensure that its forces are not in the line of fire. The requirement for coordination implies a dialogue between the Army and Air Force, but risks the loss of the opportunity to engage time-sensitive, high-payoff targets. The challenge in using the FSCL continues between maintaining the balance between force protection and responsiveness in engaging perishable high payoff targets.

The example of the on-going friction between the Army and the Air Force in prosecuting enemy targets at greater ranges, with the need to maintain force protection, illustrates the changing nature of armed conflict at the theater level. This one example demonstrates the philosophical

differences and a lack of trust between the services.

> Ultimately, CENTCOM took over setting of the FSCL and used it as a boundary, assigning all terrain on one side to the ground commanders and all terrain and airspace on the other to the air component commander. In the words of the Third Army deep fires after-action report: "The end result, ironically, was that the high level of success attained on the ground frequently led to a loss of air support, since bombers could no longer execute their mission, and because the mission manager didn't have the necessary lead time to successfully divert the mission to another target...."
>
> The Air Force capabilities, combining J-STARS observation with sophisticated attack tools, would seem likely to have been much more effective. VII Corps was unable to employ Air Force battlefield air interdiction as a blocking force in support of its maneuver units or maintain continuous interdiction with its own aviation brigade (the 11th). Indeed, because of its lack of control over the FSCL, it could not interdict targets within range."[142]

RECOMMENDATIONS

There are two possible evolutionary steps that will help the JFC integrate FSCMs with airspace command and control measures in conducting operational fires. These steps will also keep doctrine in synchronization with emerging technological capabilities. The first step requires an organizational change, and the second step is a procedural change.

The organizational change is the outgrowth of an existing structural concept. It entails applying the principles of integration that have worked for corps and below units, and applying them at the theater level. The concept centers on the creation of the Joint Force Operational Fires Coordinator (JFOFC) and his staff which form the Joint Force Operational Fires Coordination Center (JFOFCC). The JFOFC functions in a similar manner to Fire Support Coordinators (FSCOORD) at the corps level and below. At the theater level, he is the integration agent for all component combat functions for the JFC. The criticality of the fires coordinator was addressed by Brigadier General Robert H. Scales Jr. in his book, Firepower in Limited War. BG Scales stated that

> A fire support coordinator must know how much is enough. He must apply firepower not with the objective of relieving pressure on friendly infantry, but with the single purpose of destroying the enemy's ability to fight. He must be extravagant when the enemy is precisely located, exposed, or psychologically vulnerable. He must resist the temptation to fire for the sake of firing when the situation clearly does not justify the expenditure. Decisions of this sort demand of a fire support coordinator far more than technical skill and knowledge of the systems at his command. He must study the enemy and his environment intimately, and must be as aware as his maneuver commander of the intangible factors, the hidden strengths and frictions of battle, which are truer indicators of the types and qualities of firepower he must employ to win.[143]

The technical expertise and holistic understanding of the battlefield environment that the FSCOORD must have, according to BG Scales, applies across an even wider area for the JFOFC. He should have a joint background which provides the knowledge and experience of weapons systems and doctrine. This experience will allow him to develop an effective system of systems to achieve the desired operational objectives.

Currently, the role of the JFOFC is filled through a collection of joint boards that represent the requirements of component commanders. While not discounting the importance of their own mission, there is no specified executive agent for the JFC who focuses solely on the integration of operational fires assets at the theater level -- without regard for service parochialism. At corps and division level, units are standing up Deep Operations Coordination Cells (DOCC) to accomplish the same purpose. The III Corps Commander has specified that the Corps Artillery Commander is the Deep Battle Expert. He supervises and integrates the Corp's deep fight. Another example occurred during the Gulf War. Third Army formed a deep battle cell only days prior to the initiation of the air war. The cell collected all corps target nominations and then prioritized them in accordance with the Third Army Commander's priorities before forwarding the target nominations to the Joint Targeting Board.[144]

At the theater level, the AOC-BCD is the vehicle in place to integrate the operational fires for the JFC; however, the role of the BCD is to serve as the Army Forces Commander's (ARFOR) liaison in the air component commander's operation center.[145] Under this structure the AOC serves the JFACC and the BCD serves the ARFOR/JFLCC. Arguably, everyone in the AOC-BCD works for the JFC, unfortunately because they serve the JFACC and the JFLCC, service parochialism may become obstacles.

The problems with parochialism have improved, but are still emotional issues today as evidenced during the Gulf War and the Roles and Missions Commission.

> With the start of air operations, tension grew between the Air Force, which was concentrating its efforts on strategic and independent operational strikes, and the leadership of the Third Army, which assumed that the ground attack would be the theater commander's principal means of achieving success and must, therefore, be given priority for direct employment of air assets. At its root, the argument was an old one, reflecting differing views of

the role of air power in theater operations.[146]

The congressionally mandated commission was formed in May 1994 and is still resolving issues that were raised during the study. One of the most contentious was the issue of deep attack. The Air Force position was to divest the Army and Marine Corps of deep attack systems -- ATACMS and the F/A 18 Hornet aircraft -- and segment the battlefield. This would make the deep fight primarily an Air Force and Navy responsibility with the JFACC commanding the deep battle. According to the Air Force, the dividing line between the close and deep battle would be the FSCL, normally positioned at multiple launch rocket system (MLRS) range. This proposal was unacceptable to the Army and the Marine Corps.

The Army made the case that with current and planned sensors and C^2 systems, the LCC will have an unprecedented picture of friendly and enemy forces on the battlefield. This will provide the ability to more effectively synchronize resources from supporting commanders. Additionally, the Army cited the need for an organic deep fires capability exemplified by ATACMS. The missile systems advantages are its responsiveness, all weather capability and ability to penetrate high-threat air defense areas. The Navy and the Marine Corps supported the Army position on ATACMS and the Army confirmed the Marine Corps' use of the Hornet as its organic deep attack and CAS system in the MARFOR AO.[147]

The philosophical differences manifested during the Roles and Missions Commission clearly show that while the JFC may have unity of command, through Combatant Command (COCOM), over his subordinates, he does not have full unity of effort.[148] The creation of the JFOFC will take the necessary steps to correct this problem. Instead of the component commanders focusing on their areas of responsibility exclusively, the JFOFC will ensure that unity of effort is achieved in all warfare mediums -- land, sea, air, and space. The JFOFCC will ensure the integration of all command and control systems. In the absence of a specified JFOFC, the JFC may designate the deputy JFC as the standing JFOFC to accomplish operational integration. During the Gulf War, General Schwarzkopf initiated a similiar system with General Calvin Waller, Deputy CINC. General

Waller had oversight responsibility of the target review process -- an Army initiative. This was not the full role of the JFOFC described; however, it is a step toward that end.[149]

The second step is to change the current procedures for FSCMs, airspace control measures (ACMs), and air defense control measures. The JFOFCC would serve as the JFC's executive agent on the management of these three areas. At the theater level the integration of these three areas is a complex endeavor since the Air Force, Navy, Marine Corps and the Army use different systems.

For the integration to be effective there must be detailed planning in the JFOFCC and decentralized execution, all four services must have a common communications and an IFF capability, and there must be one set of permissive and procedural controls.

Common Communications

The JFOFCC must conduct a detailed METT-T (mission, enemy, troops, terrain -- time available) analysis of the theater – in each area of responsibility as well as the combat and communications zone -- to determine the control requirements. (see appendices 4 & 5)[150]. The tendency is to focus on the LCC or the amphibious area of operations, and then deconflict problems as they occur. The problem is wasted time in clearing targets and the inefficient use of resources. If the METT-T is properly conducted the JFC will be able to conduct precision depth and simultaneous attacks against high payoff targets.

The detailed planning allows for the deconfliction of preplanned deep missile fires with fixed and rotary wing aircraft.

With all of the services having a common communications and an IFF capability, units will be able to quickly pass information to protect friendly assets, and to minimize sensor to shooter times. The requirement to have 30 minutes to clear airspace prior to the launch of an ATACMS missile, as happened in the Gulf War, with these capabilities is unrealistic.

A common relevant picture, provided through a common communications network, that the Army alluded to during the Roles and Missions Commission study allows air-power commanders to quickly identify the front line trace of troops. It also allows ground commanders to locate friendly

aircraft when conducting tactical fire direction to engage a perishable HPT. With this type of system in place, the coordination required would drop considerably. The only real requirement for coordination would be for SOF teams that are deployed beyond the FSCL, in the combat zone or in the communications zone. There may be an operational security reason as to why their location can not be disseminated.

Positive Control

The current concepts of positive and procedural control are necessary; however, one set of controls would be more effective. For positive control, the clearance of immediate missile fires -- ATACMS, cruise (subsurface, surface, and air-launched), or ballistic. Future computer technological capabilities will enhance coordintion and positive control. With the increased capability of computers the execution of depth and simultaneous attack will become much faster.

An example of pending technology is the Army's Battle Command System (ABCS). The ABCS is a system of systems. It connects sensors with shooters. The fire direction centers of shooters, like ATACMS, Hawk, or a Poseidon (IRBM) will communicate with sensors like JSTARS, AWACS, or ABCCC as well as higher headquarters (HQ) elements, like the BCD. If the target is identified by a sensor, like a SOF team, the target is passed through the HQ where its status is monitored. The target is cleared and passed to the advanced Field Artillery tactical data system (AFATDS) where it will determine if a SEAD program is required. If a SEAD proagram is required, subordinate corps FSEs will plan the program for targets in their AO.

Simultaneously, the Contingency Theater Automated Planning System (CTAPS) will determine if any preplanned sorties from the ATO are capable of attacking the target. If there are available sorties then the directions are passed to the controllers such as the airborne battlefield command and control center (ABCCC) or airborne warning and control system (AWACS) to engage and destroy the target. The controllers will also determine if any airframes are in danger. If they are, then the AWACS will vector them to a safe area. If the fire support platform is a naval vessel, then its fire direction computer would perform the same functions as the AFATDS. In the event the munition selected to destroy the enemy HPT is a cruise missile, fired from a submerged submarine,

the digitial traffic could be passed through a satellite for clearance and fire commands. All of these actions minimize the inherent delays in the current system of three different combat function control systems (FSCMs, ACM, and ADA control measures).

The speed of the operational fire is based on the quality of the data bases of the computers involved. The JFOFCC is responsible for collecting the materials for building the data base for the control procedures for theater system, like ABCS. This ensures a common relevant picture.

Procedural Control Measures

While positive control is desirable, it is not always possible due to battlefield conditions and inherent system vulnerabilities. Facilities for positive control are subject to direct attack, sabatoge, adverse weather conditions or jamming. Procedural control provides a backup system that overcomes positive control vulnerabilities. It relies upon techniques such as segmenting the airspace by volume and time, and using weapon system statuses.[151] The procedural operational fire control measures (OFCMs) should focus on permissive and restrictive management. These measures are applicable for corps and echelon above corps level only; therefore tactical measures such as CFLs and RFLs normally will not be used. However, the same measures do have relevance for tactical forces. The approach on employing OFCMs should be established based on a METT-T anaylsis, and planned in concert with the JFC's plan for operational fires.

Joint Publication 3-52, Doctrine for Joint Airspace Control in the Combat Zone, lists 29 different airspace procedural control measures used by the different services. When the airspace measures are combined with the seven FSCMs, and four maneuver control measures, the impact of the potential combinations may be unknown until the enemy is engaged.[152] This makes command and control very complex. Listed below are some of the control measure that apply at the theater level.

