Bringing the Box into Doctrine: Joint Doctrine and the Kill Box

A Monograph

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Since the dawn of modern warfare, commanders have sought ways to maximize the combined effects of maneuver and firepower. In the early years of mechanization and aircraft, the struggle to define the roles of these new weapon systems prevented anything more than ad hoc attempts to synchronize their effects. It would take a tragedy during the Normandy campaign of the Second World War to motivate the Army and its post-war counterpart, the Air Force, to formalize air-ground coordination procedures. Describing these procedures is now the responsibility of joint and service doctrine, but on the topic of commanding, controlling, and synchronizing operational fires, both remain deficient. Most notably, the inability of doctrine to provide clarity and a common philosophy concerning the fire support coordination line has led to confusion and allowed a debate over the purpose and placement of this fire support coordinating measure to detract from joint interoperability. To compensate for this shortcoming, some components of the joint force have developed the kill box to supplement or potentially replace the fire support coordination line. This paper seeks to evaluate the kill box, determine its utility as a joint coordination measure, and make a recommendation on its role in joint doctrine.

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ABSTRACT

BRINGING THE BOX INTO DOCTRINE: JOINT DOCTRINE AND THE KILL BOX by MAJ James W. MacGregor, United States Army, 61 pages.

Since the dawn of industrial age warfare, commanders have sought ways to maximize the combined effects of maneuver and firepower. A demanding task on battlefields cluttered with horse-drawn artillery and foot infantry, the task became more challenging with the advent of mechanization and flight during the First World War. In the early years of both, the struggle to define the roles of these new weapon systems prevented anything more than ad hoc attempts to synchronize their effects. It would take a tragedy during the Normandy campaign of the Second World War to motivate the Army and its post-war counterpart, the Air Force, to formalize air-ground coordination procedures.

Describing these procedures is now the responsibility of joint and service doctrine, but on the topic of commanding, controlling, and synchronizing operational fires, both remain deficient. Most notably, the inability of doctrine to provide clarity and a common philosophy concerning the fire support coordination line has led to confusion and allowed a debate over the purpose and placement of this key fire support coordinating measure to detract from joint interoperability. To compensate for this shortcoming, some components of the joint force have developed the kill box to supplement or potentially replace the fire support coordination line. This paper seeks to evaluate the kill box, determine its utility as a joint fire support coordination measure, and make a recommendation on its role in joint doctrine.

ACKNOWLEDGEMENTS

I chose this topic in the interests of expanding my understanding of a complicated operational fire support issue and perhaps contributing to its resolution. While I have accomplished the former, an assessment of the latter is for someone else to decide. Ironically though, shortly after I took on this task, the School of Advanced Military Studies directed a group of my fellow students, the members of Seminar 1, led by Lieutenant Colonel James Klingaman and Major Jamie Royse, to conduct their own assessment of the fire support coordination line and kill box issue. I am grateful that I was able to observe their presentation and take advantage of the background information they collected.

To those professionals – LTC John R. McIlhaney, LtCol Michael B. McGee, LtCol Michael P. Connolly, LTC Joe Gallagher, and LTC John W. Gillette – who answered my numerous questions by email, telephone, and in person, I offer my gratitude. This was a topic relatively new to me; their real-world experiences and observations made an invaluable contribution to this paper and my professional development. I owe a special thanks to Brigadier General Richard P. Formica, Commander, III (US) Corps Artillery, who not only took time from his busy schedule to answer my questions about this challenging topic, but who has also been a great mentor these last five years.

Finally, I thank my family – Debbie, Nathan, Lauren, Kylie, and Robbie. Despite the time and energy that this paper and a similar one that I wrote last year at the Command and General Staff College consumed, these last two years have been the “best year(s) of my life.” I appreciate your faith, patience, and love. These gifts will keep us going in the hectic days and years ahead. I am truly blessed. I love you all.

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LIST OF ABBREVIATIONS AND DEFINITIONS

ABCA	American, British, Canadian, Australian Armies Standardization Program
ACA	Airspace Coordination Area — a three-dimensional block of airspace in a target area, established by the appropriate ground commander, in which friendly aircraft are reasonably safe from friendly surface fires. The airspace coordination area may be formal or informal. (JP 3-09.3)
ACM	Airspace Control Measures – category of control measures that aid in defining airspace control requests, orders, and plans; includes air corridors, airspace coordination areas, coordinating altitude, restricted operating areas, and numerous other air defense and airspace procedural control measures. (JP 3-52)
ACC	Air Component Commander – see JFACC.
ACCE	Air Component Coordination Element – a non-doctrinal organization created by the C/JFACC during Operation IRAQI FREEDOM (OIF) as the principal operational-level agent between the C/JFACC and the supported/supporting component. The ACCE Director represented C/JFACC issues to the host commander and provided the C/JFACC a presence in the host component headquarters. During OIF Major General Daniel P. Leaf was the Director, K-ACCE (Kuwait CFLCC ACCE).[1]
AFATDS	Advanced Field Artillery Tactical Data System – a multi-service (Army and Marine Corps) fire support software system that runs on common hardware for the Army battle command system (ABCS). (FM 90-36)
AI	Air Interdiction – air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear 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. (JP 1-02)
AOC	Air Operations Center – the principal air operations installation from which aircraft and air warning functions of combat air operations receive direction, control, and execution guidance. It is the senior agency of the Air Force Component Commander from which command and control of air operations are coordinated with other components and Services. (JP 1-02)
ASOC	Air Support Operations Center – agency of the tactical air-ground system collocated with a corps or appropriate land force headquarters; coordinates and directs close air support and other tactical air support. (JP 1-02)
ATACMS	Army Tactical Missile System – a guided missile launched from a Multiple Launch Rocket System (MLRS) with a standard range of approximately 160 kilometers. Block IA missiles increase this range to approximately 300 kilometers.

[1] Maj Gen Daniel P. Leaf, "Operation Iraqi Freedom - After Action Report (CFLCC ACCE)" (Headquarters, United States Central Command Air Forces, April 28, 2003), 4-5.

ATO	Air Tasking Order – A method used to task and disseminate to components, subordinate units, and command and control agencies projected sorties, capabilities and/or forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. Also an Integrated Tasking Order (ITO). (JP 1-02)
BAI	Battlefield Air Interdiction – AI attacks conducted against hostile land forces that are not in close proximity to friendly forces are referred to as battlefield air interdiction if the hostile forces could have a near-term effect on the operation or scheme of maneuver of friendly forces. No longer found in joint doctrine, but still defined in some older Army publications. (FM 6-20-30)
BCD	Battlefield Coordination Detachment - An Army liaison provided by the Army component or force 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 detachment processes Army requests for air support, monitors and interprets the land battle situation for the AOC, and provides the necessary interface for exchange of current intelligence and operational data. (JP 1-02)
BCL	Battlefield Coordination Line – a non-doctrinal United States Marine Corps measure that delineates battlefield responsibilities between the Marine division and the Marine Expeditionary Force (MEF); placed between the division forward boundary and the JFC-established fire support coordination line, during Operation IRAQI FREEDOM, the BCL was the point at which control of kill boxes within the MEF sector passed from the MEF to the C/JFACC.
CAS	Close Air Support – air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces.
CENTCOM	United States Central Command – a combatant command headquartered in Tampa, Florida and responsible for planning and executing military operations in support of the national security strategy in Central and Southwest Asia and parts of east Africa.
CFC	Combined Forces Command (Korea) – a combined American-South Korean command headquartered in Yongsan, South Korea and responsible for the planning and executing the defense of the Republic of Korea.
CGRS	Common Grid Reference System – provides a universal, joint perspective with which to define specific areas of the battlespace, enabling the JFC and component commanders to efficiently coordinate, deconflict, and synchronize surface TCT (time critical target) attacks. (FM 90-36)
EUCOM	United States European Command – a combatant command headquartered in Heidelberg, Germany and responsible for planning and executing military operations in support of the national security strategy in Europe, Russia, Israel, and the majority of Africa.

FLOT	Forward Line of Troops – a line that indicates the most forward positions of friendly forces in any kind of military operation at a specific time. (JP 1-02)
FSCL	Fire Support Coordination Line – A fire support coordinating measure that is established and adjusted by appropriate land or amphibious force commanders within their boundaries in consultation with superior, subordinate, supporting, and affected commanders. Fire support coordination lines (FSCL) facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. An FSCL does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support. The FSCL applies to all fires of air, land, and sea-based weapons systems using any type of ammunition. Forces attacking targets beyond an FSCL must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the FSCL must ensure that the attack will not produce adverse attacks on, or to the rear of, the line. Short of an FSCL, all air-to-ground and surface-to-surface attack operations are controlled by the appropriate land or amphibious force commander. The FSCL should follow well-defined terrain features. Coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL. However, failure to do so may increase the risk of fratricide and could waste limited resources. (JP 1-02)
FSCM	Fire Support Coordinating (or Coordination or Control) Measure – a measure employed by land or amphibious commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces. (JP 1-02)
JFC	Joint Forces Commander – a general term applied to a combatant commander, sub-unified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force. (JP 1-02)
JFACC	Joint Forces Air Component Commander – 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 assigned, attached, and/or made available for tasking air forces; planning and coordinating air operations; or accomplishing such operational missions as assigned. (JP 1-02)
JFLCC	Joint Forces Land Component Commander – 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 assigned, attached, and/or made available for tasking land forces; planning and coordinating land operations; or accomplishing such operational missions as may be assigned. (JP 1-02)
JOA	Joint Operations Area – an area of land, sea, and airspace, defined by a geographic combatant commander or subordinate unified commander, in which a joint force commander (normally a joint task force commander) conducts military operations to accomplish a specific mission.

JSOA	Joint Special Operations Area – a restricted area of land, sea, and airspace assigned by a joint force commander to the commander of a joint special operations force to conduct special operations activities. (JP 1-02)
JTF	Joint Task Force – a joint force that is constituted and so designated by the Secretary of Defense, a combatant commander, a sub-unified commander, or an existing joint task force commander. (JP 1-02)
KM	Kilometer – equal to approximately 3,274 feet
LCC	Land Component Commander – see JFLCC.
MCM	Maneuver Control Measures – category of control measures that aid in the command and control of joint maneuver forces on the battlefield; includes boundaries, phase lines, and fire support area (or fire support station). (JP 3-09)
MLRS	Multiple Launch Rocket System – ground-based weapon system with a standard rocket range of between 8-32 kilometers (11,000 meter maximum ordinate); extended range rockets improve this range to 45 kilometers (19,000 meter maximum ordinate).
NM	Nautical Mile – equal to approximately 6,076 feet

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CHAPTER ONE: INTRODUCTION

Doctrine "provides a military organization with a common philosophy, a common language, a common purpose, and unity of effort." General George H. Decker[2]

The purpose of joint military doctrine, according to the *Joint Doctrine Capstone and Keystone Primer* is to provide essential principles that guide the employment of military forces. As such, it provides authoritative direction built upon time-tested principles and contemporary lessons to ensure the exploitation of friendly advantages against threat vulnerabilities. In other words, joint doctrine defines the way the "Armed Forces think about the use of the military instrument of national power" by describing methodologies that synchronize the capabilities of the joint force to decisively defeat its enemies.[3]

To accomplish its objective, joint doctrine must represent the unified position of the joint force on the application of military capabilities against potential problem sets across the spectrum of military operations – including humanitarian, peace, and combat operations. Formulation of this unified position requires a common assessment of contemporary joint and service capabilities, a thorough, objective debate over the best methods to synchronize and apply those capabilities, and the mediation of conflicting service perspectives and priorities by an unbiased executive agent. The United States military has spent the last eighteen years – those since the passage of the Goldwater-Nichols Department of Defense Reorganization Act of 1986 – creating and refining a doctrinal development process to fulfill these tasks.