PERMISSIVE		RESTRICTIVE
	FSCMs	
FFA		ACA
FSCL		NFA
	ACMs	
		Coordinating Altitude

		HIDACZ
		ROA/ROZ
MRR		SAAFR
		AIR CORRIDOR
	ADCMS	
WEZ (JEZ)		WEZ (FEZ / MEZ – HIMEZ/LOMEZ/FAADEZ)
Weapons Free Zone		ADOA (ADAA/ADA/ADIZ)

A way to integrate these measures with the weapons systems available to the JFC is using the weapon control status procedures the air defense artillery employs. "The weapons control status provides a relative degree of control of the air defense system fires. Weapons control statuses apply to weapons systems, volumes of airspace, or types of air platforms."[153] The control status reflects the degree of permission/restriction available to the operator of the weapons system. Weapons Free allows the operator to fire at any target not positively identified as friendly. Weapons Tight allows the operator to engage a target positively identified as enemy. Weapons Hold restricts the operator from firing unless in self defense or with an explicit order. An example of nine control measures (listed down the side) with the four systems (across the top) may look like the chart below. The operational fire control measures are the FSCL, the FFA, the NFA, the Air Transit Route [this is a non-doctrinal term that combines the airspace coordination area (ACA), minimum risk route (MRR), air corridor, and standard use Army aircraft flight route (SAAFR], the high-density airspace control zone (HIDACZ), the restricted operations area (ROA)/ restricted operations zone (ROZ), the joint engagement zone (JEZ), the weapons free zone (WFZ), and the air defense operations area (ADOA). The weapons systems are ATACMS, air-breathing systems (rotary and fixed-wing aircraft), non-air-breathing systems (ballistic, cruise, and air defense missiles), and SOF.

	ATACMS	AB SYSTEMS	NAB SYSTEMS	SOF
FSCL	FREE	FREE	FREE	N/A
FFA	FREE	FREE	FREE	N/A
NFA	HOLD	<---------MUST SPECIFY---------->		YES
ATR	TIGHT	TIGHT	TIGHT	N/A
HIDACZ	TIGHT	<---------MUST SPECIFY---------->		N/A
ROZ/ROA	HOLD	HOLD	HOLD	N/A
JEZ	FREE	FREE	FREE	N/A
WFZ	FREE	FREE	FREE	N/A
ADOA	FREE	FREE	TIGHT	N/A

When the weapon control status methodology is used in conjunction with IFF and a common relevant picture, available through electronic means, control of integrated weapons systems are much less complex. The advantage to this system is that rather than employing service specific elements of TAGS to manage and control assets, the JFOFCC under the direction of the JFOFC is able to execute operational fires much more effectively and efficiently.

CHAPTER 5

CONCLUSIONS

There can never be too many projectiles in a battle. Whether they are thrown by cannon, rockets, or recoilless devices is immaterial. The purpose of all these instruments is identical -- namely, to deluge the enemy with fire. Nor is it necessary that these projectiles be discharged on the ground.

General George S. Patton, JR.[154]

General Patton's comment concerning intensity on the battlefield, reflected through the number of projectiles is extremely insightful. The general's observations suggest activity but not necessarily accomplishment. Activity does not, however, equate to the precision and accuracy that are required when engaging targets. As such, the military must have a coherent methodology on how it intends to prosecute conflict. Otherwise it has misdirected activity and no accomplishment.

The methodology of how wars are fought and how the military employs its technology (projectiles) is the result of the military's doctrine. The type of projectiles the military uses is a reflection of the nation's technological abilities. The combat formations involved in fighting comprise the organizational structure of the military. Each of these elements -- doctrine, technology, and organizational structure -- are connected as functions of time and capability. The interaction of doctrine, technology, and organizational structure are linked in a dynamic process that suggests an ongoing evolution and results in the success or failure of the military. If there is too great of a divergence in one direction or another the military may be defeated.

Doctrine evolves from three sources: lessons learned during operations, the infusion of new technologies, and external influences. It is used to develop combat potential for the nation, enhance interoperability, and win the nation's wars. Improvements in technology have caused significant changes in the style and approach the military takes toward conflict. Dovetailed with the recent infusion of new technological abilities was the Goldwater-Nichols Department of Defense Reorganization Act. This law was a milestone in the evolution of joint warfare.

Prior to the Act the services used individual service doctrine and TTPs. At the end of the Vietnam War some of the services tried to develop multi-service initiatives to enhance

interoperability. Since then joint doctrine has evolved through a system of top-down initiation and bottom-up development. The process results in a doctrine of least disagreement from the services.

The Act made two other significant changes in the Department of Defense. The first change was shifting more authority to the theater commanders-in-chief. This piece of legislation along with the technological developments of the 1980s and 1990s shifted the role of the JFC from battlefield manager to warfighter. As the individual responsible for linking battles and engagements to operational objectives and strategic endstates, the JFC became a more active player in the operational level of war.

The second change made the Chairman of the Joint Chiefs of Staff (CJCS) the executive agent for the development of joint doctrine. Since then joint doctrine has developed slowly. The tendency was to follow service doctrine if at all possible. By making the doctrine authoritative, the CJCS forced the services to follow joint doctrine. This served to increase interoperability. Unfortunately the doctrine failed to maximize the emerging technology.

Prior to the Act, the JFC's goal was to generate and decisively apply combat power within the theater. Theater commanders employed fixed-wing aircraft, SOF, missile artillery, and ADA missile systems, or influenced the campaign through their subordinate commanders. The development of the ATACMS missile and cruise missile systems allowed JFCs to engage enemy targets well beyond the corps forward boundary. Along with the capability came the requirement to control the resources. In this area the doctrine and organizational structure failed to match the capability of available technology.

Each of the services provide the JFC unique capabilities. The Army provides rotary-wing aviation, rocket and missile artillery, and air defense missile systems. The Air Force provides fixed-wing air frames -- fighter, fighter bomber, bomber, electronic combat, and reconnaissance -- cruise missiles, and space systems. The Navy provides subsurface, surface and air launched cruise missiles, intermediate range ballistic missiles, and fixed-wing air frames. The Marine Corps has missile artillery and fixed-wing air frames. The special operating forces provide unique capabilities that can augment conventional forces or operate independently.

With each set of capabilities comes a service specific philosophy. This philosophy affects weapons employment and doctrine development. It ultimately affects interoperability. There is an inherent tension that builds during joint operations because of differing philosophies. This tension does not suggest that American citizens, in uniform, are going to work against each in other combat at the expense of their fellow countrymen. It does however, illustrate that the fundamental beliefs about the employment of the combat functions, in each medium -- ground, sea, and air -- must evolve for the military to remain effective as a future fighting force.

This obstacle is not new. General Bradley commented about it in 1949. Since then, the Act has influenced military operations. General Colin Powell's message in the front of Joint Publication 1, Joint Warfare of the US Armed Forces, shows the different ways the services view themselves when they go to war.[155] In the Army, soldiers fight as a team, as the member of a unit -- something larger than himself, yet 'in harm's way' -- who can directly enter the fight as a player. In the Air Force, the pilot fights by himself -- 'there's no one better' -- who directly affects how his weapons system gets to the fight, completes the mission and returns home. In the Navy, the sailor fights as the member of a ship -- something larger then himself, yet a metallic hull -- with no input on the way the ship is fought . And lastly the Marine [the only serviceman that the CJCS capitalized], fights as an individual -- there is no better infantrymen in the world -- who controls his own destiny. These mental models still affect how the services approach conflict. Additionally, the size and complexity of the battlefield has grown since General Bradley made his comments . At the theater level, systems designed and proven at the corps level and below may not be effective.

Current FSCMs, ACMs, and ADA control measures do not integrate at the theater level. The organizational structures designed to manage the air-ground operations are focused on the needs of subordinate commanders and not on the intent and changing needs/opportunities of the JFC. There is no organization that currently focuses all combat functional capabilities at the theater level. The result of this deficiency may be missed opportunities, wasted resources and unnecessary risk to friendly forces. During the Gulf War General Schwarzkopf attempted to resolve the air-ground interface by using his deputy CINC, General Waller, as the oversight for subordinate

air nominations.

The Gulf War was the first conflict that demonstrated this challenge of maintaining unity of effort while employing the increased capabilities of newly fielded technology available to the JFC. Examples are the ATACMS and Patriot missiles which were fired for the first time.

The doctrine used to manage the theater airspace is TAGS which is not a formal system, but a conglomeration of service systems. It includes three types of control: positive and procedural through the Army A^2C^2 system, positive control for the Air Force TACS, and control by negation by the Navy. These three systems do not integrate indirect fires (artillery, cruise, or ballistic missiles) or ADA fires.

Fire Support Coordinating Measures are either restrictive or permissive. They offer force protection or facilitate the rapid attack of targets. The ADA control measures establish weapons control statuses and provide guidance on airspace defense.

The OFCM provides the JFC with a system of permissive and restrictive procedural control measures. The OFCMs are the synthesis of the current FSCMs, ACMs, and ADA control measures. They focus only on those control measures that are relevant at the corps-level and above. They combine like functions across the three systems and establish weapons control. The restrictive measures function as a method of force protection and restrict access to terrain, structures, or formations. The permissive measures open terrain, permitting increased responsiveness in engaging enemy targets. When combined, positive and procedural countermeasures provide a robust, integrated system. It is a system that can apply across all services. It facilitates the rapid engagements of HPTs, provides force protection as needed, and allows a common body of terms for the services.

The positive measures, through IFF and other electronic systems, allow for a common relevant picture across the theater. Common communications means facilitate the positive control, and allow minimum sensor-to-shooter times for the engagement of HPTs. The employment of positive and procedural control measures provide depth to the JFC.

The organization that integrates the combat functions of the component commanders is the

JFOFCC. The JFOFCC ensures that unity of effort and synchronization of available combat power is achieved to attain operational objectives.

The future of military operations is clearly changing. "Advances in technology are likely to continue to increase the tempo, lethality, and depth of warfare. Joint doctrine should be flexible enough to recognize the impact of emerging technologies and integrate emerging advances that may provide the Armed Forces of the United States with a decisive advantage."[156] At the center of the advances is the ability to conduct depth and simultaneous attacks that TRADOC Pam 525-5 discusses. The senior leadership of the country has also recognized this requirement and offered the following comments.

> The ability to precisely strike targets deep in the heartland of a potential adversary is a critical operational capability of our Armed Forces. The military services field an expanding arsenal of deep attack munitions, which can be delivered from a variety of platforms -- land- and sea-based tactical aircraft, long-range bombers, sea-based cruise missiles, and land-based ballistic missiles.[157]

These capabilities further demonstrate the phenomenon of the expanding battlefield, and the role of the JFC as a warfighter. This mandates the need to adjust doctrine and organizational structure to match technological realities. Failure to do so will result in misfortune stemming from a failure to learn, a failure to adapt, and the failure to anticipate when the time was available.

ENDNOTES

1. Field Manual 100-5, Operations, (Washington, DC: US Government Printing Office,1993), vi.

2. See Eliot A. Cohen and John Gooch, Military Misfortunes The Anatomy of Failure in War, (The Free Press: New York, 1990) for a review of examples of previous military failures. They identify three causes of failure in organizations: failure to learn, failure to adapt, and failure to anticipate. A combination of any two failures is an aggregate failure, and the combination of all three types of failure is a catastrophic failure.

3. Harold R. Winton, "Partnership and Tension: The Army and Air Force Between Vietnam and Desert Shield." Parameters. XXVI (Spring 1996): 105, 109.

4. Douglas C. Lovelace Jr. and Thomas-Durell Young, Strategic Plans, Joint Doctrine and Antipodean Insights, (Carlisle Barracks: Strategic Studies Institute, U. S. Army War College, 1995), 10.

5. Lovelace and Young, 7.

6. Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms (Washington, DC: US Government Printing Office, 1994), 276.

7. Field Manual 101-5 (Final Draft), Command and Control for Commanders and Staff, (Washington, DC: US Government Printing Office, 1993), 1-1; states that "Command includes the authority and responsibility for effectively using available resources a commander employs in planning, organizing, directing, coordinating, and controlling military forces for the accomplishment of assigned missions." "Commanders use control to regulate forces and functions on the battlefield to execute the commander's intent." (1-18) "The command and control system enables the commander to use his military leadership skills to press and sustain that end." (1-1) "Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures a commander employs in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission." (1-1).

8. Thomas A. Keaney and Eliot A. Cohen, Gulf War Air Power Summary Report, (Washington, D.C.: US Government Printing Office, 1993), 200; in some fire missions the Army fired more than one missile.

9. Field Manual 100-103-2, Multiservice Procedures for the Theater Air-Ground System, (Washington, DC: US Government Printing Office, 1994), 8, 22, 26, 35, 42.

10. Field Manual 100-103-2, Multiservice Procedures for the Theater Air-Ground System, (Washington, DC: US Government Printing Office, 1994), 73; Harold R. Winton, "Partnership and Tension: The Army and Air Force Between Vietnam and Desert Shield." Parameters. XXVI (Spring 1996):114. By 1990 the Army and Air Force disagreed significantly over two issues: the amount of influence that senior ground commanders should have over Air Force interdiction operations, and the mechanisms for coordinating the effects of fixed-wing air and extended-range Army systems....[A]t the tactical level there [is] significant agreement [between the Army and Air Force], [yet] at the operational level views are noticeably divergent.

11. Joint Publication 3-09 (Second Draft), Doctrine for Joint Fire Support, (Washington, DC: US Government Printing Office, 1995), I-4, I-5, I-6, I-7.

12. Training and Doctrine Command Pamphlet 525-XXX (Draft), U.S. Army Operational Concept for Army Airspace Command and Control (A^2C^2), (Washington, DC: US Government Printing Office, 13 April 1995), 2.

13. United States Army Field Artillery Center and School, Directorate of Combat Developments. Program and Project Summary Sheet. (Fort Sill, Oklahoma: United States Army Field Artillery Center and Fort Sill, May 1995), 31-1, 31-2, 32-1, 32-2, 33-1, 33-1.

14. Robert H. Scales Jr., Terry L. Johnson, and Thomas P. Odom. Certain Victory: The US Army in the Gulf War. Office of the Chief of Staff, United States Army. (Washington, DC: US Government Printing Office, 1993; a selected reprint, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 1994), 368.

15. Joint Publication 1-02, 120.

16. Ibid, 60.

17. Field Manual 100-15, Corps Operations, (Washington, DC: US Government Printing Office, 1995), 1-10.

18. Field Manual 71-100 (Approved Final Draft), (Division Operations. Washington, DC: US Government Printing Office, June 1995), 1-11.

19. United States Army Command and General Staff College Student Text 100-3, Battle Book: Center for Army Tactics, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1995), 3-3, 3-4; and Field Manual 71-100 (Approved Final Draft), (Division Operations. Washington, DC: US Government Printing Office, June 1995), 1-7, 1-8, 1-9.

20. Field Manual 100-15, Corps Operations, (Washington, DC: US Government Printing Office, 1989), 2-5; and John H. Cushman, Thoughts for Joint Commanders, (Annapolis, Maryland: Whitmore Printing, August, 1993), 24.

21. United States Army Program Executive Office for Tactical Missiles, Project Book: Close Combat, Fire Support, Forward Area Air Defense Tactical Missile Systems, (Redstone Arsenal, AL: Program Executive Office, January, 1996), II-2-1.

22. Ibid.

23. Ibid.

24. Field Manual 100-103-2, 12.

25. United States Army Program Executive Office for Tactical Missiles, Project Book: Close Combat, Fire Support, Forward Area Air Defense Tactical Missile Systems, II-8-1.

The missile will engage targets throughout the corps area of influence and is designed to destroy tactical missile launchers, suppress air defense, counter C^3 (command, control, and communications complexes) and disrupt logistics.

26. Ibid, II-8-3.

27. David Johnson, Assistant TRADOC Systems Manager - ATACMS. Interview by the Author, 17 April 1996, Fort Leavenworth, Kansas, Verbal Interview. Fort Leavenworth, Kansas: School of Advanced Military Studies.

According to Fort Sill, as of the writing of this paper, there are no unclassified published areas of coverage.

28. Ibid.

29. United States Army Program Executive Office for Tactical Missiles, Project Book: Close Combat, Fire Support, Forward Area Air Defense Tactical Missile Systems, II-8-5.

30. Ibid; The BAT is a non-powered, dual tandem shaped charge submunition with acoustic and infrared seekers. The target set for BAT is moving armored formations. The target sets for BAT (P3I) are sitting armored formations, artillery positions, moving and stationary surface-to-surface missile transporter-erector launchers (TEL).

31. United States Army Program Executive Office for Tactical Missiles, Project Book: Close Combat, Fire Support, Forward Area Air Defense Tactical Missile Systems, (Redstone Arsenal, AL: Program Executive Office, January 1996), II-8-7; and Headquarters, United States Department of the Army, Weapons Systems, (Washington, DC: US Government Printing Office, 1995), 137,139.

32. United States Army Program Executive Office for Tactical Missiles, Project Book: Close Combat, Fire Support, Forward Area Air Defense Tactical Missile Systems, II-8-7.

33. United States Army Field Artillery Center and School, Directorate of Combat Developments, Program and Project Summary Sheet, (Fort Sill, Oklahoma: United States Army Field Artillery Center and Fort Sill, 1 May 1995), 33-2; and Headquarters, United States Department of the Army, (Weapons Systems, (Washington, DC: US Government Printing Office, 1995), 137,139.

34. David Johnson, Interview.

35. United States Army Command and General Staff College Student Text 100-3, Battle Book: Center for Army Tactics, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1995), 7-1.

36. Field Manual 44-100, U.S. Army Air Defense Operations, (Washington, DC: US Government Printing Office, 1995), 1-1; and United States Army Command and General Staff College Student Text 100-3, Battle Book: Center for Army Tactics, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1995), 7-1.

37. United States Army Command and General Staff College Student Text 100-3, 7-15.

38. Ibid, 7-7.

39. Field Manual 44-100, U.S. Army Air Defense Operations, (Washington, DC: US Government Printing Office, 1995), 1-6; and "PAC-3." Army. 12 (December 1995): 20.

"Since the Gulf War the Army is developing the next version of the Patriot missile. The Patriot Advanced Capability-3 (PAC-3) air defense system is emerging as a vital component of the United States' tactical ballistic missile defense (TBMD) system. Initial fielding of the PAC-3 missile is planned for 1998.

The PAC-3 missile has no explosive warhead; it employs hit-to-kill technology to intercept and destroy the target through kinetic energy. The PAC-3 system will help protect friendly forces from cruise missiles and other air-breathing air defense threats as well as TBMD threats.

The PAC-3 missile is a ground-launched "fire and forget" weapon. It is inertially guided to a predicted impact point that is provided by a fire-solution computer from data supplied by the Patriot radar.

PAC-3 launchers will be incorporated into the Patriot battery configuration.... The baseline Patriot battery would consist of two PAC-3 (PAC-2-capable) launchers, one PAC-2 (PAC-3-capable) launcher and five PAC-2-only launchers, along with an engagement control station, fire control radar, antenna mast group and electrical plant systems.

PAC-3 launchers will reduce the chance of TBM defense saturation because they provide a four-to-one firepower enhancement. There are 16 PAC-3 missiles per launcher compared with four Patriot missiles per launcher."

40. Robert H. Scales, Jr., Terry L. Johnson, and Thomas P. Odom, Certain Victory: The US Army in the Gulf War, Office of the Chief of Staff, United States Army, (Washington, DC: US Government Printing Office, 1993; a selected reprint, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 1994),367; and Richard Moody Swain, "Lucky War" Third Army in Desert Storm, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 1994), 177.

On 18 January, seven Scud missiles fell on Israel, followed by one on Dhahran. The decision, taken during Internal Look, to make the 11th Air Defense Brigade a theater air defense asset now proved to have been wise indeed. Patriot missiles, by their rapid response and evident success in intercepting incoming Scuds, quickly restored confidence to those in the target areas, whatever the missiles' practical value in destroying Scud warheads.

41. United States Army Command and General Staff College Student Text 100-3, 7-15.

42. Ibid.

43. Field Manual 100-15, Corps Operations, (Washington, DC: US Government Printing Office, 1989), A-11; and United States Army Command and General Staff College Student Text 100-3, Battle Book: Center for Army Tactics, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1995), 7-7.

44. Field Manual 100-1, The Army, (Washington, DC: US Government Printing Office, June 1994), Foreword.

45. Field Manual 100-5, 1-1.

46. Ibid, 1-2.

47. Field Manual 100-103-2, 13.

48. Ibid.

49. Field Manual 101-5-1 (Final Draft), Operational Terms and Symbols, (Washington, DC: US Government Printing Office, July 1995,) 1-20.

50. Training and Doctrine Command Pamphlet 525-XXX (Draft), U.S. Army Operational Concept for Army Airspace Command and Control (A^2C^2), (Washington, DC: US Government Printing Office, 13 April 1995), C-1; Field Manual 100-103-1, $ICAC^2$, Multi-Service Procedures for Integrated Combat Airspace Command and Control, (Washington, DC: US Government Printing Office, 1994), A-3; Also see FM 100-103, Army Airspace Command and Control in Combat Zone, (Washington, DC: US Government Printing Office, 1987).

Functional operations which require airspace and must be integrated and synchronized with other friendly combatant forces by means of the A^2C^2 system include--

- Fire support operations,
- Air defense artillery (ADA) operations,
- Army aviation operations,
- Special electronic mission aircraft (SEMA) operations,
- Heliborne electronic warfare operations,
- Remotely piloted vehicle operations,
- Intratheater airlift operations,
- Amphibious operations, and
- Joint and combined arms operations.

51. TRADOC Pam 525-XXX (Draft), 5.

52. Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms, (Washington, DC: US Government Printing Office, 1994), 294 and 301; also see Training and Doctrine Command Pamphlet 525-XXX (Draft), U.S. Army Operational Concept for Army Airspace Command and Control (A^2C^2), (Washington, DC: US Government Printing Office, 13 April 1995), 3, and Field Manual 1-111, Aviation Brigades, (Washington, DC: US Government Printing Office, 1990), H-10.

53. Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms, (Washington, DC: US Government Printing Office, 1994), 294 and 301; also see Training and Doctrine Command Pamphlet 525-XXX (Draft), U.S. Army Operational Concept for Army Airspace Command andControl (A^2C^2), (Washington, DC: US Government Printing Office, 13 April 1995), 3.

54. Field Manual 1-111, H-11.

55. Ibid.

56. Field Manual 100-103-2, 70.

Coordinating Altitude. A coordinating altitude separates fixed- and rotary-wing aircraft. The Airspace Control Authority (ACA) approves the coordinating altitude, which is normally specified in the Airspace Control Plan (ACP). The ACA is the final approving authority for changes, which are requested through airspace coordination channels. Fixed- or rotary-wing aircraft planning extended penetration of this altitude, when possible, will notify the appropriate airspace control facility; however, approval acknowledgement is not required.

High-Density Airspace Control Zone (HIDACZ). An HIDACZ is an area of airspace in which employment of weapons and airspace users is concentrated. The zone has defined dimensions, which usually coincide with geographical features/navigational aids. The ground commander nominates an HIDACZ and the ACA approves it. Preplanned HIDACZs, which are based on threat, friendly operations, and minimum risk routes, are included in the ACP. The requesting authority normally controls access to air defense weapons status within an HIDACZ.

Restricted Operations Area/Restricted Operations Zone (ROA/ROZ). ROAs and ROZs are synonymous for defining a volume of airspace set aside for a specific operational mission. They are normally used for drop or landing zone activity, search-and-rescue operations, and so forth. Controlling authority requirements for
the ROA/ROZ are similar to those required for an HIDACZ.