This process can count amongst its successes the victories of Operations DESERT STORM, ENDURING FREEDOM, and IRAQI FREEDOM, but not without recognizing where it has fallen short. One of these shortcomings has directly contributed to the topic of this paper. Since before the end of combat operations during DESERT STORM, ground and airpower

[2] MAJ Robert F. Barry, "'Who's Zooming Who?' Joint Doctrine and the Army - Air Force Debate over the FSCL" (Master of Military Arts and Science, Command and General Staff College, 1994), 3.

[3] United States Department of Defense. *Joint Doctrine Capstone and Keystone Primer* (Washington, D.C.: Joint Staff, September 10, 2001), 2.

proponents have conducted a debate over the most efficient and effective application of operational fires on the battlefield. Though the debate is about the division of the joint operations area and the most efficient means to engage targets, it manifests itself in a doctrinal discussion over the purpose and placement of a graphic control measure – the fire support coordination line.[4]

Unable to resolve this debate doctrinally, numerous work-around solutions have appeared in professional papers and journals. Some have argued for the strict adherence to existing joint doctrine while others have proposed adjustments to the FSCL and other fire support coordinating measures. Still others have proposed the redefinition of the FSCL as a boundary, a greater use of forward boundaries, or the addition of new fire support or command and control measures. Proposed measures included: the Deep Battle Synchronization Line, Long Range Interdiction Line, Air-Ground Coordination Line, Battlefield Coordination Line (BCL), the Operational Interdiction Line (in conjunction with boundaries), and the kill box. Of these, only the kill box and the BCL, used by the Marine Corps in IRAQI FREEDOM, have achieved any success. However, the BCL, like most of the other proposals, is a single service solution unaccepted by, perhaps even inapplicable to, the entire joint force. Only the kill box, the focus of this paper, has enjoyed widespread acceptance across the joint force and been tested in combat. This paper asks: *Is it time to standardize this technique and incorporate it into joint doctrine?*[5]

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[4] The FSCL, which first appeared in Army doctrine in 1961, is the last in a series of coordination and anti-fratricide measures developed by the Army and Air Force to prevent the reoccurrence of the tragedies similar to that which struck the 30th Infantry Division in July 1944. On two consecutive days, medium and heavy bombers, lacking sufficient formalized coordination and deconfliction procedures, inadvertently struck the 30th Division and its adjacent units causing the death of over 130 soldiers (including that of Lieutenant General Leslie McNair, Chief of Army Ground Forces). Though an isolated incident, this tragedy triggered the post-war Army and Air Force to formalize inter-service coordination and deconfliction procedures. A historical study of the FSCL and those measures that preceded it is beyond the scope of this paper, but the reader can find this information using the sources listed in the Bibliography.

[5] Barry, 30-31 and 38-40; MAJ David H. Zook, "The Fire Support Coordination Line: Is It Time to Reconsider Our Doctrine?" (Master of Military Arts and Science, Command and General Staff College, 1992), 163-165; "Battlefield Coordination Line" (Quantico, Virginia: United States Marine Corps); and MAJ Lester C. Jauron, "The Fire Support Coordination Line: Should It Delineate Area Responsibilities between Air and Ground Commanders?" (Master of Military Arts and Science, Command and General Staff College, 1993), 31-32. The 3d Infantry Division (Mechanized) recommends the BCL as a potential solution in its AAR, but outside of the Marine Corps, it is not in use. See "Operation Iraqi Freedom - After

The FSCL: A Doctrinal Debate

Before answering this question, there are several reasons to review the ongoing doctrinal debate over the purpose and placement of the FSCL. First, the purpose of this paper is to evaluate the kill box, which, in its current form, evolved to help mitigate the shortcomings, real and perceived, of the FSCL. Practice, if not doctrine, ties the FSCL and the kill box together; the future of one could have a significant impact on the future of the other. Secondly, the FSCL provides a compelling example of the confusion that can result when the joint force lacks a common understanding of its doctrine. The inability to create a common doctrinal understanding poses challenges for a joint force that must train, deploy, and employ its forces anywhere in the world on a moment's notice. Is it not likely that unfamiliarity, caused by confusing doctrine or a lack of procedural standardization, only complicates the integration of joint forces and the creation of the synergistic effect of unified action? Anecdotal evidence from Operation IRAQI FREEDOM suggests this is so.[6]

Discussion about the FSCL rests on assertions by air- and ground-power advocates that their opposite number misapplies or misunderstands the purpose or placement criteria of the FSCL. Though both sides present valid, well thought out arguments, the root cause of the problem – contradictory joint and service definitions and their multiple interpretations – remains unresolved. Not only are joint and service definitions inconsistent, incomplete, and open to wide variations of interpretation and implementation, they describe a measure that does not fully meet the requirements – expeditious attack and force protection – of the joint force. The resulting

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Action Report (3ID)" (3d Infantry Division (Mechanized), June 2003), 108. The BCL serves a purpose similar to that of the "close proximity line" described in *Counterland.* See Department of the Air Force. AFDD 2-1.3, *Counterland* (Washington, D.C.: Headquarters, Department of the Air Force, August 27, 1999), 62.

[6] Based on several comments from the 3d Infantry Division (Mechanized) after action review. Many of the Division's issues with V (US) Corps appear related to Corps-specific standard operating procedures containing doctrinal interpretations, terms, and procedures unfamiliar to the Division. It seems possible that some of these issues would have been absent if the Division had fought with the headquarters it trains with, XVIII (US) Airborne Corps. This will become more obvious in Chapter Two, Central Command and Summary. For a similar argument at a different staff level, see LTC Thomas L. Kelly and LTC (Ret) John P. Andreason, "Joint Fires: A BCD Perspective in Operation Iraqi Freedom," *Field Artillery Journal* VIII, no. 6 (November-December 2003): 25.

confusion and frustration complicates unity of effort and mission accomplishment. Consider the three inconsistencies found in these definitions.

First, joint and service definitions neither clearly describe the FSCL nor uniformly explain its purpose. Is it a permissive control measure that requires notification, as the Army suggests, or is it a restrictive control measure that requires coordination, as the Air Force suggests? The joint definition answers the question one way, yet in reality, the joint force operates in the other. Not one of mere semantics, the answer to this question is one of purpose and implementation. Should the FSCL force the land component to coordinate actions within its own area of operations? While a soldier might answer in the negative, an airman required to operate forward of the FSCL would probably answer in the affirmative.

Second, joint and service definitions variously describe the FSCL as a tool to coordinate fires, expedite attack, and protect the friendly force (air assets beyond it and ground forces short of it). Can it do all three equally well? It probably cannot. At first glance, one might assume, by reading Joint Publication 3-09, *Joint Fire Support*, and Field Manual 101-5-1, *Operational Terms and Graphics*, that force protection is the primary purpose. If so, the FSCL will likely remain what it was at its origin – an anti-fratricide tool that accomplishes its mission of protecting air and ground forces by separating the joint components of operational fires on the battlefield. At the very least, this interpretation will virtually ensure continued tension over its placement.

Finally, poorly worded or incomplete definitions have also led to confusion over FSCL placement. According to JP 3-0, *Doctrine for Joint Operations*, the FSCL should not "unduly inhibit operational tempo while maximizing the effectiveness of organic and joint force interdiction assets." It continues by stating that establishing the FSCL "too far forward of friendly forces can limit the responsiveness of air interdiction sorties and could unduly hinder expeditious attack of adversary forces." The vagueness of these two brief phrases forms the centerpiece of the debate between air and ground forces. How can its placement inhibit tempo and what is "too far

forward?" Joint doctrine fails to adequately address either of these questions and there is little inter-service agreement on possible solutions.[7]

Ground forces, interested in maximizing the capabilities of deep strike weapons like ATACMS and Apache helicopters and even more concerned in protecting maneuver space, generally want the FSCL deep in the area of operations. Some ground commanders believe that a FSCL placed close to the forward line of troops requires additional coordination within the Air Tasking Order battle rhythm, an Air Force dominated process many soldiers neither understand nor appreciate. Real and perceived shortcomings in the design and feedback of this process tend to force the ground commander to gain influence the best way he knows how – he tends to push the FSCL deep and shape the fight with army aviation and long-range artillery.[8]

Some members of the ground component believe that a "closely held" FSCL also denies them freedom of maneuver and hinders operational tempo. They point out that even the best of plans, with initial and subsequent locations for the FSCL, cannot precisely predict how a battle will unfold. If, for example, a land and amphibious force makes progress more rapidly than planned, it could find itself at or beyond the FSCL before the FSCL can move. Joint doctrine allows six hours to affect a change in the FSCL, yet frequently it takes longer, sometimes as much as two to six hours longer. This presents the ground commander with a dilemma: Does he halt his force, potentially sacrificing momentum and initiative, until the FSCL moves?

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[7] United States Department of Defense. JP 3-0, *Doctrine for Joint Operations* (Washington, D.C.: Joint Staff, September 10, 2001), III-44.

[8] Lt Col R. Kent Laughbaum, "Synchronizing Airpower and Firepower in the Deep Battle" (Air University, January 1999), 48. According to this source, Third Army planned to place the FSCL 80-100 kilometers forward of its front line of troops in normal operations and as much as 150 kilometers forward during rotary wing operations in future conflict. This occurred during OIF. As for the ATO, the author has heard many Army officers express doubt in or ignorance of the process. Lieutenant General William S. Wallace, Commander, U.S. Army Combined Arms Center and former Commander, V (US) Corps in OIF, agrees. In a published interview, LTG Wallace, who has "no problem with the ASR [air support request] cycle or the ATO cycle," stated: "…Army guys don't understand it [the ATO]. They think … that the cycle is rigid." See Patrecia S. Hollis, "Trained, Adaptable, Flexible Forces = Victory in Iraq," *Field Artillery Journal* VIII, no. 5 (September-October 2003): 10-11.

Alternatively, but at much greater risk, does he allow his ground force to cross the FSCL? It is a decision no commander should have to make.[9]

Air Force doctrine states that the FSCL should be located at that point "where the capability to produce the preponderance of effects … shifts from the ground component to the air component." Recognizing the limited availability of ATACMS and the infrequency of Apache deep attacks, the Air Force considers the standard range of MLRS as the most reliable standard for determining the limit at which the land component can provide the majority of effects. As a result, it believes the FSCL should be much, much closer to the forward line of troops and states that an FSCL placed beyond the standard range of MLRS creates a gap or "sanctuary" between surface-to-surface and air-to-surface fires that benefits only one force, the enemy.[10]

The Air Force agrees that adjusting the FSCL on a dynamic battlefield can be difficult and requires additional planning. However, Air Force doctrine emphasizes the establishment of an on order FSCL, coordinated using advanced digitization technology, to largely overcome this challenge. Related to digitization, the Air Force also suggests that the requirement to place the FSCL along distinct terrain features, like rivers or roadways, is outdated. The Air Force believes that because new navigational technology frees most of the joint force from a dependency on terrain orientation, the FSCL should follow latitude and longitude lines common to these navigational systems. Though not a significant issue for most ground maneuver units, the terrain-oriented issue is yet another example of the inconsistencies between service and joint doctrine.[11]

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[9] United States Department of Defense. JP 3-09, *Doctrine for Joint Fire Support* (Washington, D.C.: Joint Staff, May 12, 1998), A-2; and "Operation Iraqi Freedom - After Action Report (3ID)", 39 and 112. The 3ID(M) reference describes two instances when the division Coordinated Fire Line (CFL) was beyond the FSCL. The risk of fratricide is obvious as the CFL generally indicates the very close proximity of friendly ground forces. Whether correct or not, one quick fix involves placing the FSCL at great distances from the forward lines of troops.

[10] *Counterland*, 61. The range of the Multiple Launch Rockets System is 32 kilometers for standard range rockets, 45 kilometers for extended range rockets, and 160+ kilometers for ATACMS. The Apache is capable of conducting deep attacks as far as 200 kilometers into enemy-occupied territory.