Minimum-Risk Routes. Minimum risk routes are temporary corridors recommended for use by high-speed, fixed-wing aircraft. These routes present
the minimum known hazards to low-flying aircraft transiting the combat zone. The ground component commander recommends the routes and the ACA approves them. They normally extend from the corps rear boundary to the FSCL and may extend below the coordinating altitude.

Standard-Use Army Aircraft Flight Routes (SAAFRs). SAAFRs are established below the coordinating altitude to allow safe movement of aviation assets performing combat support and combat service support missions. These routes
do not need ACA approval. They are normally located in the corps through brigade rear areas but may be extended to support logistics missions.

Also see Field Manual 90-20, Multi-Service Procedures for Joint Application of Firepower, (Washington, DC: US Government Printing Office, February 1994).

57. Ibid, 68.

58. Field Manual 100-103-2, Multiservice Procedures for the Theater Air-Ground System, (Washington, DC: US Government Printing Office, 1994), 68-69; Field Manual 6-20-30, Tactics, Techniques, and Procedures for Corps and Division Operations, (Washington, DC: US Government Printing Office, 1989), Appendix F. FM 6-20-30 discusses each of the terms; The Army doctrinal definitions are from Field Manual 101-5-1 (Final Draft), Operational Terms and Symbols, (Washington, DC: US Government Printing Office, July 1995), 1-32,1-19, 1-34.

Fire Support Coordination Line (FSCL) - A line established by the appropriate ground commander to ensure coordination of fire not under his control but which may affect current tactical operations. The FSCL is used to coordinate fires of air, ground, or sea weapons systems using any type of ammunition against surface targets. The FSCL should follow well-defined terrain features. The establishment of the FSCL must be coordinated with the appropriate tactical air commander and other supporting elements. Supporting elements may attack targets forward of the FSCL, without prior coordination with the ground force commander, provided the attack will not produce adverse surface effects on, or to the rear of, the line. Attacks against surface targets behind this line must be coordinated with the appropriate ground force commander.

Coordinated Fire Line (CFL) - A line beyond which conventional surface fire support means (mortars, field artillery, naval gunfire ships) may fire at any time within the zone of the establishing HQ without additional coordination. It is usually
established by brigade or division, but may be established by a maneuver battalion. (The term no-fire line is used by other NATO nations for a CFL.)

Free Fire Area (FFA) - A specific designated area into which any weapon system may fire without additional coordination with the establishing headquarters.

59. Field Manual 100-103-2, Multiservice Procedures for the Theater Air-Ground System, (Washington, DC: US Government Printing Office, 1994), 69; Field Manual 6-20-30, Tactics, Techniques, and Procedures for Corps and Division Operations, (Washington, DC: US Government Printing Office, 1989), Appendix F. FM 6-20-30 discusses each of the terms; The Army doctrinal

definitions are from Field Manual 101-5-1 (Final Draft), Operational Terms and Symbols, (Washington, DC: US Government Printing Office, July 1995), 1-62,1-4, 1-50.

Restrictive Fire Line (RFL) - A line established between converging friendly forces (one or both may be moving) that prohibits fires or effects from fires across the line without coordination with the affected force. It is established by the commander of the converging forces.

Restrictive Fire Area (RFA) - An area in which specific restrictions are imposed and into which fires that exceed those restrictions may not be delivered without prior coordination with the establishing headquarters.

No-Fire Area (NFA) - An area in which no fires or effects of fires are allowed. Two exceptions are (1) when establishing headquarters approves fires temporarily within the NFA on a mission basis, and (2) when the enemy force within the NFA engages a friendly force, the commander may engage the enemy to defend his force.

Airspace Coordination Area (ACA) - A block of airspace in the target area in which friendly aircraft are reasonably safe from friendly surface fires. It may occasionally be a formal measure (a three-dimensional box in the sky). More often, it is informal. The purpose of the ACA is to allow the simultaneous attack of targets near each other by multiple fire support means, one of which normally is air. Formal ACAs are usually established by a separate brigade or higher level command. Informal ACAs may be established as low as the task force (TF) level.

60. Field Manual 100-103-2, 69

61. Ibid, 72.

62. Ibid, 72, 73.

JOINT ENGAGEMENT ZONE (JEZ). The JEZ is airspace of specified dimensions within which multiple air defense weapon systems (SAMs and friendly fighters) of one or more services are simultaneously employed and operated.

FIGHTER ENGAGEMENT ZONE (FEZ). FEZs will normally be established in those areas where no effective surface-to-air capability is deployed. Operations conducted within a FEZ usually take place in airspace above and beyond the engagement ranges of surface-based (land and sea), short-range air defense systems and are an alternative type of engagement operation if the detailed control aspects of joint engagement operations cannot be met. From an air defense perspective, they are normally used when fighter aircraft have the clear operational advantage over surface-based systems. From an airspace control perspective, the FEZ provides airspace users with the location of the engagement zone for fighter aircraft for mission planning purposes.

HIGH-ALTITUDE MISSILE ENGAGEMENT ZONE (HIMEZ). Normally applied to long-range surface-to-air missiles, a HIMEZ will limit the volume of airspace within which these weapons may conduct engagements without the AADC's specific direction. From an air defense perspective, it is normally used when a high-altitude missile system has a clear operational advantage over using aircraft. From an airspace control perspective, it provides airspace users with location of the engagement zone of a high-altitude missile system for mission planning purposes.

LOW-ALTITUDE MISSILE ENGAGEMENT ZONE (LOMEZ). A LOMEZ is a volume of airspace established to control engagements of low- to medium- altitude surface-to-air missiles. Subject to weapon system capabilities, the LOMEZ will normally extend beyond the forward edge of the battle

area.

SHORT-RANGE AIR DEFENSE ENGAGEMENT ZONE (SHORADEZ). Normally, SHORADEZs are established for the local air defense of high-value assets. Areas of SHORAD deployment may fall within a LOMEZ or HIMEZ. Some areas may possibly be defended solely by SHORAD assets. A SHORADEZ can be established to define the airspace within which these assets will operate. Because centralized control over the SHORAD weapons may not be possible, these areas must be clearly defined and disseminated so friendly aircraft can avoid them. From an airspace control perspective, a SHORADEZ provides airspace users with location of the engagement zone of short-range air defense systems for mission planning purposes.

BASE DEFENSE ZONE. A base defense zone is a zone established around an air base limited to the engagement envelope of short-range air defense weapons systems defending that base. Base defense zones have established entry, exit, and identification friend or foe procedures.

The TAGS is not a formal system in itself, but the actual sum of various component air-ground systems. The TAGS mission is to enable the delivery of the maximum amount of combat power to the desired place at the right time. To accomplish this, everyone working within the TAGS must understand each component's capabilities, limitations, and contributions to the overall system. Everyone must strive to make the TAGS work by knowing system and coordination requirements, what is required to make the system work, and who to contact when coordination is required.

63. Ibid, 18.

64. Field Manual 100-13 (proposed initial draft), 1-2, 1-3.

65. Donald G. Oxford, "A Primer on the BCE." Field Artillery Journal. HQDA PB6-95-1 (February 1995): 30.

The four BCEs are 1st BCE at Fort Bragg North Carolina which supports Army Central Command (ARCENT) and XVIII Airborne Corps contingency missions; 2nd BCE in Birmingham, Alabama, is a Reserve BCE supporting United States Army Pacific (USARPAC); 7th Liaison Group which provides the core of the BCE supporting United States Army Europe (USAREUR)/Seventh Army; and Eighth Army BCE, OSAN, Korea, which supports the Combined Forces Command (CFC's) Ground Component Commander (GCC).

66. Ibid, 29.

67. Department of the Air Force Manual 1-1 Volume II, 126.

A classic example of the close working relationship necessary between air and ground forces for combined arms operations occurred during 1942-1945 (World War II). General George C. Kenney commander of the air forces supporting the Southwest Pacific Forces under the command of General Douglas MacArthur was instrumental in developing TTPs for the employment of airpower during General MacArthur's famous island hoping campaign.

68. Field Manual 100-13 (Proposed Initial Draft), 3-1.

69. Department of the Air Force Manual 1-1 Volume II, 72.

70. William J. Perry, Annual Report to the President and the Congress, (Washington, DC: US Government Printing Office, March 1996), 169.

71. Perry, 174.

72. Perry, 215.

73. Perry, 175.

74. Swain, 184.

75. Lovelace and Young, 8.

76. Department of the Air Force Manual 1-1 Volume II, 6.

77. Department of the Air Force Manual 1-1 Volume I, Basic Aerospace Doctrine of the United States Air Force, (Washington, DC: US Government Printing Office, March 1992), 6.

Aerospace control includes all missions whose objectives are designed to gain and maintain control of the aerospace environment.

Counterair missions are those whose objective is control of the air.

Counterspace missions are those whose objective is to control space. These missions include offensive and defensive aerospace control.

Offensive aerospace control operations seek out and neutralize or destroy enemy aerospace forces and ground-based defenses at a time and place of our choosing.

Defensive aerospace control operations detect, identify, intercept, and destroy enemy aerospace forces attempting to attack friendly forces or to penetrate the aerospace environment above friendly surface forces.

Strategic attack missions are aimed at destroying or neutralizing an enemy's war-sustaining capabilities or will to fight.

Interdiction missions delay, disrupts, divert, or destroys an enemy's military potential before it can be brought to bear against friendly forces.

Close Air Support directly supports the surface commander by destroying or neutralizing enemy forces that are in proximity to friendly forces.

Airlift projects power by transporting people and material without regard to surface obstacles.

Air Refueling increases the ability of aircraft by extending their range, payload, and endurance.

Spacelift projects power by transporting people and materiel to and through space.

Electronic Combat controls the electromagnetic spectrum by neutralizing or destroying the enemy's electromagnetic capabilities.

Surveillance and reconnaissance provides data needed for effective combat operations.

Special Operations perform a variety of missions.
Base Operability and Defense missions defend aerospace installations from attack, help aerospace forces survive such attacks, and return installations to full capability after attacks.

Logistics creates and sustains aerospace forces. This mission involves all such activities except those that are part of the combat support mission.

Combat Support provides essential services to aerospace organizations and their personnel in operational conditions.

On-Orbit Support keeps platforms in space operating as effectively and efficiently as possible.

These missions listed above were developed from lessons learned during the Gulf War. The aerial missions flown during the Gulf War included: Counter Air (offensive and defensive), Suppression of Enemy Air Defense (SEAD), Air Interdiction, Close Air Support (CAS), Tactical Surveillance and Reconnaissance, Electronic Combat, Special Operations, and Combat Search and Rescue.

78. Eliot A. Cohen, ed., Gulf War Air Power Survey. Vol. IV, Weapons , Tactics, and Special Operations. (Washington, D.C.: US Government Printing Office, 1993), 367 & 368.

79. Dennis Palzkill, "Making Interoperability Work," Proceedings, 118 (September 1991): 51.

80. Field Manual 100-103-2, Multiservice Procedures for the Theater Air-Ground System, (Washington, DC: US Government Printing Office, 1994), 26, 27; For a good article on differences between Air Force and Navy approaches to control see Dennis Palzkill, "Making Interoperability Work," Proceedings, 118 (September 1991): 50-54.

81. Field Manual 100-103-2, 27, 28.

82. Palzkill, 51.

83. Perry, 158.

84. Perry, 158,159.

85. Department of the Navy, Deputy Chief of Naval Operations, Resources, Warfare Requirements Assessments (N8), FORCE 2001, A Program Guide to the U.S. Navy, (Washington, DC: US Government Printing Office, 1995), 59-62.

86. William J. Perry, Annual Report to the President and the Congress, (Washington, DC: US Government Printing Office, March, 1996), 159; also see Charles C. Krilak, The 31st Commandant's Planning Guidance, A Marine Corps for the 21st Century, Marine Corps Association, August 1995), A-4, A-14.

87. Lovelace and Young, 8,9.

88. Ibid, 10.

89. Fleet Marine Force Manual 1, Warfighting, (Washington, DC: US Government Printing Office, 1989), 43-44.

90. Lovelace and Young, 10.

91. Naval Doctrine Publication 6, Naval Command and Control, (Washington, DC: US Government Printing Office, 1995) Foreword. See Chapter 1 endnote number seven for the Army's doctrinal view of command and control. NDP 6 discusses command and control (page7-10). There is The focus of naval command and control is the *commander.* Command is a function of authority, responsibility, and accountability.... Command implies *leadership* - the art of motivating people toward a common objective. Leadership is the foremost quality of command, instilling unit cohesion and sense of purpose. It is the catalyst that inspires effort, courage, and commitment. Leadership is the cornerstone of effective command.... The naval commander derives his authority form two sources -- official and personal. Official authority is a function of rank or position and is accorded by law. Personal authority is a function of influence and
charisma, stemming from experience, reputation, character, and personal example.... Throughout American history, the hallmark of command at sea has been the broad, undisputed authority of the ship's captain. Similarly, commander's of Marine expeditions have exercised broad authority as soldier-statesmen.... Control is the means by which a commander guides the conduct of operations. A commander commands by deciding what must be done and exercising leadership to inspire subordinates toward a common goal; he controls by monitoring and influencing the action required to accomplish what must be done.... Control can range from the broad control of military operations -- such as the policies issued by a theater commander -- to the specific, procedural control of individual weapons systems.... The naval commander monitors and guides the actions of his forces through a *command and control system* that extends his influence through the chain of command. A command and control system encompasses the facilities, equipment, communications, procedures, and personnel essential to commander for planning, directing missions assigned.

The discussion presented by NDP 6 closely parallels the explanation of battle command in the 1993 version of Field Manual 100-5, 2-14 through 2-16.

92. Krulak, A-14.

93. FM100-103-2, 32.

94. Palzkill, 51.

95. FM 100-103-2, 33, 34.

96. Ibid, 35, 36.

97. Joint Publication 3-05, Doctrine for Joint Special Operations, (Washington, DC: US Government Printing Office, 1992), I-3.

98. Ibid, II-1, II-2.

99. Joint Publication 3-05, Doctrine for Joint Special Operations, (Washington, DC: US Government Printing Office, 1992), II-2; For a brief overview of SOF activities see William J. Perry, Annual Report to the President and the Congress, (Washington, DC: US Government Printing Office, March, 1996), 199-202.

100. Joint Publication 3-05, I-2.

101. Gordon R. Sullivan, "Force XXI, A New Force for a New Century," ARMY, 5 (May 1994): 25.

102. TRADOC Pam 525-5, i.

103. Ibid, 1-1.

104. Ibid, 1-3.

105. Ibid, 2-11.

106. Ibid, 2-5.

107. The decision by the Bush Administration to change the military from a threat-based to capabilities-based was discussed by General Colin Powell during The Future of Warfare, Inaugural Annual Conference of The James A. Baker III Institute at Rice University on "C-SPAN", 26 November 1995.

108. Leo J. Baxter, "Field Artillery, Vision 2020." Field Artillery Journal. HQDA PB6-94-5 (November-December 1994): 10.

109. James J. Schneider, "The Theory of the Empty Battlefield," Journal of the Royal United Services Institute for Defense Studies. 3 (September 1987), 37.

110. TRADOC Pam 525-5, 3-1.

111. Ibid, Glossary. Definitions of the five battle dynamics are defined as follows:

Battle Command is the art of decision making, leading, and motivating soldiers and their organizations into action to accomplish missions: includes visualizing current state and future state, then formulating concepts of operations to get from one to another at least cost; also includes assigning missions, prioritizing and allocating resources, selecting the critical time and place to act, and knowing how and when to make adjustments during the fight.

Battlespace - components of this space are determined by the maximum capabilities of friendly and enemy forces to acquire and dominate each other by fires and maneuver and in the electromagnetic spectrum.

Depth and Simultaneous Attack is the simultaneous application of combat power against the enemy throughout the depth and breadth of the battlefield; objectives goes beyond defeating the enemy; objective is to accelerate enemy defeat.

Early Entry operations involving the initial deploying forces; they occur whenever the missions require the projection of U.S. forces from CONUS or elsewhere.

Combat Service Support the essential logistics functions, activities, and tasks necessary to sustain all elements of an operating force in an area of operations.

112. Ibid, 3-10.

113. Training and Doctrine Command Pamphlet 525-200-5, (Depth and Simultaneous Attack, (Washington, DC: US Government Printing Office, June 1994), 4.

114. Ibid.

115. James M. Dubik, Combat Power in Force XXI: Getting the Balance Right, (Unpublished, February, 1996), 8.

116. See Cohen and Gooch. They discuss the causes of military failure. The causes of aggregate failure that affect the military with respect to the evolution of doctrine with technology are a failure to learn, the failure to adapt, and the failure to anticipate.

117. Joint Publication 1, Joint Warfare of the US Armed Forces, (Washington, DC: US Government Printing Office, 1991), iii.

118. Cushman, 18.

119. Joint Publication 3-0, Doctrine for Joint Operations, (Washington, DC: US Government Printing Office, 1993), II-17.

120. Joint Publication 0-2, IV-3.

121. Joint Publication 3-56.1, Command and Control for Joint Air Operations, (Washington, DC: US Government Printing Office, November 1994) I-3.

122. Headquarters, United States Army Training and Doctrine Command, Corps Deep Operations (ATACMS, Aviation and Intelligence Support) Tactics, Techniques and Procedures Handbook, (Washington, DC: US Government Printing Office, 1990), 2-3 and Joint Publication 3-0, Doctrine for Joint Operations, (Washington, DC: US Government Printing Office, February 1995), GL-8.

123. Joint Publication 3-56.1, I-2.

124. Field Manual 100-103-1, ICAC^2, Multi-Service Procedures for Integrated Combat Airspace Command and Control, (Washington, DC: US Government Printing Office, 1994), 1-4; also see Joint Publication 3-56.1, Command and Control for Joint Air Operations, (Washington, DC: US Government Printing Office, November 1994), II-2, II-3, II-4, II-7.

125. Headquarters, United States Army Training and Doctrine Command, Corps Deep Operations (ATACMS, Aviation and Intelligence Support) Tactics, Techniques and Procedures Handbook, (Washington, DC: US Government Printing Office, 1990), 2-5; and Joint Publication 3-0, Doctrine for Joint Operations, (Washington, DC: US Government Printing Office, February 1995),GL-8. There is little additional material in Joint and service doctrine on the roles and responsibilities of the JFMCC.

126. Headquarters, United States Army Training and Doctrine Command, Corps Deep Operations (ATACMS, Aviation and Intelligence Support) Tactics, Techniques and Procedures Handbook, (Washington, DC: US Government Printing Office, 1990), 2-4; and Joint Publication 3-0, Doctrine for Joint Operations, (Washington, DC: US Government Printing Office, February 1995),GL-8. Most of the additional material on the JFLCC is available in FM 100-5, Operations, (Washington, DC: US Government Printing Office, June 1993); and FM 100-7, Decisive Force: The Army in Theater Operations, (Washington, DC: US Government Printing Office, June 1995).

127. Headquarters, United States Army Training and Doctrine Command, Corps Deep Operations (ATACMS, Aviation and Intelligence Support) Tactics, Techniques and Procedures Handbook, (Washington, DC: US Government Printing Office, 1990), 2-4; and Joint Publication 3-0, Doctrine for Joint Operations, (Washington, DC: US Government Printing Office, February 1995),GL-8; There is an indepth discussion on the roles and responsibilities of the JFSOCC in JP 3-05.3, Joint Special Operations Operational Procedures. (Washington, DC: US Government Printing Office, August 1993), IV.

At theater level, the JFSOCC is normally the commander of the theater special operations command (COMSOC). For subordinate joint forces, the JFSOCC is normally the commander of a joint special operations task force (JSOTF). The term JFSOCC is a generic term that refers to both the theater COMSOC and the commander of a JSOTF reporting to a joint force commander (JFC) subordinate to the theater combatant commander.

128. Joint Publication 3-0, I-7.

129. Lovelace and Young, 4.

130. Ibid, 11.

131. Joint Publication 3-0, II-20.

132. Cushman, 1.

133. Field Manual 100-7, 5-1.

134. Joint Publication 1-02, 192.

135. Ibid, 16.

136. Field Manual 100-7, 5-8.

137. Ibid, 5-3.

138. Ibid.

139. Crosby E. Saint, A CINC's View of Operational Art, The United States Naval War College, Operations Department, Rhode Island: The United States Naval War College Press, September 1990, reprinted by permission from Military Review, (September 1990): 76.

140. Field Manual 100-7, 5-7.

141. Joint Publication 1-02, 146.

142. Swain, 228.

143. Robert H. Scales Jr., Firepower in Limited War. (Washington, DC: National Defense University Press, 1990), 240.

144. Swain, 186.

145. Field Manual 100-13 (Proposed Initial Draft), Battlefield Coordination Detachment, (Washington, DC: US Government Printing Office, June 1995), 1-1; The BCD provides the close coordination between the Army and the JFACC to achieve the Army functional responsibility of synchronizing maneuver, fires, and interdiction within ARFOR defined areas of operation (AOs). The BCD provides representation at the JFACC joint air operation center (JAOC). The JAOC is hosted by the Air Operations Center (AOC) when the JFACC is provided by the Air Force; the Tactical Air Control Center (Navy TACC) when the JFACC is provided by the Navy; and the Tactical Air Command Center (Marine TACC) when the JFACC is provided by the Marine Corps.

146. Swain, 181.

147. John Gordon IV, "Deep Attack and CAS– Joint Roles and Missions." Field Artillery Journal. HQDA PB6-95-5 (November-December 1995): 6, 7.

148. Joint Doctrine defines combatant command is JP 1-02, 74.

Combatant Command is the nontransferable command authority established by title 10, United States Code, section 164, exercised only by commander of unified or specified combatant commands unless otherwise directed by the President of the United States or the Secretary of Defense. Combatant command (command authority) is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designing objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command (command authority) should be exercised through the commanders of subordinate organizations; normally this authority is exercised through the Service or functional component commander. Combatant command (command authority) provides full authority to organize and employ commands and forces as the combatant commander considers necessary to accomplish assigned missions.

FM 100-5, 2-5. Unity of Command means that all forces are under one commander.

FM 100-5, GL-9. Unity of Effort is the coordination and cooperation among all forces, not necessarily part of the same command structure toward a commonly recognized objective.

149. Swain,187.

150. Joint Publication 3-0, (appendix 4) II-20 & (appendix 5) II-18.

151. Field Manual 44-100, 5-10.

152. Joint Publication 3-09 (Second Draft), appendix F.

153. Field Manual 44-100, 5-12.

154. George S. Patton, JR., War as I Knew It, Annotated by Colonel Paul D. Harkins, (New York: Bantam Books, 1981), 337, 338.

155. Joint Publication 1, Message form the CJCS.

156. Joint Publication 3-0, II-1.

157. The White House, Office of the Press Secretary, Fact Sheet on Deep Attack Weapons Mix Study, (From: The White House [Publications-Admin@WhiteHouse.Gov] Reply-To: Publications@clinton.ai.mit.edu [Publications@clinton.ai.mit.edu], February 8, 1996), 1.