[11] Ibid.; and see Leaf, 22. In fact, with the FSCL well forward of most ground forces, the placement "issue" is transparent to most soldiers on the ground. Those most concerned with its placement are generally located at division and higher staff elements and artillery units not found near the FSCL. The

A Review of Joint and Service Doctrine

So, what does doctrine say? According to the *Dictionary of Military and Associated Terms,* Joint Publication 1-02, the FSCL is:

> … established and adjusted by appropriate land or amphibious force commanders … in consultation with superior, subordinate, supporting, and affected commanders ... [to] facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. An FSCL does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support …applies to all fires of air, land, and sea-based weapons systems using any type of ammunition. Forces attacking targets beyond an FSCL must inform all affected commanders … to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the FSCL must ensure that the attack will not produce adverse attacks on, or to the rear of, the line. Short of an FSCL, all air-to-ground and surface-to surface attack operations are controlled by the appropriate land or amphibious force commander. The FSCL should follow well-defined terrain features. Coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL. However, failure to do so may increase the risk of fratricide and could waste limited resources.[12]

However, joint doctrine begins to lose clarity when one looks beyond the *Dictionary*. JP 3-03, *Joint Interdiction,* and JP 3-09, *Joint Fire Support,* only suggest that these attacks "should be coordinated with the affected [land or naval] commanders," but recognize that "exceptional circumstances" may require deviations from this standard. More than just a difference of semantics, this phrase is very different from the requirement to prevent the effects of an attack "on, or to the rear of, the [fire support coordination] line" unless these attacks are under the control of the appropriate land or amphibious force commander.[13]

Joint Fire Support describes the FSCL as a permissive fire support control measure. However, in defining permissive control measures, it qualifies the FSCL as unique and unlike those permissive measures that require no detailed coordination before the engagement of targets.

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few ground elements located at FSCL-depth on the battlefield, predominately special operations forces, are generally well equipped with global positioning devices that decrease their reliance on terrain orientation.

[12] United States Department of Defense. JP 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, D.C.: Joint Staff, September 25, 2002), 197. Author added emphasis. The joint force adopted this version of the FSCL definition in the 1993 version of JP-3-09, *Joint Fire Support*.

[13] United States Department of Defense. JP 3-03, *Doctrine for Joint Interdiction Operations* (Washington, D.C.: Joint Staff, April 10, 1997), II-14; and *Department of Defense Dictionary of Military and Associated Terms*, 197. Author added emphasis.

Because the FSCL requires coordination between the land component and attacking air assets short of the FSCL and attempts by the land component to inform affected commanders (usually the air component) of attacks long of the FSCL, it is more like those measures defined as restrictive. These measures, like the FSCL, require pre-engagement coordination between the owner of the weapon system and the owner of the control measure.[14]

Joint Fire Support, with by far the most detailed description, also makes it clear that using the FSCL is optional. When used, however, establishment is the responsibility of the land or amphibious component commander in consultation with supporting and affected component commanders. It should follow well-defined terrain features (notably to assist with visual identification from the air) and should be flexible enough to coordinate changes in six hours. The manual explicitly states that the FSCL is not a boundary, does not create a free fire area beyond it, and does not relieve the land or amphibious commander of his responsibilities throughout the depth of his area of operations. Instead, it states that the "synchronization of operations on either side of the FSCL is the responsibility of the establishing commander out to the limits of the land or amphibious force boundary."[15]

Service definitions complicate matters. FM 3-0, *Operations*, a cornerstone manual for Army doctrine, provides a description of the FSCL consistent with that found in *Military and Associated Terms*. However, the official Army dictionary, FM 101-5-1, *Operational Terms and Graphics*, is seven years old and confusing. This manual actually contains two FSCL definitions. The first, an out-dated and incomplete version of the joint definition, does not place any requirement on forces conducting surface-to-surface attacks beyond the FSCL. In other words, it requires neither coordination with nor notification to affected commanders. The second, an Army definition, contains the "inform" requirement found in current joint definitions. FM 1-02,

[14] *Doctrine for Joint Fire Support*, III-13.

[15] Ibid., A-2. Many soldiers and airmen agree that contemporary navigational systems, like the global positioning system, make the requirement to place the FSCL on well-defined terrain features obsolete.

Operational Terms, which will supersede *Operational Terms and Graphics* when released for publication, contains a definition identical to that found in the *Dictionary of Military and Associated Terms*.[16]

Though Air Force Doctrinal Document 1-2, *Glossary*, does not contain a definition of the FSCL, the Air Force *Counterland* manual, describes the FSCL at length and refers to its joint definition and purpose, with modification. Significantly, *Counterland* states that when the ground component attacks "targets beyond the FSCL …it is required to coordinate with the air component to ensure deconfliction and prevent multiple assets attacking the same target." Note it does not say must inform or should coordinate, but is required to coordinate.[17]

In another departure from joint doctrine, Air Force doctrine implies boundary-like qualities to FSCL. In fact, *Counterland* states: "the FSCL is often used as the forward limit of airspace controlled by the theater air-ground system." Though not restricting close air support (CAS) and air interdiction (AI) to opposite sides of the FSCL, this division, if used, would partition responsibilities between the Air Support Operations Center short of the FSCL and the Joint Air Operations Center beyond it.[18]

Summary

Since DESERT STORM, the joint force has struggled, within the confines of poorly worded and inconsistent doctrinal definitions, to develop a common language and purpose governing the command and control of operational fires and effects. Unable to resolve this problem doctrinally, various components and individuals have proposed work-around solutions;

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[16] Department of the Army. FM 3-0, *Operations* (Washington, D.C.: Headquarters, Department of the Army, June 2001), 2-21; and Department of the Army. FM 101-5-1, *Operational Terms and Graphics* (Washington, D.C.: Headquarters, Department of the Army, September 30, 1997), I-67. See also Department of the Army. FM 1-02, *Operational Terms (Final Draft Edition)* (Fort Leavenworth, Kansas: Combined Arms Doctrine Directorate, August 2002). Somewhat out of place and contrary to other Army publications, this manual implies the FSCL has "boundary-like" qualities when it tells the reader to: "See also [the definition of] boundary …"

[17] *Counterland*, 59; and *Air Force Glossary*, (Headquarters, United States Air Force Doctrine Center, 2004, accessed January 27, 2004). Available from https://www.doctrine.af.mil/library/afdd1-2.asp. Author added emphasis.

[18] *Counterland*, 59. Author added emphasis.

most failed to work effectively or to gain acceptance by the joint force. Only one, the kill box, has had combat success and achieved widespread acceptance. In fact, all three major warfighting combatant commands – Central Command, European Command, and Combined Forces Command (Korea) (CFC) now include the kill box in their standard operating procedures. Two of these commands, Central Command (CENTCOM) and European Command (EUCOM) have experience with the kill box in war. [19]

Joint doctrine empowers commanders to deviate from doctrinal standards when exceptional circumstances provide justification. Deviate they have, but individually. A lack of doctrinal standardization has led to the development of three slightly differing versions of the technique. Even as its role increases in importance, this lack of standardization undermines the kill box's effectiveness. With these two points – general acceptance, but incomplete standardization – in mind, this paper asks: *Is it time to standardize the kill box and incorporate it into joint doctrine*?[20]

[19] United States Department of Defense. JP 3-60, *Doctrine for Joint Targeting* (Washington, D.C.: Joint Staff, January 17, 2002), B-7. For brevity, the phrase "three major warfighting combatant commands" refers to Central Command, European Command, and Combined Forces Command, Korea even though CFC is a combined command and not a combatant command in the Unified Command Plan.

[20] United States Department of Defense. JP 1-01 (Change 1), *Joint Doctrine Development System* (Washington, D.C.: Joint Staff, June 29, 2001), vi.

CHAPTER TWO: DEFINING THE KILL BOX

The term kill box is not new. In fact, though then performing a different task, kill boxes have been in the joint toolkit in one form or another since 1991. During Operation DESERT STORM, the JFACC established 30' by 30' boxes in which scout-killer teams roamed in search of specific target sets, usually Iraqi Republican Guard formations or mobile SCUD missile launchers. One account says this technique "doubled the F-16 BDA [battle damage assessment]," but at this stage, the JFC used the kill box exclusively to orient air assets beyond the FSCL.[21]

In 1997, the Air, Land, Sea Application Center (ALSA) published *Targeting: Joint Targeting Process and Procedures for Targeting Time-Critical Targets*. This all-service publication proposed, but did not standardize, techniques for the establishment of common grid reference systems (CGRS) and provides the foundation for the CGRS methodologies used today. In fact, European Command has adopted the ALSA CGRS construct virtually without modification. Though *Targeting* was also the first joint or service manual to introduce the term kill box, it did so in the DESERT STORM, not contemporary, context. [22]

When released, FM 3-09, *Doctrine for Fire Support*, will be the first Army-developed publication to discuss common reference systems and kill boxes. Yet, in the two brief paragraphs it dedicates to the subject, the manual creates a source of potential confusion. Defining the kill box as a "joint terrain reference system that may be used as a tool to facilitate rapid attacks" and stating that the kill box is "simply a common reference system that complements established fire support/airspace control systems and measures," it erroneously combines common grid reference systems (CGRS) and kill box concepts. While closely interrelated, the two are not synonymous. *Targeting* describes the former as a battlefield visualization framework, while the joint force

[21] Lt Col William F. Andrews, "Airpower against an Army: Challenge and Response in CENTAF's Duel with the Republican Guard" (Air University, February 1998), 52-53.

[22] Air, Land, Sea Application Center. *Targeting: Joint Targeting Process and Procedures for Targeting Time-Critical Targets* July 25, 1997), II-14 to II-25. The Army published *Targeting* as FM 90-36.

recognizes the latter as a coordination or synchronization technique. As used today, the kill box is a client of a common grid reference system, not a reference system itself. For instance, Combined Forces Command (Korea) defines the kill box as a CGRS targeting grid activated to achieve a specific purpose. In other words, the kill box comes into being after the CGRS.[23]

In contrast to the Army, more recently published Air Force and joint manuals address both common reference systems and kill boxes. All define the kill box as a "three-dimensional area reference that enables timely, effective coordination and control and facilitates rapid attacks." Additionally, both have manuals containing detailed descriptions of common grid reference systems. It is the Air Force, who first developed and used the kill box, which has taken the lead in evolving them to where they are today and it is the Air Force which is the most vocal on the subject of increasing the role of the kill box in joint doctrine.[24]

Combined Forces Command (Republic of Korea)[25]

Amongst the characteristics of the Combined Forces Command (Korea), most notable is the fact that this command is multinational in practice, not in theory. Unlike other commands, CFC is a fully multinational headquarters; it is not an American headquarters functioning in a multinational environment. In times of peace and war, CFC represents the combined military forces of the United States, the Republic of Korea; in times of war, it includes the United Nations. In the development of techniques and procedures, CFC must place multinational considerations (language, battle command technology, operational proficiency) at the forefront of the discussion

[23] Department of the Army. FM 3-09, *Doctrine for Fire Support (Final Draft)* (Washington, D.C.: U.S. Government Printing Office, November 2001), 3-22 and 23-23; and ROK-US Combined Forces Command. CFC 3-1, *Joint/Combined Fires (Korea)* (Seoul, Korea: Headquarters, Combined Forces Command, April 15, 2003), 48. FM 3-09, which remains in final draft form, is the first revision of Army fire support doctrine since 1988.

[24] *Doctrine for Joint Targeting*, GL7-8; and Department of the Air Force. AFDD 2-1.7, *Airspace Control in the Combat Zone* (Washington, D.C.: Headquarters, Department of the Air Force, May 9, 2001), 41.