APPENDIX 01: JOINT A^2C^2 PROCEDURAL MEASURES

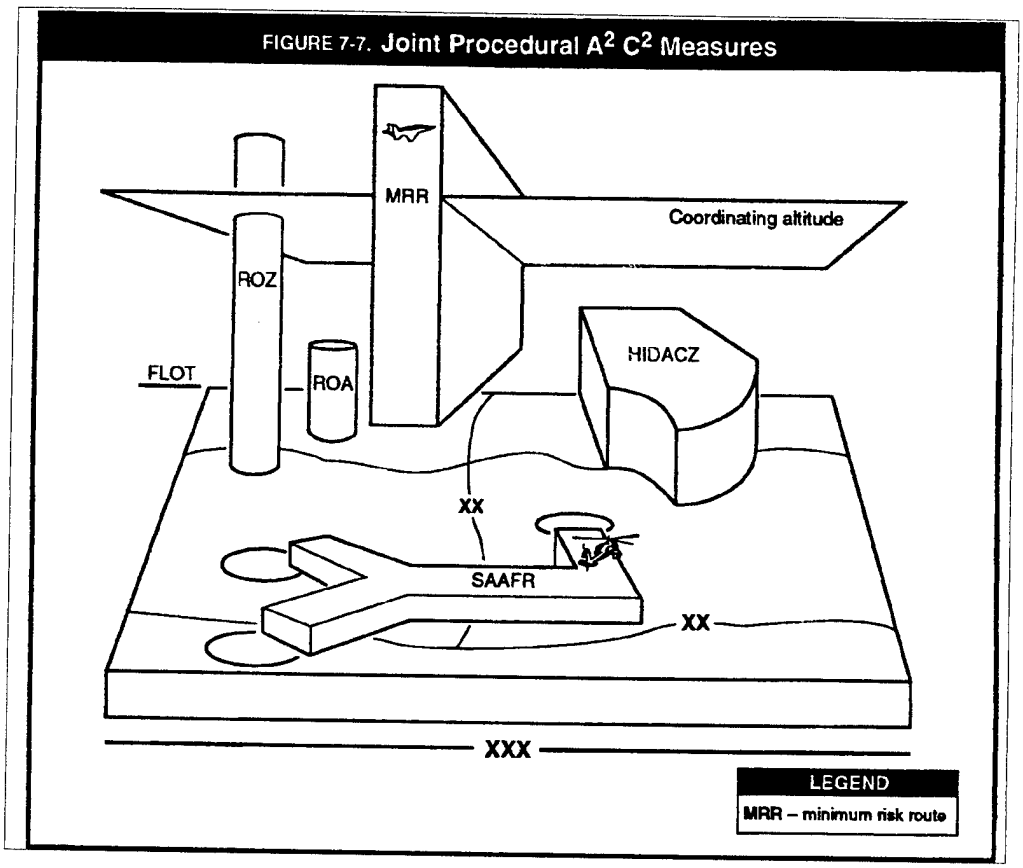


Figure 1 A^2C^2 PROCEDURAL MEASURES

APPENDIX 02: FIRE CONTROL MEASURES AFFECTING TAGS

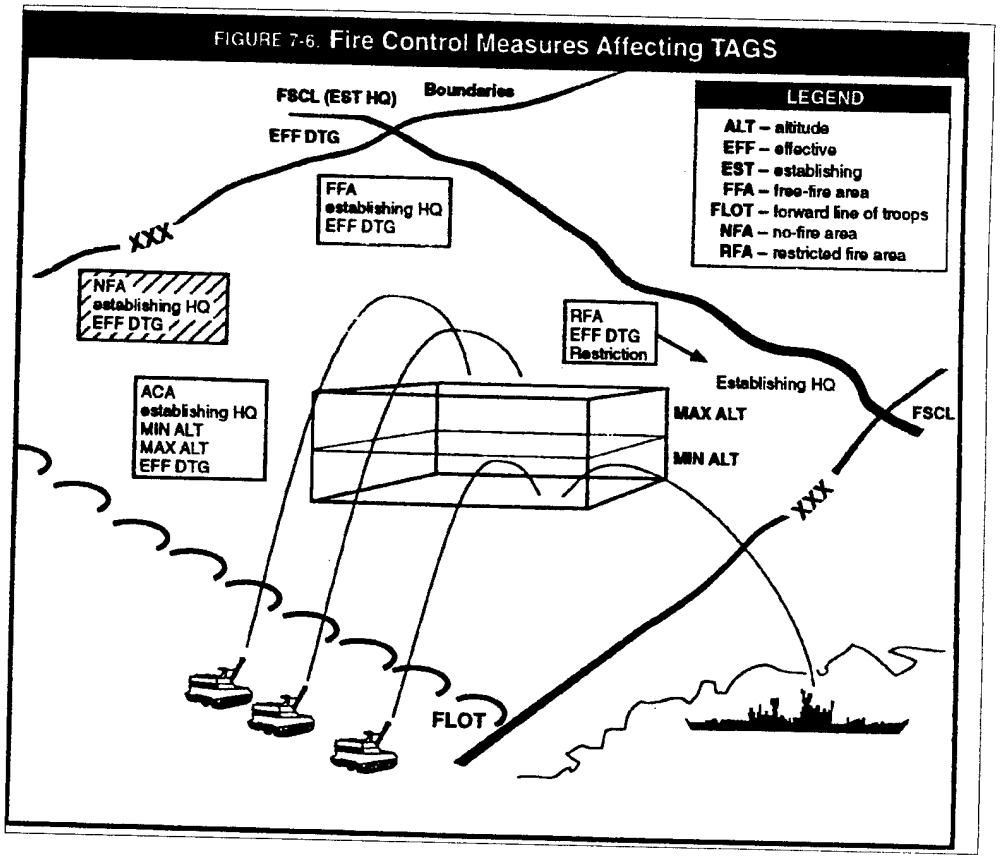


Figure 2: FSCMs

APPENDIX 03: JOINT FORCE COMPONENT COMMANDS

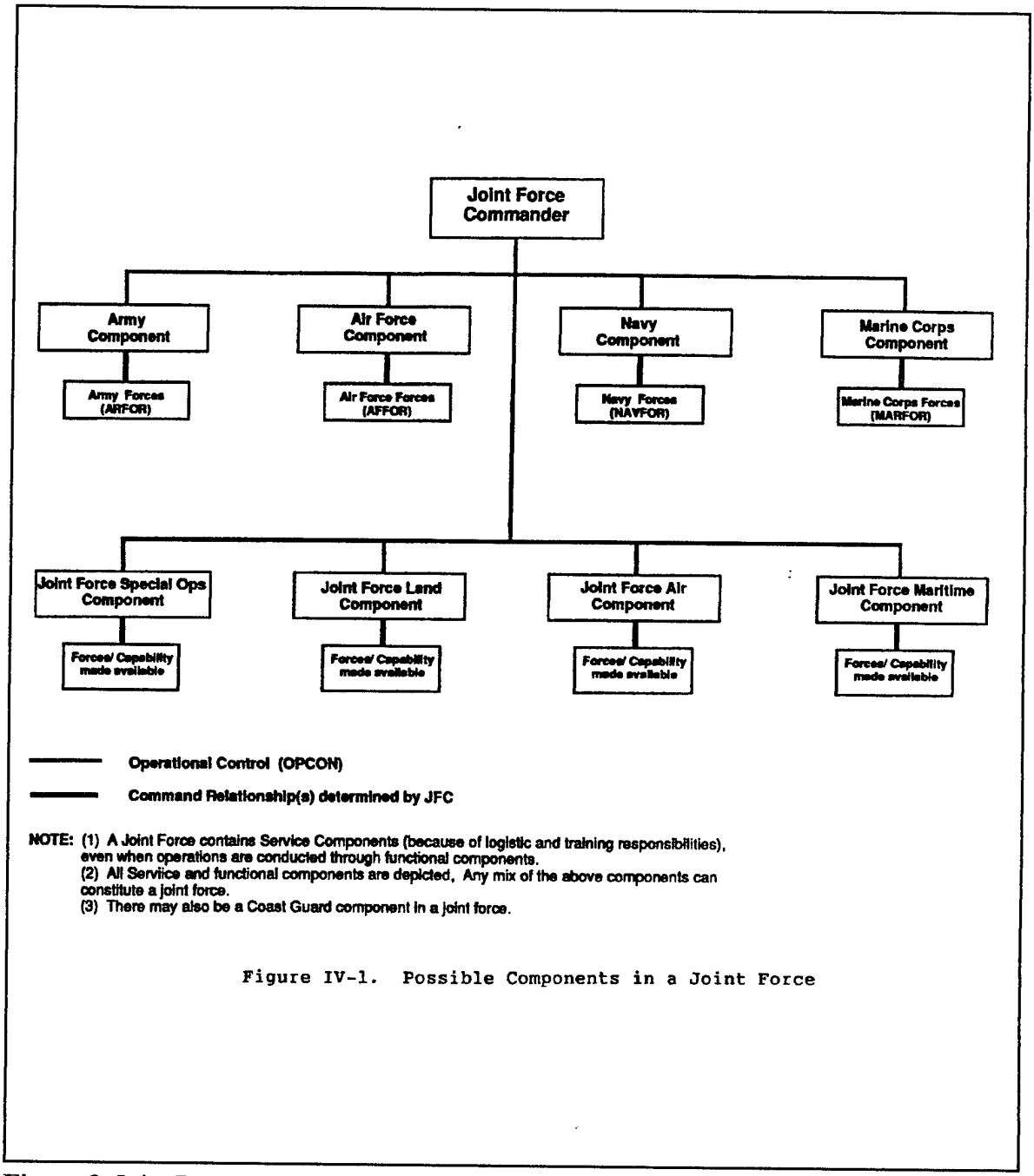
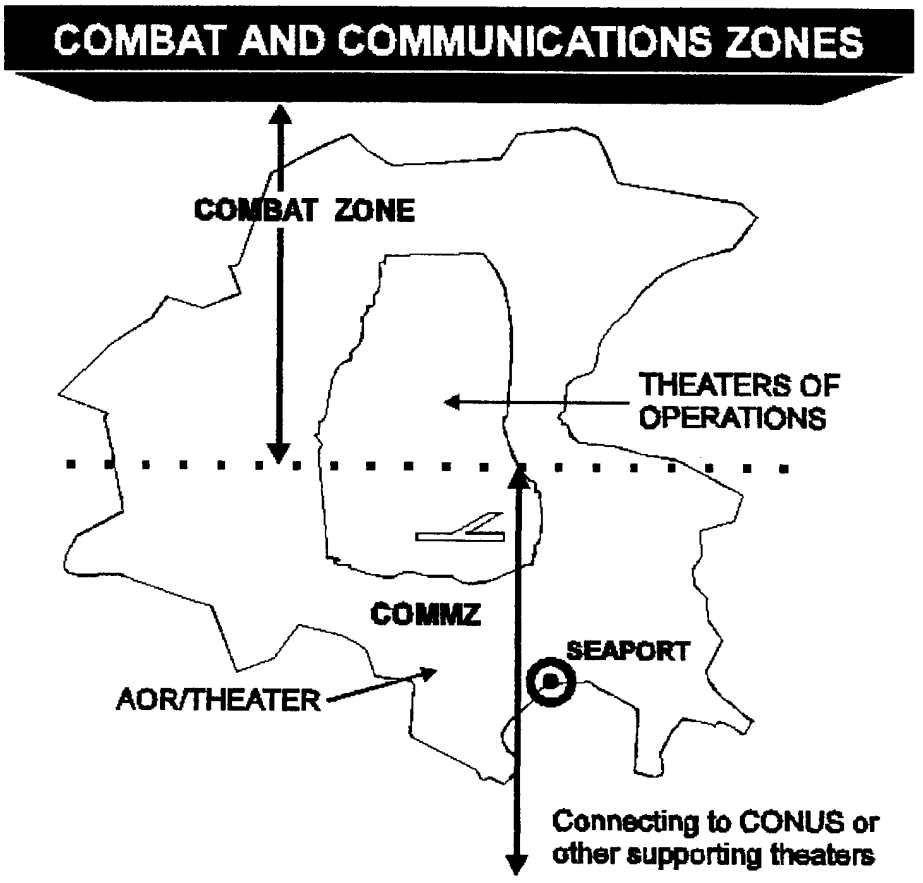


Figure IV-1. Possible Components in a Joint Force

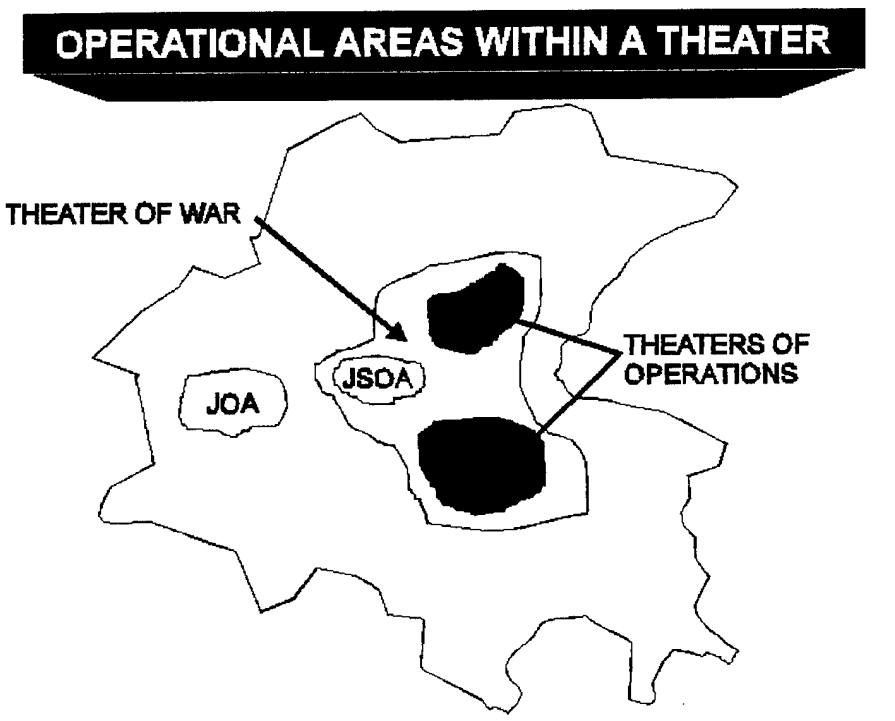
Figure 3: Joint Force Component Commands

APPENDIX 04: COMBAT AND COMMUNICATIONS ZONE



This example depicts a CINC's AOR in which a theater of operations has been designated. The combat zone includes that area required for the conduct of combat operations. The COMMZ in this example is contiguous to the combat zone.

APPENDIX 05: OPERATIONAL AREAS WITHIN THEATER



This example depicts a combatant commander's AOR, also known as a theater. Within the AOR, the CINC has designated a theater of war with two subordinate theaters of operations. Also within the theater of war is a JSOA. To handle a situation outside the theater of war, the CINC has established a JOA, within which a JTF will operate. JOAs could also be established within the theater of war or theaters of operations.

GLOSSARY

Army airspace command and control (A^2C^2) -- Those actions that ensure the synchronized use of airspace and enhance the command and control of those forces using airspace. This system includes those organizations, personnel, facilities, and procedures required to perform the airspace control function. (TRADOC Pam 525-XXX, C-1)

Army air-ground system (AAGS) --

The Army piece of integrating airspace management which begins at field army and extends through all echelons down to maneuver battalion level. (TRADOC Pam 525-XXX, C-1)

The Army system which provides for interface between Army and tactical air support agencies of other Services in the planning, evaluating, processing, and operations. It is composed of appropriate staff members, including G-2 air and G-3 air personnel, and necessary communications equipment. (Joint Publication 1-02, 36)

Airspace control Authority (ACA) -- The commander designated to assume overall responsibility for the operation of airspace control system in the airspace control area. (TRADOC Pam 525-XXX, C-1)

Air operations Center (AOC) --

The principal air operations installation (land- or ship-based) from which all aircraft and air warning functions of tactical air operations are controlled. (Joint Publication 1-02, 373)

Formerly called the Tactical Air Control Center (TACC). It is a ground based element of the Theater Air Control System (TACS), that is divided between the plans and operations functions. Its primary function is to provide the staff necessary to support the Air Component Commander in his function as the Airspace Control Authority. The Army representative at this element is the BCE. (TRADOC Pam 525-XXX, C-2)

Battlefield Coordination Element (BCE) --

An Army liaison provided by the Army component commander to the Air Operations Center (AOC) and/or to the component designated by the joint force commander to plan, coordinate, and deconflict air operations. The battlefield coordination element processes Army requests for tactical air support, monitors and interprets the land battle situation for the AOC, and provides the necessary interfaces for exchange of

current intelligence and operational data. (Joint Publication 1-02, 50)

Provided by the Land Component Commander and is collocated with the AOC or theater equivalent. The BCE expedites the exchange of information through face-to-face coordination with elements of the AOC. (TRADOC Pam 525-XXX, C-2)

Fire support coordination measure (FSCM) -- A measure employed by land or amphibious commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces. (Joint Publication 1-02, 146)

Marine air command and control system (MACCS) -- A US Marine Corps tactical air command and control system which provides the tactical air commander with the means to command, coordinate, and control all air operations within an assigned sector and to coordinate air operations with other Services. It is composed of communications-electronics equipment that incorporates a capability from manual through semiautomatic control.(TRADOC Pam 525-XXX, C-4)

Naval tactical air control system (NTACS) -- A US Navy tactical air control system which provides the commander of the amphibious task force (CATF) with the means to command, coordinate, and control all air operations to support air operations in the amphibious objective area (AOA). When NTACS is used in conjunction with MACCS, it forms the Amphibious Tactical Air Control System (ATACS).

Theater air control system (TACS) -- (USAF) The organization and equipment necessary to plan, direct, and control tactical air operations and to coordinate air operations with other Services. It is composed of control agencies and communications electronics facilities which provide the means for centralized control decentralized execution of missions. (TRADOC Pam 525-XXX, C-5)

BIBLIOGRAPHY

BOOKS:

Cohen, Eliot A., ed. Gulf War Air Power Summary Report. Summary Report, by, Thomas A. Keaney and Eliot A. Cohen. Washington, D.C.: US Government Printing Office, 1993.

Cohen, Eliot A. , ed. Gulf War Air Power Survey. Vol. IV, Weapons , Tactics, and Special Operations. Washington, D.C.: US Government Printing Office, 1993.

Cohen, Eliot A. and John Gooch. Military Misfortunes The Anatomy of Failure in War. New York: The Free Press, 1990.

Cushman, John H. Thoughts for Joint Commanders. Annapolis, Maryland: Whitmore Printing, August 1993.

Dubik, James M. and Gordon R. Sullivan. Envisioning Future Warfare. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 1995.

Marshall, S. L. A. Men *against* Fire, The Problem of Battle Command in Future War. Gloucester, Massachusetts: Peter Smith, 1978.

Patton JR., George S. War as I Knew It. Annotated by Colonel Paul D. Harkins. New York: Bantam Books, 1981.

Perry, William J. Annual Report to the President and the Congress. Washington, DC: US Government Printing Office, March, 1996.

Scales, Jr., Robert H., Terry L. Johnson, and Thomas P. Odom. Certain Victory: The US Army in the Gulf War. Office of the Chief of Staff, United States Army. Washington, DC: US Government Printing Office, 1993; a selected reprint, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 1994.

Scales, Jr., Robert H., Firepower in Limited War. Washington, DC: National Defense University Press, 1990.

Swain, Richard Moody. "Lucky War" Third Army in Desert Storm. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 1994.

The New Merriam-Webster Dictionary. 1989 ed. Frederick C. Mish, ed. Springfield, Massachusetts: Merriam-Webster INC., 1989.

MILITARY PUBLICATIONS:

Department of the Air Force Manual 1-1 Volume I, Basic Aerospace Doctrine of the United States Air Force. Washington, DC: US Government Printing Office, March 1992.

Department of the Air Force Manual 1-1 Volume II, Basic Aerospace Doctrine of the United States Air Force. Washington, DC: US Government Printing Office, March 1992.

Department of the Navy, Deputy Chief of Naval Operations, Resources, Warfare Requirements Assessments (N8). FORCE 2001, A Program Guide to the U.S. Navy. Washington, DC: US Government Printing Office, 1995.

Department of the Navy, Director, Surface Warfare (N86) Office of the Chief of Naval Operations, Surface Combatant Force Level Study Group. Surface Combatant Force Level Study Requirement for Joint Warfare. Washington, DC: US Government Printing Office, August 1995.

Field Manual 1-100. Doctrinal Principles for Army Aviation in Combat Operations. Washington, DC: US Government Printing Office, 1989.

Field Manual 1-101. Aviation Battlefield Survivability. Washington, DC: US Government Printing Office, 1990.

Field Manual 1-111. Aviation Brigades. Washington, DC: US Government Printing Office, 1990.

Field Manual 6-20-30. Tactics, Techniques, and Procedures for Corps and Division Operations. Washington, DC: US Government Printing Office, 1989.

Field Manual 44-100. U.S. Army Air Defense Operations. Washington, DC: US Government Printing Office, 1995.

Field Manual 71-100 (Approved Final Draft). Division Operations. Washington, DC: US Government Printing Office, June 1995.

Field Manual 90-20. Multi-Service Procedures for Joint Application of Firepower. Washington, DC: US Government Printing Office, February 1994.

Field Manual 90-21. Multi-Service Procedures For Joint Air Attack Team Operations. Washington, DC: US Government Printing Office, 1991.

Field Manual 90-36 (Second Draft). Targeting, Procedures for Coordinating, Deconflicting, and Synchronizing Attack Against Time-Critical Targets. Washington, DC: US Government Printing Office, October 1995.

Field Manual 100-1. The Army. Washington, DC: US Government Printing Office, June 1994.

Field Manual 100-5. Operations. Washington, DC: US Government Printing Office, June 1993.

Field Manual 100-6 (Coordinating Draft). Large Unit Operations. Washington, DC: US Government Printing Office, May 1987.

Field Manual 100-7. Decisive Force: The Army in Theater Operations. Washington, DC: US Government Printing Office, June 1995.

Field Manual 100-12 (Initial Draft). Army Theater Missile Defense Operations. Washington, DC: US Government Printing Office, September 1995.

Field Manual 100-12 (Coordinating Draft). Army Theater Missile Defense Operations. Washington, DC: US Government Printing Office, February 1996.

Field Manual 100-13 (Proposed Initial Draft). Battlefield Coordination Detachment. Washington, DC: US Government Printing Office, June 1995.

Field Manual 100-13 (Initial Draft). Battlefield Coordination Detachment. Washington, DC: US Government Printing Office, November 1995.

Field Manual 100-15. Corps Operations. Washington, DC: US Government Printing Office, 1989.

Field Manual 100-15. Corps Operations. Washington, DC: US Government Printing Office, 1995.

Field Manual 100-26. The Air-Ground Operations System. Washington, DC: US Government Printing Office, 1973.

Field Manual 100-103-1. ICAC², Multi-Service Procedures for Integrated Combat Airspace Command and Control. Washington, DC: US Government Printing Office, 1994.

Field Manual 100-103-2. Multiservice Procedures for the Theater Air-Ground System. Washington, DC: US Government Printing Office, 1994.

Field Manual 101-5 (Final Draft). Command and Control for Commanders and Staff. Washington, DC: US Government Printing Office, August 1993.

Field Manual 101-5-1. Operational Terms and Symbols. Washington, DC: US Government Printing Office, 1985.

Field Manual 101-5-1 (Final Draft). Operational Terms and Symbols. Washington, DC: US Government Printing Office, July 1995.