[25] *Joint/Combined Fires*, Command. 41-56. Information found in the Combined Forces Korea section originates from this source and from Lieutenant Colonel John R. McIlhaney, 3d Battlefield Coordination Detachment unless otherwise noted.

more so than Central Command and European Command. This aspect will become more relevant later in Chapter Three, Analyzing a Potential Solution.

According to CFC 3-1, *Joint/Combined Fires*, the command uses FSCM to:

> enhance expeditious attack of targets; to protect forces, populations, critical pieces of infrastructure, and sites of cultural and religious significance; to deconflict fire support activities; and to set the stage for future operations. The primary purpose of permissive measures is to facilitate the attack of targets … Restrictive measures impose requirements for specific coordination before the engagement of targets.

Though *Joint/Combined Fires* accepts the joint definition of the FSCL, it "amplifies, for theater use, the doctrinal definition." Most notably, the publication defines a standard for FSCL placement in both the offense and defense, 25-40 kilometers and 15-25 kilometers from the forward line of troops respectively. It continues by stating that the FSCL generally follows terrain, but may follow along the corners of the Korean Common Grid Reference System (CGRS). Regardless of the method used, "friendly artillery (cannon) must range from the FLOT [forward line of own troops] to the FSCL (this to deny enemy sanctuary)." A key element, missing from the joint definition, resides in this publication.[26]

The baseline of the CFC kill box technique is the Korean Common Grid Reference System or KCGRS. Like those of European Command and Central Command, the KCGRS divides the area of operations, along lines of latitude and longitude, into 30' by 30', or approximately 30 NM by 24 NM, targeting grids. Each grid has a numeric-alphabetic name with 1A being in the lower left corner of the grid system. Within each targeting grid are 10' squares, each roughly 10 NM by 8 NM, named with a numeric keypad similar to a telephone. These subsections are the smallest divisions of the KCGRS. Figure 1, Combined Forces Command Kill Box Configuration, on the next page, provides an example of the labeling system.

[26] Author added emphasis. One could debate the specified distance, cannon artillery range, but the Command has identified a specific standard that all parties can recognize. In addition, with the kill box in use, the Command expects the "leading edge" of green kill boxes to define the placement of the FSCL and CFC 3-1 unambiguously makes the kill box the predominant coordinating measure. For example, a green kill box beyond the FSCL effectively moves the FSCL forward and a blue kill box short of the FSCL moves that portion of the FSCL closer to the FLOT.

According to CFC procedures, targeting grids or subsections become kill boxes when activated for use as a FSCM and airspace control measures. As FSCM, they are useful as "reactive, timely, and simple tools for combined force employment and component integration." As airspace control measures, they are control measures only in that aircraft must remain above selected altitudes to avoid friendly surface-to-surface fire. This provides the kill box a third-dimension.

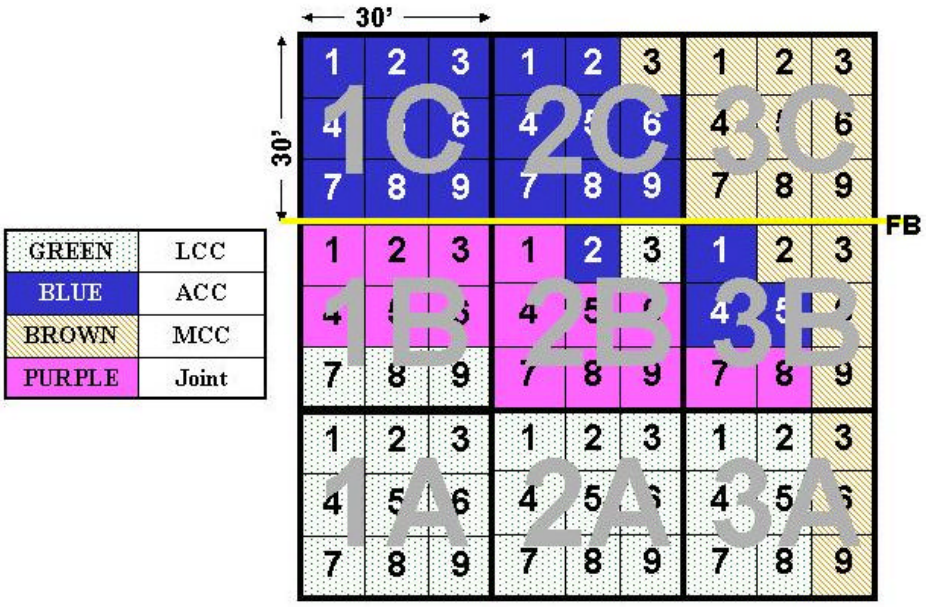

Figure 1. Combined Forces Command Kill Box Configuration (Using the KCGRS Baseline)

Kill boxes are color-coded (Figure 1 uses patterns and shading to provide a black and white example) to reflect the coordination required to engage targets within that area. Green or brown kill boxes reflect ongoing land or maritime component operations. Air-to-ground attacks in these kill boxes require positive control.[27] Aircraft transit green and brown kill boxes using

[27] This paper uses the terms found in each SOP, but recognizes that joint doctrine now identifies three types of terminal attack control. They are: Type 1(risk assessment requires visual acquisition of the attacking aircraft and the target); Type 2 (control desired, but visual acquisition of the attacking aircraft or target at weapons release is not possible or when attacking aircraft are not in a position to acquire the target prior to weapons release); and Type 3 (risk assessment indicates that CAS attacks impose low risk of fratricide). Positive control is most closely associated with Type 1 and "without positive control" is Type 3. See United States Department of Defense. JP 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support (Final Coordination)* (Washington, D.C.: Joint Staff, August 28, 2002), V-14.

previously established minimum risk routes or by remaining above the artillery altitude. Ground commanders must ensure the effects of their fires do not impact these routes and are responsible for the establishing and managing all other FSCM within the kill box.[28]

Blue kill boxes allow CFC to focus airpower into areas the land or maritime components cannot or will not engage. In a blue kill box, a CAS sortie may attack targets without positive control. Even more importantly, AI sorties may attack targets in blue kill boxes without regard to the location of the FSCL. In effect, the blue kill box implies the absence of friendly ground formations and individuals.

Purple kill boxes provide the best opportunity to integrate the combined effects of all fixed-wing assets, both CAS and AI, and surface fires. Just as in the blue kill box, AI can attack targets on either side of the FSCL, if used. CAS, though not normally flown into these kill boxes, is available to support the limited number of ground units, usually special operations forces, one might find operating in a purple kill box. NFA and RFA protect these ground units and their activities. An artillery altitude, like that of the green kill box, but at a lower altitude, creates spatial separation between air assets and surface-to-surface trajectories. The Battlefield Coordination Detachment (BCD) is responsible for coordinating all attack assets operating within a purple kill box.

The Integrated Targeting Order (ITO) designates the initial status of each kill box, but coordination between the BCD and the Combined Air Component Commander (CACC) can affect changes within the ITO cycle as required. Furthermore, the kill box system is flexible enough to allow the application of other coordinating measures without changing the status of the

[28] The CFC ACC establishes the "artillery" altitude as a ceiling for surface-to-surface fires short of the FSCL (that is, in green, brown, and purple kill boxes). Surface-to-surface fires exceeding this altitude require coordination with the ACC. However, unlike the minimum altitude of an airspace coordination area, there are no restrictions on aircraft transiting below this altitude. In other words, aircraft may transit below the artillery altitude after coordinating with the ASOC or by assuming risk. Aircraft might be more likely to assume this risk in a purple kill box (where surface-to-surface activity is less) than in a green one. The existence of this feature does not change the coordination requirements for air-to-ground attacks in a green kill box.

box itself. Though the only requirement to activate or change the status of a kill box is the approval of the supported commander, *Joint/Combined Fires* contains detailed instructions and considerations for the activating or effecting a change to kill box status. It is, by far, the most detailed and complete description of the kill box in the joint force.[29]

Combined Forces Command has confidence in the effectiveness of its kill box technique. The decision by its American component to abandon the FSCL during ULCHI FOCUS LENS 2003 is a clear demonstration of this confidence. Despite the existence of training problems and issues replicating kill boxes within current automated command and control systems like the Advanced Field Artillery Tactical Data System,[30] kill boxes proved that they provided a "very flexible way of delineating battlespace both in time and space." Given additional training and familiarization with kill boxes throughout the Command, it is possible the FSCL will play an even more limited role in future operations on the Korean peninsula.[31]

United States European Command[32]

Before Operation IRAQI FREEDOM, European Command (EUCOM) was the only major warfighting command with experience using kill boxes in a combat environment. Operation ALLIED FORCE, an air-centric operation aimed at the removal of Serbian troops from Kosovo, used this technique to focus air assets against enemy targets. However, the lack of

[29] The land or maritime component forward boundary is central to this process as it marks the point beyond which the CACC becomes the supported commander. Generally, CFC codes only those boxes between the forward line of troops and the LCC forward boundary. According to LTC McIlhaney, the CFC codes kill boxes short of the former and long of the latter by exception only.

[30] AFATDS does not currently contain a means to recreate the various aspects of a kill box (i.e. various color coding) nor can it manage so many entries (there are 154 30' by 30' targeting grids in South Korea). See Chapter Three, Analyzing a Potential Solution for more discussion on automation.

[31] Quotes from BG Richard P. Formica, electronic mail message to MAJ James W. MacGregor, "Kill Box - FSCL Question." Received January 12-14, 2004. Subsequent to the exercise, General Leon J. LaPorte, Commander, Combined Forces Command, directed his staff to "develop a plan to update CFC Documents and to train subordinate commands on the use of Kill Boxes and how to maximize their use in conjunction with the FSCL." LTC John R. McIlhaney, "Killboxes in Theater Publications (PowerPoint Briefing)," (CFC Quarterly Targeting Conference: 3d Battlefield Coordination Detachment (Korea), February 2004), Slide 2.

[32] United States European Command. *TTP for Command and Control of Joint Fires (Draft)* Headquarters, United States European Command, April 24, 2001), 4-1 to 4-5. Information found in the European Command section originates from Chapter Four, Kill Boxes, of this source unless otherwise noted.

friendly ground troops in Kosovo prevented ALLIED FORCE from fully testing the kill box as IRAQI FREEDOM would four years later. Still, EUCOM has valuable experience with this technique and, like CFC, it is experience gained within a permanent multinational structure, in this case the North Atlantic Treaty Organization.

The EUCOM publication for joint fires, *TTP for Command and Control of Joint Fires,* contains the joint definition of the FSCL without modification. The publication contains detailed instructions for movement of the FSCL, but does not provide placement guidance. The FSCL is a critical component of the EUCOM kill box technique.

The Joint Target Reference Grid System (JTRGS) is the common reference system for the EUCOM AOR. Similar to the KCGRS, this reference system provides theater-wide orientation and, though used to define kill box boundaries, its grids are not kill boxes. Just as in the other two combatant commands, the standard grid is 30' by 30'. As needed, EUCOM can divide each grid into nine sectors (a 10' by 10' division), each sector into four sub-sectors (a 5' by 5' division of the sector), and each sub-sector into two divided sub-sectors (a 5' by 2.5' division of the sub-sector).[33]

Each grid has a numeric-alphabetic name starting with 1A at the top left. Each sector has a number, one through nine using the telephone keypad, and each sub-sectors has a letter, A to D, starting with the top left sub-sector. Finally, each divided sub-sector is either W, for west, or E, for east, related to its position within the sub-sector. Therefore, the bottom right sector in Figure 2, European Command Joint Target Reference Grid System, on the next page, is location 4E9DE.