Fleet Marine Force Manual 1. Warfighting. Washington, DC: US Government Printing Office, 1989.

Fleet Marine Force Manual 1-1. Campaigning. Washington, DC: US Government Printing Office, 1990.

Fleet Marine Force Manual 1-2. The Role of the Marine Corps in National Defense. Washington, DC: US Government Printing Office, 1991.

Fleet Marine Force Manual 6-9. Marine Artillery Support. Washington, DC: US Government Printing Office, 1993.

Headquarters, United States Army Training and Doctrine Command. Corps Deep Operations (ATACMS, Aviation and Intelligence Support) Tactics, Techniques and Procedures Handbook. Washington, DC: US Government Printing Office, 1990.

Headquarters, United States Department of the Army. Weapons Systems. Washington, DC: US Government Printing Office, 1995.

Headquarters, United States Department of the Army. Battlefield Framework White Paper. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, June 1994.

Headquarters, United States Department of Defense, Office of the Secretary of Defense. Proliferation: Threat and Response. Washington, DC: US Government Printing Office, April 1996.

Joint Publication 0-2. Unified Action Armed Forces (UNAAF). Washington, DC: US Government Printing Office, 1994.

Joint Publication 0-2. Unified Action Armed Forces (UNAAF). Washington, DC: US Government Printing Office, 1995.

Joint Publication 1. Joint Warfare of the US Armed Forces. Washington, DC: US Government Printing Office, 1991.

Joint Publication 1-02. Department of Defense Dictionary of Military and Associated Terms. Washington, DC: US Government Printing Office, 1994.

Joint Publication 3-0. Doctrine for Joint Operations. Washington, DC: US Government Printing Office, 1993.

Joint Publication 3-0. Doctrine for Joint Operations. Washington, DC: US Government Printing Office, 1995.

Joint Publication 3-05. Doctrine for Joint Special Operations. Washington, DC: US Government Printing Office, 1992.

Joint Publication 3-05.3. Joint Special Operations Operational Procedures. Washington, DC: US Government Printing Office, 1993.

Joint Publication 3-09 (Second Draft). Doctrine for Joint Fire Support. Washington, DC: US Government Printing Office, 1995.

Joint Publication 3-52. Doctrine for Joint Airspace Control in the Combat Zone. Washington, DC: US Government Printing Office, 1993.

Joint Publication 3-56 (Initial Draft). Command and Control Doctrine for Joint Operations. Washington, DC: US Government Printing Office, 1992.

Joint Publication 3-56.1. Command and Control for Joint Air Operations. Washington, DC: US Government Printing Office, November 1994.

Joint Publication 5-0. Doctrine for Planning Joint Operations. Washington, DC: US Government Printing Office, 1994.

Krulak, Charles C. The 31st Commandant's Planning Guidance, A Marine Corps for the 21st Century. Marine Corps Association, August 1995.

Naval Doctrine Publication 6, Naval Command and Control. Washington, DC: US Government Printing Office, 1995.

Training and Doctrine Command Pamphlet 525-5. FORCE XXI OPERATIONS, a Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century. Washington, DC: US Government Printing Office, August 1994.

Training and Doctrine Command Pamphlet 525-200-5. Depth and Simultaneous Attack. Washington, DC: US Government Printing Office, June 1994.

Training and Doctrine Command Pamphlet 525-200-6. Combat Service Support. Washington, DC: US Government Printing Office, August 1994.

Training and Doctrine Command Pamphlet 525-XX. Force XXI Division Operations Concept. Washington, DC: US Government Printing Office, May 1995.

Training and Doctrine Command Pamphlet 525-XXX (Draft). U.S. Army Operational Concept for Army Airspace Command and Control (A^2C^2). Washington, DC: US Government Printing Office, April 1995.

United States Air Force Air Ground Operations School. Joint Air Operations Staff Course Book 95-02. Hurlburt Field, FL: United States Air Force Air Ground Operations School, November 1994.

United States Army Command and General Staff College Student Text 100-3. Battle Book: Center for Army Tactics. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1994.

United States Army Command and General Staff College Student Text 100-3. Battle Book: Center for Army Tactics. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1995.

United States Army Field Artillery Center and School, Directorate of Combat Developments. Program and Project Summary Sheet. Fort Sill, Oklahoma: United States Army Field Artillery Center and Fort Sill, May 1995.

United States Army Program Executive Office for Tactical Missiles. Modernization Plan: Fire Support Rocket and Missile Systems. Redstone Arsenal, AL: Program Executive Office, March 1995.

United States Army Program Executive Office for Tactical Missiles. Project Book: Close Combat, Fire Support, Forward Area Air Defense Tactical Missile Systems. Redstone Arsenal, AL: Program Executive Office, January 1996.

U.S.N.I. Military Database, Missiles/Rockets - Land Attack/Theater - ATACMS. Provided by the United Communications Group and The U.S. Naval Institute. Edition 05/01/95. Copyright 1991 by United Communications Group, 11300 Rockville Pike, Suite 1100, Rockville, Md.

ARTICLES

"Army Weaponry and Equipment." Army. 10 (October 1995): 217 - 320.

Baxter, Leo J.. "Field Artillery, Vision 2020." Field Artillery Journal. HQDA PB6-94-5 (November-December 1994): 10-14.

Garner, Jay M. "Army Theater Missile Defense." Army. 12 (December 1995):17-19.

Garrett, Grady B. "The Corps Commander and Deep Operations." Field Artillery Journal. HQDA PB6-93-3 (April 1993): 15-21.

Gloriod, John A. and Scott E. Nahrwold. "Targeting – Keeping It Simple." Field Artillery Journal. HQDA PB6-92-2 (February 1992): 11-14.

Gordon IV, John. "Deep Attack and CAS– Joint Roles and Missions." Field Artillery Journal. HQDA PB6-95-5 (November-December 1995): 6-9.

Gourley, Scott R. "Extending the Range of Rockets and Missile Systems." ARMY. 6 (June 1995): 36 - 42.

"PAC-3." Army. 12 (December 1995): 20

Haynes III, Forrest D. " Synchronizing the Divisional Deep Fight." Field Artillery Journal. HQDA PB6-93-3 (April 1993): 21-25.

Hilliard, Jay. "ATACMS Block II: Killing Armored Targets Deep." Field Artillery Journal. HQDA PB6-96-1 (January-February 1996): 22-24.

Oxford, Donald G. "A Primer on the BCE." Field Artillery Journal. HQDA PB6-95-1 (February 1995): 27-30.

Palzkill, Dennis. "Making Interoperability Work." Proceedings.118 (September 1991): 50-54.

Rigby, Randall L. "Fires for Division XXI: State of the Branch 1995." Field Artillery Journal. HQDA PB6-95-5 (November-December 1995): 1-5.

Rigby, Randall L and Lon E. Maggart. "Shaping Battlespace – More than just Deep Attack." Field Artillery Journal. HQDA PB6-95-5 (November-December 1995): 12-14.

Saint, Crosby E. A CINC's View of Operational Art. The United States Naval War College, Operations Department, Rhode Island: The United States Naval War College Press, September 1990; reprinted by permission from Military Review, (September 1990): 65-78.

Schneider, James J. "The Theory of the Empty Battlefield." Journal of the Royal United Services Institute for Defense Studies. 3 (September 1987): 37-44.

Stewart, William G., "Interaction of Firepower, Mobility, and Dispersion." Military Review. XXXIX (March 1960): 26-33.

Sullivan, Gordon R., "Force XXI, A New Force for A New Century," ARMY, 5 (May 1994): 24-26.

Valle, Hector R. "Army Airspace Command and Control." Air Defense Artillery. (March-April 1993): 27-31.

Wagner, Louis C. U.S. Forces - Theater Missile Defense. Association of the United States Army Institute of Land Warfare, Land Power Essay Series Number 94-9. Arlington, VA: Association of the United States Army, (October 1994): 1-5.

Winton, Harold R. "Partnership and Tension: The Army and Air Force Between Vietnam and Desert Shield." Parameters. XXVI (Spring 1996):100-119

MONOGRAPHS and THESES

Brehm, Norman R. Evolving Field Artillery Standard Tactical Missions for Force XXI. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1995.

Corpac, Peter S. Airland Battle Future - Fires: How Do You Do It?. Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1991.

Crawford, Darrell E. Deep Operations in Airland Battle Doctrine: The Employment of U.S. Ground Forces in Deep Operational Maneuver. Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1989.

Daniel, Donald C.F. and Bradd C. Hayes, The Future of U.S. Sea Power, Carlisle Barracks: Strategic Studies Institute, U. S. Army War College, 1993.

Holder, Don. III Corps Maneuver Booklet. Fort Hood, TX: III Corps, May 1987.

House, Jonathan M. Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine and Organization. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 1984.

Kelly, Patrick. Modern Scientific Metaphors of Warfare: Updating the Doctrinal Paradigm. Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1993.

Lovelace, Douglas C. Jr. and Thomas-Durell Young, Strategic Plans, Joint Doctrine and Antipodean Insights, Carlisle Barracks, PA: Strategic Studies Institute, U. S. Army War College, 1995.

M°Meen, Scott R. Field Artillery Doctrine Development 1917 - 1945. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1991.

Pickar, Charles K. Tactical Deep Battle: The Missing Link. Fort Leavenworth, Kansas: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1991.

Schneider, James J. Vulcan's Anvil: The American Civil War and the Emergence of Operational Art. Theoretical Paper Number Four, Fort Leavenworth, Kansas: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1991.

Swan, Robin P. The Pieces of a Chessboard - What is the Contemporary Significance of Jomini's Design of a Theater of Operations?. Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1991.

UNPUBLISHED MATERIAL

After Action Report from the Mobile Strike Force, Exercise Prairie Warrior, 1995. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1995.

Dubik, James M. Combat Power in Force XXI: Getting the Balance Right. Unpublished, February 1996.

Field Standard Operating Procedures (FSOP), Deep Operations Annex. Vth Corps Artillery Headquarters (AETV-AT-GC), April 1995.

... From The Sea, A New Direction for the Naval Service, Preparing the Naval Service for the 21st Century. White Paper produced by the Honorable Sean O'Keefe, Secretary of the Navy, Frank Kelso II, Chief of Naval Operations, and C.E. Mundy, JR., Commandant of the Marine Corps, September 1992.

Shaping the Deep Battlefield Synchronized Operations in the Air Assault Division. Division Fire Support Element, 101st Airborne Division (Air Assault), April 1992.

Tactical Standard Operating Procedures (TACSOP). Vth Corps Artillery Headquarters (AETV-AT-GC), Undated.

United States Army Command and General Staff College, Corps and Division Doctrine Division. Battlefield Framework White Paper. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, June 1995.

United States Army Field Artillery Center and School, War Fighter Division, Fire Support and Combined Arms Operations Department. Joint Fire Support and Interdiction: Conduct of Operations Between the Fire Support Coordination Line and the Forward Boundary. (Final Draft) Fort Sill, Oklahoma: United States Army Field Artillery Center and Fort Sill, August 1994.

INTERVIEWS

Johnson, David, Assistant TRADOC Systems Manager - ATACMS. Interview by the Author, 17 April 1996, Fort Leavenworth, Kansas. Verbal Interview. Fort Leavenworth, Kansas: School of Advanced Military Studies.

CONFERENCES

The Future of Warfare. Inaugural Annual Conference of The James A. Baker III Institute at Rice University on "C-SPAN", 26 November 1995.

Shape the Battlespace. "How to Fight Seminar" held by the Training and Doctrine Command, 26 September 1995.

PRESS RELEASES

The White House, Office of the Press Secretary. Fact Sheet on Deep Attack Weapons Mix Study. From:The White House [Publications-Admin@WhiteHouse.Gov] Reply-To: Publications@clinton.ai.mit.edu [Publications@clinton.ai.mit.edu], February 8, 1996.

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