EUCOM references a CENTCOM publication, *USCENTAF/JFACC Concept of Operations for Command and Control of Air Operations,* to define a kill box as a "fire support and deconfliction measure used by the Theater Air Control System (TACS) for the command and control of airpower." As a fire support measure, the "intent of developing Kill Boxes is to quickly

[33] Though called the "Joint" Target Reference Grid System, this grid system technique applies only to those joint forces assigned to the European Command, not to all joint forces of the United States.

identify an area, clear of friendly forces, where joint force assets can attack targets without direct positive control." When employed properly, "kill boxes can speed the destruction of emerging or lucrative target areas or groups ... [and] "protect land component assets or operations [ATACMS or rotary-wing assets] beyond the FSCL from air attack." It is essential, according to EUCOM, to "ensure that they [kill boxes] are communicated rapidly to all users, are easily defined, and [that] the appropriate component command and control agencies can activate and deactivate them as a battle develops."

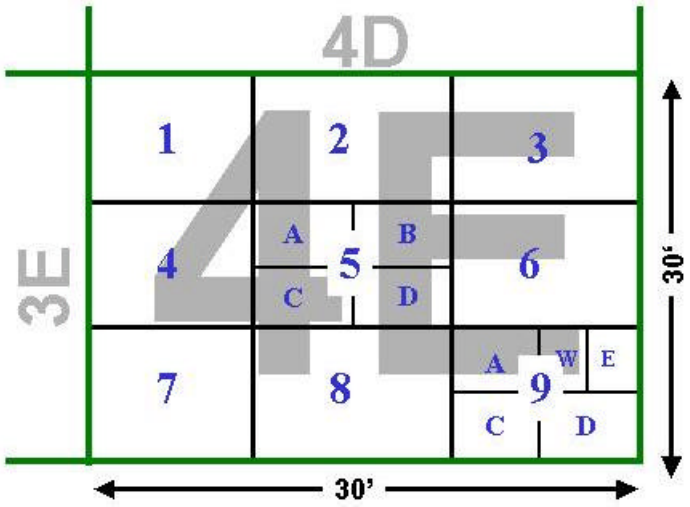

Figure 2. European Command Joint Target Reference Grid System

EUCOM target reference grids are either active for air attack, deactive for air attack, or not coded at all. The first two statuses indicate the presence of a kill box. In the latter status, no kill box is present. The EUCOM technique does not apply a kill box status to each target reference grid. Instead, it describes the establishment of one or more kill boxes for specific missions (as shown in Figure 3 on the next page). Neither non-coded target reference grids nor deactive kill boxes prevent target engagement with surface-to-surface fires. Only the presence of a restrictive FSCM (for example, a no fire area) can prevent the effect of those fires from affecting these areas. The LCC cannot engage targets in an active kill box, regardless of its position relative to the FSCL, without prior coordination with the ACC.

The Air Tasking Order coordinates all planned kill box changes, but immediate changes are possible through the airspace coordination process. By also coordinating altitude separation for aircraft, the kill box allows for massed air and surface fires against the target. When designated, active kill boxes, short of the FSCL, ensure clearance by the LCC and enable the ACC to engage specific targets and target sets in accordance with LCC priorities. With reasonable assurance in place, these attacks do not require positive terminal control.

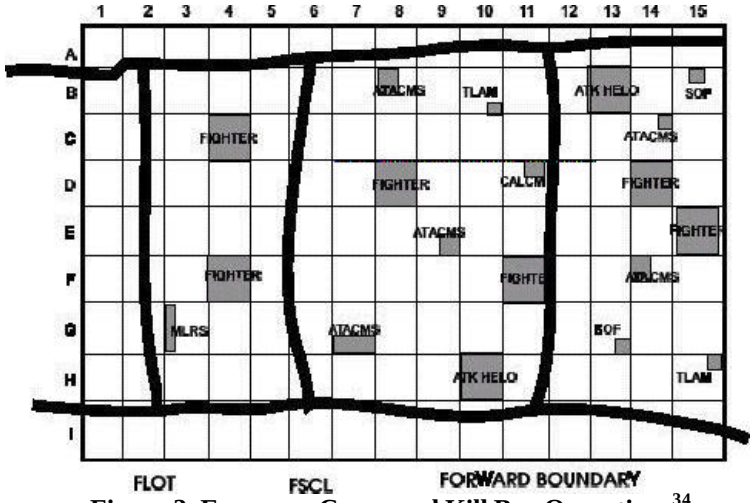

Figure 3. European Command Kill Box Operations[34]

Without a specific request from the LCC asking that a kill box become deactive for air, the ACC assigns and activates kill boxes for air attack between the FSCL and the land component forward boundary. These attacks must support LCC priorities. Beyond the forward boundary of the LCC, the ACC attacks targets in accordance with Joint Force priorities.

United States Central Command[35]

Consistent with joint and service doctrine, the Central Command publication on operational fires, *Concept of Operations for Joint Fires*, assigns commanders the responsibility for establishing FSCM within their area of operations to safeguard friendly forces and enable

[34] *TTP for Command and Control of Joint Fires (Draft)*, 4-2. Though taken from the EUCOM document, this diagram is identical to one found in the ALSA *Targeting* manual published in 1997. See *Targeting*, II-23.

[35] United States Central Command. *Concept of Operations for Joint Fires* (Tampa, Florida: Headquarters, United States Central Command, November 10, 1999), . Information found in the Central Command section originates from Chapter Four, Fire Support Coordination Measures, of this source unless otherwise noted.

joint and combined operations. This publication adopts portions of the Air Force concept of the FSCL, requiring coordination before the land component can engage targets beyond the FSCL, and specifically retains approval authority for placement of the FSCL at the Joint Task Force level, but provides no other guidance clarifying or augmenting doctrine.

As for kill boxes, the *Concept* states: "killboxes [sic] are integral to Joint Fire operations within the CENTCOM Area of Responsibility (AOR) and are supplemental and complementary to FSCM." Beyond confirming that kill boxes and doctrinal FSCM can coexist on the battlefield, this document makes it clear that kill boxes will not replace the FSCL. In fact, the FSCL plays a critical role in determining the restrictions resident in a kill box.

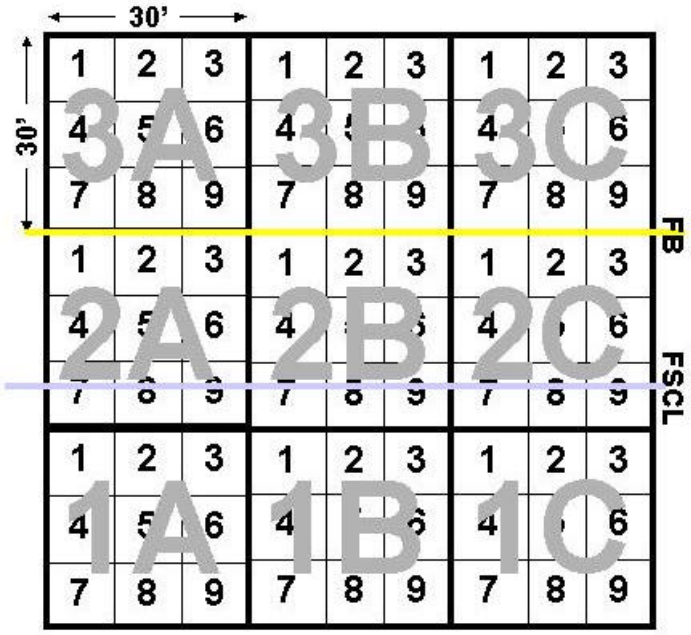

Figure 4. Central Command Kill Box Configuration

In the Central Command area of responsibility, kill boxes are 30' latitude by 30' longitude squares, roughly 30 nautical miles by 24 nautical miles, with a specified coordinating altitude. The command has the option of subdividing each kill box in one of three ways – four 15' by 15' quadrants labeled Northwest, Northeast, Southeast, or Southwest; or two 15' by 30' quadrants (the term used in CENTCOM) labeled North and South or East and West. The first two methods appear in CENTCOM publications, but a third method – nine 10' by 10' blocks

numbered like a telephone keypad – appeared during Operation IRAQI FREEDOM. Though CENTCOM used only the latter method during IRAQI FREEDOM, multiple methods provide additional flexibility by allowing the unit to tailor the shape and attitude of each kill box to the situation found on the battlefield.[36]

Using the CENTCOM kill box technique, a kill box is either open or closed and the restrictions and permissions flowing from being either open or closed depend on the position of the kill box relative to the FSCL. For example, all kill boxes short of the FSCL remain closed unless specifically opened by the Land Component Commander (LCC) and those beyond the FSCL remain open unless specifically closed. Between the FSCL and the forward boundary of the land component, the LCC approves changes from open to closed status and vice versa. Beyond the land component forward boundary, this responsibility rests with the Air Component Commander (ACC).[37]

LCC approval to open a kill box provides the reasonable assurance necessary to enable aircraft to operate without positive control in open kill boxes short of the FSCL. In effect, opening the kill box pre-clears the area. Called kill box interdiction, these missions must generally engage targets in accordance with land component priorities. Though, the intent of an open kill box short of the FSCL is to focus air assets against targets the LCC does not intend to strike with ground assets, the *Concept* does not restrict surface-to-surface fires into these kill boxes unless another FSCM, like an airspace coordination area, is active.

The LCC can close a kill box short of the FSCL at anytime, but must delay the introduction of ground troops or aircraft into that area until after the ASOC confirms the area is free of aircraft. Closed kill boxes do not prevent surface-to-surface engagements. If the command wants to prevent surface-to-surface fires from affecting all or part of a closed kill box, it must

[36] Kelly and Andreason: 22-23.

[37] Though not specified in the *Concept for Fires*, it is possible to assume that the Joint Special Operations Task Force Commander (JSOTF) would manage kill box statuses within the boundaries of his assigned Joint Special Operations Area (JSOA).

establish other FSCM, like restricted or no fire areas. However, air assets cannot engage targets in a closed kill box unless under the positive control of a Tactical Air Control Party (TACP).

CENTCOM requires air attacks into open kill boxes beyond the FSCL, yet short of the forward boundary, to comply with LCC targeting priorities. The LCC can close a kill box in this area at anytime by coordinating with the appropriate ASOC and BCD. Consistent with the CENTCOM FSCL definition, attacks by the land component into open kill boxes beyond the FSCL require prior coordination with the air component. Though CENTCOM does not specify the objective of open kill boxes beyond the forward boundary, one can assume that attacks into those kill boxes would support the objectives of the JFC and theater air interdiction plan.

The Kill Box in Operation IRAQI FREEDOM

Operation IRAQI FREEDOM provided Central Command its first opportunity[38] to use the kill box in a campaign involving large numbers of both ground and air forces. As planned, CENTCOM used kill boxes to coordinate, deconflict, and synchronize attacks. After Action Reviews report mixed success and suggest that implementation challenges prevented the FSCL-Kill Box combination from completely solving the problem of air-ground coordination.

According to Major General Daniel P. Leaf, Director, Air Component Coordination Element (ACCE), the "kill box/grid square method of deconflicting fires worked well and buy-in was complete at all levels by the end of offensive operations." However, in the next sentence of his report, he alludes to a problem. There was, he says, "difficulty in getting some Major Subordinate Commands to open Kill Boxes short of the FSCL." This observation reinforces comments, made by some Air Force officers, suggesting that V (US) Corps, by refusing to open kill boxes within its area of operations but short of the FSCL, created sanctuary for Iraqi forces. [39]

[38] To be more clear – first, DESERT STORM kill boxes were conceptually and functionally different from the technique studied by this paper and second, though CENTCOM did use the kill box (and no FSCL) during ENDURING FREEDOM, this operation lacked large-scale ground operations.

[39] Leaf, 22. The ACCE performed at the Combined Land Forces Component Command headquarters tasks similar to those performed by the BCD at the Combined Air Forces Component Command headquarters. See the source for more details.

These officers have said that the decision of V (US) Corps to leave closed kill boxes in its area of operations meant that as many as 80% of the AI sorties pushed to the corps at critical stages of the fight left without engaging any targets. Conversely, because the Marine Expeditionary Force routinely opened kill boxes short of the FSCL, 80% of the AI sorties sent to this area of operations expended all of their ordnance. While this critique fails to recognize the numerous other reasons why V (US) Corps might have turned aircraft away, if even partially true, it would represent the loss of a tremendous opportunity by the Corps.[40]

Members of the V (US) Corps staff disagree. In a presentation provided after the war, Lieutenant General William S. Wallace briefed that corps shaping operations, which in technique are similar to an old technique known as battlefield air interdiction (BAI), between the division forward boundary and the FSCL were "270% more effective than killbox [sic] interdiction." A second briefing, provided by the 4th Air Support Operations Squadron (ASOS), which supported the Corps during the operation, shows that over half of all sorties committed to the V (US) Corps area of operations did attack their target. Coordination problems caused the pilot to abort less than six percent of the time. Not perfect, but not the crisis of control some might argue.[41]

In reality, there is probably a little bit of truth to both perspectives, but there were other complaints about the kill box system as well. In the 3d Infantry Division (Mechanized) after action report, the division stated that kill boxes were not responsive to change during rapid offensive operations and that it had little control over which targets the Air Force attacked in open

[40] Amongst others, a senior Air Force officer made statements to this effect during a presentation to the School of Advanced Military Studies in late 2003. These statements fail to consider that a ground unit might turn aircraft away because it has more air support than it can manage (generally a good thing), because it lacks clearly identifiable or stationary targets, or any number of other reasons.

[41] "Operation Iraqi Freedom - After Action Report (3ID)", 106; LTG William S. Wallace, "Joint Fires in OIF: What Worked for V (US) Corps (PowerPoint Briefing)," (Fort Leavenworth, Kansas: Combined Arms Center, 2003), Slide 8; and "How We Fought OIF (PowerPoint Briefing)," (Mannheim, Germany: 4th Air Support Operations Squadron, July 17, 2003), Slide 16. Of the 45% who did not attack, problems ranged from target identification problems (45%), weapons problems or conflicts (29%), and fuel problems (20%). Only 5.9% had "miscellaneous" problems.

kill boxes short of the FSCL. Instead, it says, aircraft engaged "targets in the order they appeared on the battlefield" rather than targets on the division High Payoff Target List (HPTL).[42]

Despite these issues, most IRAQI FREEDOM after action reviews state that, when kill boxes worked, their benefits were persuasive. Most importantly, when they worked they alleviated the consequences of improperly placed FSCL. Again, some suggest the V (US) Corps positioned the FSCL too far forward on the battlefield. Those who do fail to realize, as LTG Wallace points out, that FSCL placement is the responsibility of the JFC with input from his land and air component commanders. This point aside, FSCL placement remained an issue at times. At some stages of the operation, it was over 100 kilometers forward of the front line of troops. Notably, but rarely mentioned, there were also at least two instances when the FSCL was too close; so close that the 3d Infantry Division (Mechanized) had troops at risk on its "far" side.[43]

Summary

The table in Appendix 2, Comparing Kill Box Techniques, illustrates the differences among these three techniques. Whether these differences are the result of the characteristics of the theater – friendly forces, the nature of the threat, and the terrain – or personalities is relevant, but difficult to determine. Is the expected nature of combat on the Korean peninsula – where terrain constrains mobility and slows the pace of offensive action – the critical factor in the decision by CFC to employ kill boxes and minimize the role of the FSCL? Has mobile desert warfare driven CENTCOM to maintain the FSCL while incorporating kill boxes?

While these are worthy questions, an analysis of the kill box can proceed without additional discussion on the FSCL. However, existing kill box procedures do not definitively answer one pivotal question the paper must address before continuing. Is the kill box a fire support coordinating measure, an airspace control measure (ACM), a maneuver control measure

[42] "Operation Iraqi Freedom - After Action Report (3ID)", 32 and 109.

[43] Leaf, 22; Wallace, Slide 22; and "Operation Iraqi Freedom - After Action Report (3ID)", 106 and 112. LTG Wallace, MG Leaf, 4th ASOS, and 3 ID(M) all point out the positive aspects of the kill box or suggest its retention.

(MCM), or a combination of all three? The answer to this question influences the development and selection of evaluation criteria.

Categorizing the kill box as a FSCM, ACM, or MCM is complicated because it has features of all three. Like an FSCM, the purpose of a kill box is to "facilitate the rapid engagement of targets" and "provide safeguards for friendly forces." In most cases though, FSCM place an emphasis on protecting ground, not air forces. The kill box functions as an airspace control measure by effectively creating airspace coordination areas in blue, open, or active for air kill boxes and coordinating altitudes in purple kill boxes. Finally, it assumes MCM characteristics by facilitating ground or air freedom of action and maneuver within a designated area by restricting the actions of other components in the same area (as a boundary would).

Despite possessing boundary-like qualities, the joint force should be cautious suggesting that the kill box is an MCM. Unlike a boundary, the kill box should not separate targeting and execution responsibilities between commanders.[44] Blue, open or active kill boxes merely pre-clear portions of the area of operations and allow supporting commanders to strike targets in these areas within the limits of the supported commander's targeting priorities and objectives. If the supporting commander does not adhere to these priorities and objectives, he could desynchronize the supported commander's concept of operations and place the overall mission at risk. Because of this threat to the principle of unity of effort, any additional suggestion that the kill box has MCM characteristics seems inappropriate.

Both Combined Forces and Central Commands manage kill boxes as FSCM. Combined Forces Command's *Joint/Combined Fires* says that the kill box is both an FSCM and an ACM, but it minimizes the kill box's ACM characteristics by stating that the kill box is an ACM only to the "extent that aircraft are required to remain above selected altitudes" to avoid friendly artillery

[44] By definition, the FSCL "does not divide an area of operations by defining a boundary." However, in practice, the FSCL is the point at which the LCC passes significant portions of his battlefield responsibilities (intelligence, surveillance, and reconnaissance (ISR) and targeting execution) to the ACC.

fire. In Central Command, kill boxes appear in the FSCM chapter of the *Concept for Joint Fires*. The same document defines the kill box as a "fire support and deconfliction measure" complementing, not precluding or conflicting with, "other fire support control measures." One could infer that CENTCOM, like CFC, sees the kill box as more FSCM than ACM.[45]

Emphasis on the kill box as an FSCM is acceptable, but it is an incomplete characterization. Though joint doctrine does not specifically define FSCM as two-dimensional in nature, all current fire support coordinating measures, except, one could argue, the FSCL, are two-dimensional; they lack consideration of airspace. Similarly, airspace control measures fail to consider ground operations. Combining the protective features of an ACM (i.e., a coordinating altitude) with the kill box creates a three-dimensional means to enable rapid target engagement and protect friendly ground and air forces. This is the very definition of an FSCM.

With an understanding of the three existing kill box techniques and an idea of what a kill box is and is not, this paper returns to the original question: *Should the joint force standardize the kill box and incorporate it into joint doctrine?* The existence of multiple, unique techniques could cause potential interoperability problems for the joint force. Anecdotal evidence suggests that some of the problems V (US) Corps, from EUCOM, and the Air Component Coordination Element, a CENTCOM staff element, experienced are attributable to a different understanding of kill boxes. Likewise, V (US) Corps procedures, like "corps CAS," that were unfamiliar to the 3d Infantry Division bred coordination problems and frustration in both headquarters. Some standardization of techniques seems warranted, but can the kill box meet the needs of the joint force sufficiently enough to be included in joint doctrine? To answer this, a more detailed analysis of the kill box is necessary.[46]

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[45] *Joint/Combined Fires (Korea)* 48; and *Concept of Operations for Joint Fires*.

[46] See "Operation Iraqi Freedom - After Action Report (3ID)", 106-109. LTC Thomas Kelly argues that "different equipment and procedures" caused coordination issues between the BCD and COAC, drawn from different combatant commands. Kelly and Andreason: 25.

CHAPTER THREE: ANALYZING A POTENTIAL SOLUTION

In the development of joint and service doctrine, like that involving maneuver control measures and fire support coordinating measures, doctrine writers must first conduct an analysis, not unlike the METT-TC (mission, enemy, terrain, troops, time, and civil considerations) analysis of a combat operation, to understand the environment within which the joint force operates. The mission, the nature of contemporary military operations, and the capabilities and limitations of the United States, its friends, and its enemies are just a few of the factors the doctrine writer must take into account. Beginning with a look at the contemporary operating environment, this chapter will explore some of these considerations as it defines the evaluation criteria.

Defining the Contemporary Operating Environment

A veteran of the great battles in Western Europe during 1915-1918 would have felt naked in the deserts of Kuwait and Iraq in 1991 without the benefit of the massive trench systems with which he was familiar. Shown a map, however, he could likely distinguish rear from close or deep areas and become comfortable with the relatively shoulder-to-shoulder aspect of the linear battlefield. It has been for these battlefields that contemporary joint and service doctrine exists. Unfortunately, they belong more to history than to the future. Instead, as the prognostications of military scholars and think tanks suggest and recent operations in Afghanistan and Iraq substantiate, most contemporary battlefields are composed of non-standard force mixes using asymmetric tactics and techniques to identify and fight an invisible enemy in complex, noncontiguous, and independent areas of operation. What changed? Why?

The change is predominately the result of gross skill and technological overmatch between the United States and those who would threaten its national security interests. Combat operations in Iraq, both in 1991 and 2003, have demonstrated the superiority of Coalition, meaning American, command, control, and weapons systems against what were numerically larger forces. With its precision weapons, advanced navigational technology, state-of-the-art

information systems, and superbly trained soldiers, airmen, sailors, and marines, the United States has no peer competitor. Overmatch has created both positive and negative side effects.

From the positive perspective, decisive overmatch allows the United States and its allies to achieve and sustain the initiative. The United States wishes to defeat its enemies using long-range, precise weapons, and information superiority – a friendly common operating picture matched with superior satellite- and communications-based intelligence – simultaneously and throughout the depth of the battlespace. As the rolling start in Operation IRAQI FREEDOM demonstrates, the United States can pick the time, the place, and the method of engagement almost at will and win a conventional engagement. The goal is to mass capabilities, to create a physical and psychological effect greater than the sum of its components. Called "cybershock," this new way of war demands a departure, both intellectually and physically, from the linear battlefield.[47]

Though technology may make defeating adversaries less challenging, it will not, by itself, accomplish the task. Threat forces desire victory as much as the United States does and will continuously strive to employ niche technology and develop tactics and techniques that neutralize the advantages the United States possesses. They hope for success in terrorist and guerilla tactics, decentralized command structures, and dispersed forces, often intermingled with no-strike infrastructure and noncombatants. Both the Taliban and the Fedayeen Saddam used this technique with some success. In both cases, there were no front or rear areas; there was only the battlefield without distinct divisions between friend and foe.

Though the overmatch currently enjoyed by the United States over its enemies, real and potential, may be historic in scale, the concept is not new. Adversarial relationships have

[47] Dr. James J. Schneider, "A New Form of Warfare," *Military Review* LXXXX, no. 1 (January-February 2000).; One need only consider OEF, OIF, or the capabilities of the Stryker Brigade to understand that the American way of war is evolving into one heavily dependent on decentralized, but joint action, covering vast areas of operation. Among other documents, see also the "Guide to Army Transformation" (Washington, D.C.: Association of the United States Army, 2001).

contributed to the pursuit of match and overmatch since the beginning of warfare. It cannot, however, be forgotten as the joint force struggles with solutions to its doctrinal challenges. Joint doctrine is "written to reflect existing capabilities" – both good and bad. If one result of these capabilities is the creation of a nonlinear, noncontiguous battlefield, intended or not, the characteristics of this battlefield must influence the doctrinal development process that supports the joint force.[48]

Selecting and Defining Evaluation Criteria

With a basic understanding of the contemporary operating environment in hand, it is possible to develop evaluation criteria for coordinating measures designed to work in this environment. There is no published standard for evaluating the feasibility, acceptability, and suitability of individual fire support coordinating measures, either during doctrine development or during the planning and execution phases of combat operations. However, careful consideration of JP 3-09, *Joint Fire Support*, provides options. This publication describes key definitions, identifies two key concepts – joint fire support coordination principles and basic joint fire support tasks – and suggests that these items, coupled together, provide the standard by which the joint force commander can assess the effectiveness of the joint fire support system.

It seems reasonable to expect that if these concepts evaluate the overall system, their core characteristics could form criteria useful to evaluate the effectiveness of specific fire support coordinating measures like the FSCL or kill box. Logically, if a FSCM helps the joint force accomplish these tasks or sustain these principles, it should be included in joint doctrine. Alternatively, if the FSCM violates a coordination principle or prevents the accomplishment of a basic task, it is not a benefit, but a hindrance to the overall fire support system.

Joint Fire Support says that fires are the effects of lethal and nonlethal systems and joint fires are those fires "produced during the employment of forces from two or more components in coordinated action toward a common objective." In other words, it is neither the delivery system

[48] *Joint Doctrine Development System*, I-2.

nor the technique that make joint fires joint. Instead, fires become joint through "flexible and responsive" coordination procedures that synchronize operations to "place the right attack means on the correct target at the precise time." This coordination includes measures designed to "deconflict attacks, avoid fratricide, reduce duplication of effort, and assist in shaping the battlespace." Fire support coordinating measures exist to help the joint force fulfill these requirements.[49]

The coordination required to transform service fires into joint fires is a "continuous process of planning and executing" supported by a distinct set of principles. These principles, shown in Table 1, Principles of Fire Support Coordination, stress the efficient, synchronized, and flexible application of all available fire support systems. Their goal is to guide fire support planning and execution towards the coordinated accomplishment of the four basic fire support tasks. In the end, the successful performance of these tasks ensures effective fire support.[50]

Principles of Fire Support Coordination **Source: JP 3-09, Joint Fire Support except as noted.**	
Plan Early and Continuously	Avoid Unnecessary Duplication
Ensure Continuous Flow of Targeting Information	Coordinate Airspace
Consider the Use of all Lethal and/or Non-lethal Attack Means	Provide Adequate Support
Use the Lowest Echelon Capable of Furnishing Effective Support	Provide for Rapid Coordination
Furnish the Type of Fire Support Requested	Protect the Force
Use the Most Effective Means	Provide for Flexibility
Consider the Use of FSCM (FM 3-09 DRAFT, pages 3-4 and 3-5)	Maximize Use of Digital Equipment (FM 3-09 DRAFT, pages 3-4 and 3-5)
Correlate Essential Fire Support Tasks with Decisive Points (FM 3-09 DRAFT, pages 3-4 and 3-5)	Provide for Safeguarding and Survivability of Friendly Forces and Installations (FM 6-20)

Table 1. Principles of Fire Support Coordination

[49] *Doctrine for Joint Fire Support*, v and III-3. According to *Joint Fire Support*, the purpose of a FSCM is to "enhance the expeditious attack of targets, protect forces, populations, critical infrastructure, and sites of religious or cultural significance, and set the stage for future operations." See *Doctrine for Joint Fire Support*, A-1.

[50] *Doctrine for Joint Fire Support*, III-7 and III-2. According to *Joint Fire Support* and FM 3-09, *Doctrine for Fire Support* (Final Draft), these principles evolve from the four basic fire support tasks. Similarities in these two manuals exist because the Army is the proponent for both publications. Air Force doctrinal publications do not address coordination principles or basic fire support tasks.

If accomplished, these four basic fire support tasks – support forces in contact, support the concept of operations, synchronize fire support, and sustain fire support operations – provide reasonable assurance to the joint force commander that he will achieve the desired effects on the enemy and set the conditions for decisive operations. Inherent in these tasks is the expectation that the joint force will provide "responsive fire support [throughout the area of operations] that protects and ensures freedom of maneuver," will focus on command-designated high-payoff targets, and will "continuously and concurrently" plan to synchronize joint assets to "optimize limited resources, achieve synergy, and prevent fratricide." Three themes – efficiency, synchronization, and flexibility – appear again and form the basis for the evaluation criteria.[51]

The broadest and most important of the three evaluation criteria, efficiency, has several elements critical to the success of the joint force. Undefined by joint doctrine, the *American Heritage Dictionary* defines efficiency as "acting or producing effectively with a minimum of waste, expense, or unnecessary effort." At its core, efficiency implies that joint coordination measures support the mission and intent of supported commanders by facilitating the engagement of high-payoff targets with the right attack means on the right target at the right time. The joint force cannot expend limited air and ground assets on duplicated targets or on targets of only tangential significance to the concept of operations.[52]

Secondly, efficiency requires that the control measure adequately address the intrinsic requirements of the four basic tasks and coordination principles. It must enable "responsive fire support that protects and ensures freedom of maneuver to forces [air, land, and maritime] in contact." To gain responsiveness, FSCM must react readily by limiting procedural requirements during their creation, modification, or deletion. Simultaneously, it must be neither too restrictive

[51] Ibid., III-2; and *Doctrine for Fire Support (Final Draft)*, 1-12 to 11-17. The fourth task, sustain fire support operations, which focuses on the logistical science of fire support, is not a major component of these proposed evaluation criteria.

[52] Excerpted from *American Heritage Talking Dictionary (CD-ROM)*, (The Learning Company, 1997, accessed January 2004); and *Doctrine for Joint Fire Support*, III-7.

nor carelessly permissive. Balancing restrictions and a permissive intent, a well-defined FSCM protects the force and expedites synchronized attacks equally well. [53]

Thirdly, the FSCM must be simple, usable, and applicable to the entire joint (air, land, special operations, and maritime components) and multinational force. The foundation of this requirement lay in a common understanding of the measure. As shown, when defining the FSCL, joint doctrine fails to establish a common understanding of the requirements the measure imposes. Does it require coordination or notification? By definition, the requirement is the latter, but in practice, the joint force expects the former. To be effective, doctrine should unambiguously describe the coordination requirements each control measure imposes. It must specify those requirements placed on the supported force and those placed on supporting forces at all affected levels of command. Furthermore, as it applies to this topic, joint doctrine should be prescriptive and consistent across service doctrine.

For a measure to be simple, usable, and applicable across the joint force, the joint force must also consider the impact of automation technology. The United States possesses a digitization capability far greater than its allies or potential enemies, but it does not equally distribute this technology across the joint force. Disparities exist between and within services and are particularly acute between Active and Reserve-National Guard components. The effect can be significant. Consider the impact of automation on the kill box.

Maximizing the benefits of the kill box is digitization intensive. Currently, the Advanced Field Artillery Tactical Data System, the primary fire support planning and execution tool found in Army and Marine Corps division and brigade headquarters, cannot replicate any of the three kill box techniques. Instead, these subordinate headquarters develop solutions through creative manipulation of existing FSCM, usually free fire areas and airspace coordination areas. Neither work well. Furthermore, the potential for dozens or even hundreds of 10’ by 10’ boxes is

[53] *Doctrine for Joint Fire Support*, III-2. Responsiveness, according to *American Heritage*, implies the ability to “readily react to suggestions, influences, and efforts.”

enormous and exceeds the capability of AFATDS. Though surmountable –software patches are common – this challenge remains worthy of consideration.[54]

While the United States struggles with joint interoperability, it must also consider the importance of allied and coalition interoperability. The United States has not conducted a major combat operation without some degree of multinational participation since the Spanish-American War. Routinely, this participation includes the Republic of South Korea, members of the North Atlantic Treaty Organization (NATO), and the American, British, Canadian, Australian (ABCA) Armies Standardization Program. At other times, this group has expanded to include states from throughout the world. Differences, in national and military language, warfighting skills, and technological capability, abound.

The United States should not discount these issues. Proposed doctrine should efficiently work within the battle command capabilities and technology of coalition partners without significant modification. The United States should not act in haste, but acknowledge that it takes time for each multinational partner to review, accept, and integrate new ideas. If one assumes that multinational partners will adopt American doctrine, they presuppose these partners can (culturally, philosophically, and technically) adopt American doctrine. For some of these very reasons, some aspects of coalition doctrine differ altogether from joint doctrine.

The second criterion is synchronization. Like the FSCL, most FSCM evolved from the requirement to spatially deconflict fires from maneuver or other fires. However, deconfliction is by definition, the act of separating. Frequently, FSCM provide this effect in much the same way a traffic light does, by halting one activity for the benefit of another. It is a concept opposed to

[54] III (US) Corps Effects Coordination Cell, "Ulchi Focus Lens 2003: After Action Review (PowerPoint)," (September 12, 2003), Slide 13. In the briefing and during a telephone conversation with the author (on January 29, 2004), Captain Vela, 212 Field Artillery Brigade Fire Control Officer, noted the incompatibility of kill boxes and AFATDS. As a work around, the brigade used free fire areas and "hand-jammed" an FSCL, since CFC and Corps did not provide one, using the leading edge of green kill boxes. Only the Automated Deep Operations Coordination System (ADOCS) and C^2 personal computers (C2PC) effectively replicate the kill box without such "jury-rigging." Neither system exists at the division level or below.

contemporary joint and service concepts that stress the synergistic effect of synchronization. What the joint force desires is a traffic circle, a technique able to synchronize, in time, space, and purpose, the system without stopping the forward progress of its components.

To demonstrate the emphasis, consider the words "deconflict" and "synchronize" in joint doctrine. "Deconflict(ion)" appears in *Joint Fire Support* 11 times and always in the context of separation. On the other hand, "synchronization" appears in the same manual 38 times (or almost once every other page). Furthermore, the opening paragraph of *Joint Fire Support* stresses that the joint force "must synchronize a variety of fires in time, space, and purpose to increase the total effectiveness of the joint force." Joint doctrine "recognizes the fundamental and beneficial effects of teamwork and unity of effort, and the synchronization and integration of military operations in time, space, and purpose." With this in mind, the ability to synchronize becomes the second evaluation criterion.[55]

The third criterion is flexibility. According to JP 3-09, *Joint Fire Support*, the joint fire support system (including its coordinating measures) must be "flexible and dynamic enough to support changing requests and demands for support." In the contemporary operating environment described earlier, this is a trait essential to the success of joint military operations. Flexible coordination measures support, with minimal modification, full-spectrum operations in all terrain regardless of battlefield construct (contiguous or noncontiguous, linear or nonlinear). In short, the ideal FSCM possesses the flexibility to support the joint force in unpredictable and diverse situations. When it fails to work, it remains flexible enough to provide the joint force commander options for modification.

[55] *Doctrine for Joint Operations*, ix. Author added emphasis. *American Heritage* says synchronization is "to operate in unison" or "to make into a whole by joining a system of parts." The product of synchronization is synergy which *American Heritage* defines as the "interaction of two or more agents or forces so that their combined effect is greater than the sum of their individual effects" and "cooperative interaction among groups … that creates an enhanced effect."

Perhaps even more challenging, flexibility cannot limit precision. An FSCM must provide precise solutions to spatial challenges during the current fight while laying the framework for future operations. This implies a level of fidelity suitable for air-to-ground and ground-to-ground operations in the wide-open expanse of a desert and within the complex terrain of the modern metropolis. In other words, the boundaries of the measure must be neither too large nor too small, but adaptable to the mission of the joint force and the environment in which it operates.

This paper proposes three evaluation criteria – efficiency, synchronization, and flexibility – rooted in doctrine. They are not quantitative in nature, but require a subjective assessment of published doctrine, guidelines, and procedures that the joint force may or may not consistently implement. To supplement this analysis, the evaluation includes observations from Army, Marine Corps, and Air Force officers who used the kill box during Operation IRAQI FREEDOM.

Evaluating the Kill Box

Is it necessary to first compare and contrast the Central Command, European Command, and Combined Forces Korea kill box techniques before beginning the evaluation? The answer is no. Though their distinctiveness served as part of the justification for this paper, none of the most significant variances – in dimensions, labeling, and establishment authorities – thwart a conceptual analysis. These differences can be resolved should the joint force choose to include the kill box technique in its doctrine. Consequently, this evaluation considers the kill box technique on the collective merits and shortcomings of all three existing variants and their performance in combat and exercise simulations. It does not seek to answer which technique is best, but if the concept, as currently written and exercised, is worth inclusion in joint doctrine. An argument for one variant over another can take place only after reaching an affirmative answer to this question.

As described earlier and shown in Appendix 3, Kill Box Evaluation Summary, the first evaluation criterion – efficiency – has multiple components. The first of these requires that the coordination measure support the mission and intent of the supported commander. It must enable

the joint force to attack the right target with the right weapons system, at the right time, and without wastage or excess. In theory, the kill box appears to meet this requirement. The kill box allows the joint force commander to precisely divide the area of operations and assign responsibilities based on the capabilities of his force. Within these divisions, the supported commander establishes target priorities, attack guidance, and intelligence collection priorities to support his operation.

During IRAQI FREEDOM, however, the kill box had mixed success fulfilling this requirement. While the "benefits of that approach [the kill box] were compelling" and numerous attacks against lucrative targets occurred that would not have occurred without open kill boxes, there were some prioritization issues. According to the 3d Infantry Division (Mechanized) after action review, the "Air Force destroyed targets as they were acquired instead of what the maneuver commander wanted destroyed." Unsynchronized attacks such as these transform the kill box into a glorified free fire area where individual pilots and observers, not supported commanders, establish priorities. For the kill box technique to effectively support the concept of operations and the principle of unity of effort, the joint force must do better communicating and adhering to those priorities established by the supported commander.[56]

The next two requirements of efficiency – force protection and rapid coordination – are closely related. The coordination measure must allow the latter without imposing excessive risk on the former. In one step, the kill box achieves rapid coordination by segmenting the battlefield into pre-cleared areas (designated open or active) and non-cleared areas (designated closed or inactive) for specific times and activities (as in the color-coded labeling method). Critical to the

[56] Leaf, 22; and "Operation Iraqi Freedom - After Action Report (3ID)", 109. In the particular example, MG Leaf provides in his AAR, the Coalition killed 24 Iraqi main battle tanks that were short of the FSCL, but within an open kill box. MG Leaf believes that without the kill box being open, these attacks would not have taken place. Under existing joint doctrine, the tanks, being out of ground-based direct and indirect weapons system range, would have found "sanctuary."

notion of pre-clearance is the level of confidence the commander designating a kill box has in his common operating picture.

Does the commander understand, with certainty, the arrangement of his ground and air assets on the battlefield? High-fidelity battle command systems are a prerequisite to attaining confidence in this situational understanding. Some suggest that a lack of confidence in these battle command systems, not a lack of faith in kill boxes themselves, are a main reason why some ground commanders might be reluctant to use kill boxes. Though not possible to prove, it seems reasonable to expect that individuals slow to rely completely on automated battle command systems would be equally unwilling to rely on a technique so dependent on those systems.[57]

Rapid coordination becomes more challenging and force protection increasingly risky as the joint force places other FSCM (restricted fire areas, no fire areas, etc.) within the kill box. For example, on the Korean peninsula limited numbers of ground troops, most likely special operations forces, may operate inside a purple kill box. Protecting them requires the establishment and widest dissemination of restricted fire and no fire areas and modification to the terminal attack control procedures for a purple kill box. Both of these steps impose greater complexity on the battle command system and additional stress on the joint common operating picture. Still, overcoming this complexity gives the commander still more flexibility to meet the challenges of his area of operations.

Rapid coordination also relates to the ease with which the joint force can establish or modify a coordination measure. Joint doctrine allows up to six hours to modify and disseminate the FSCL. On a dynamic battlefield, six hours is too long. In IRAQI FREEDOM, V (US) Corps was able to internally coordinate a change to a kill box status within minutes, usually as few as

[57] LtCol Michael P. Connolly, electronic mail message to MAJ James W. MacGregor, "Re: Kill Box Monograph." Received February 12-17, 2004. In this email, LtCol. Connolly, who works at the United States Air Force Air Ground Operations School, suggested that during OIF "ground commanders were reluctant to open them [kill boxes]. This was not so much due to excessive procedural steps as it was due to concerns about battle tracking...could we really ensure no friendlies were in the kill box?"

five. When forced to coordinate a change outside their headquarters (with CFLCC and the Coalition Air Operations Center), it required hours of coordination. On some occasions, the evolving battlefield situation made the change outdated before it became effective. This experience suggests that when the supported commander at the lowest level is empowered to make these decisions, coordination can occur rapidly.[58]

So, does the kill box protect the force while facilitating rapid coordination? The answer is a tentative yes. Coalition air forces struck numerous targets in open kill boxes that would have otherwise escaped attack and there were no fratricides during ENDURING FREEDOM or IRAQI FREEDOM attributed to a failure of the kill box technique. Indeed, a senior Air Force officer told the School of Advanced Military Studies that he was "not aware of any misapplication problems" during operations in Iraq. Despite this success, it is evident that more work needs to be done. Identifying the appropriate establishment authority, building confidence in kill boxes, and adjusting to the complexities of kill box-FSCM combinations will take time and training.

The fourth requirement of efficiency is ease of use and universal applicability across the joint force. IRAQI FREEDOM after action reviews are replete with positive comments, "worked well" and "continue [the] kill box method of clearance of fires" amongst them, but significant interoperability issues remain. Earlier this paper addressed the inability of some automated battle command systems to support the kill box technique, but it has not yet addressed the issue of kill box terminology and the impact of words on ease of use and universal applicability.[59]

Two kill box terminology issues create confusion or cloud intent and priorities. The first is the name itself. The very name, kill box, suggests an area in which the joint force will kill

[58] LtCol Michael B. McGee, electronic mail message to MAJ James W. MacGregor, "Kill Box Research." Received February 20-23, 2004; and "Operation Iraqi Freedom - After Action Report (3ID)", 109. Both sources argue for the management of kill boxes at the lowest level possible. As an additional note, V (US) Corps developed its own color-coded system to work within the CENTCOM open and closed construct. V (US) Corps further designated CENTCOM closed kill boxes as green (similar to the CFC green) or black (similar to a CFC purple box); open kill boxes were blue. Changes to these statuses could occur rapidly because they occurred within the Corps and did not require external coordination.

[59] Leaf, 22; and "Operation Iraqi Freedom Lessons Learned: Section II (Fire Support), Chapter 3 (Division Artillery Fires)" (101st Airborne Division (Air Assault)), 3-22.

things. This name ignores the application of non-lethal effects (information operations, electronic warfare, psychological operations, etc.). Moreover, even within an open kill box, protected sites (religious, cultural, essential infrastructure) must remain protected. Explaining to the public that an errant missile has destroyed a school or hospital in a kill box would be, at best, challenging.

The second terminology issue involves the labels chosen for specific kill boxes. During IRAQI FREEDOM, the "open" label confused some pilots. Was it open for them or for someone else? Green usually means "good to go," but who is a "go" in a green kill box? The terms are understandable to those familiar with them, but non-standardized and unclear terms create confusion, uncertainty, and doubt. The FSCL, with its history of confusing terms and incomplete definitions, serves as a case in point. To be readily usable across the joint force, the kill box needs clear and unambiguous terminology.[60]

The final requirement of efficiency involves interoperability between American, allied, and coalition forces. Several examples suggest that, in this requirement, the kill box has not succeeded. In CFC, the Korean component has not yet adopted kill boxes. The term "kill box" has an altogether dissimilar meaning in ABCA doctrine and is absent from NATO doctrine. Not only must the United States translate this concept into coalition doctrine, if it chooses itself to adopt it, but it must then also overcome the automation disparities between itself, its allies, and its coalition partners. This requirement demands greater attention or a conscious decision to accept risk and limit interoperability in a multinational environment.[61]

As a synchronization tool – the second evaluation criterion – the kill box receives generally high marks. According to the 3d Battlefield Coordination Detachment (Korea), the use of kill boxes is the most appropriate control measure to meet the conditions of the battlefield.

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[60] Connolly electronic mail message. LtCol Connolly has suggested the term Component Commander Coordination Box. Major Gregory Zehner, a member of the SAMS FSCL White Paper group suggested Coordination and Control Box (CCB).

[61] LTC John R. McIlhaney, electronic mail message to MAJ James W. MacGregor, "Kill Box Follow-Up." Received February 18-27, 2004.

They are more efficient, allow rapid changes and selective management of battlespace, and integration of assets where needed. Members of the 101st Airborne Division (Air Assault) concurred when, in their Operation IRAQI FREEDOM after action review, they wrote that kill box "grids allowed the brigade to easily and quickly de-conflict airspace to mass the effects of attack aviation, CAS, ATACMS, and JSEAD, allowing for a synergistic effect of fires at the decisive point." These comments describe the very essence of synchronization.[62]

All three kill box techniques allow for the simultaneous attack of targets by ground- and air-based weapons systems. Closed, inactive, or green/brown kill boxes accomplish this by separating friendly weapons systems spatially – by establishing minimum or "artillery" altitudes – and procedurally – terminal attack control procedures. These measures mitigate the risk of fratricide to friendly forces by isolating weapons systems – ground-based direct and indirect fires systems, attack helicopters, and fixed-wing aircraft – without isolating their effects. See Figure 5, Combined Forces Command Kill Box Types.

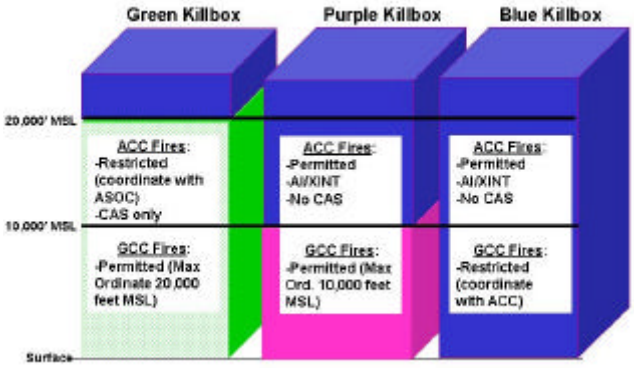

Figure 5. Combined Forces Command Kill Box Types[63]

[62] COL Jeffrey Yaeger, "CFC Control Measures (PowerPoint Briefing)," (3d Battlefield Coordination Detachment (Korea), June 27, 2003), Slide 18; and "Operation Iraqi Freedom Lessons Learned: Section II (Fire Support), Chapter 3 (Division Artillery Fires)", 3-18 and 13-19. Author added emphasis.

[63] LTC John R. McIlhaney, "XVIII Airborne Corps Battle Command Seminar Briefing: Kill Boxes (PowerPoint)," (3d Battlefield Coordination Detachment (Korea), January 2004), Slide 4. Whether a 20,000' MSL artillery altitude is the right answer or not remains a point of discussion within CFC. In part, the capabilities and limitations of American and coalition aircraft will determine this altitude. In Central

While existing doctrinal measures – combinations of fire support, maneuver, and airspace control measures – also enable some simultaneous attacks, they have limitations. For example, targets not within close proximity of ground troops fall into the air interdiction category of air support. Current doctrine makes it difficult to engage these targets with air- and ground-based assets simultaneously because AI usually occurs on the far side of the FSCL where coordination requirements delay or hinder the use of surface-to-surface assets. On those occasions when surface-to-surface systems, primarily ATACMS, do fire beyond the FSCL, they are infrequently coordinated with an AI mission.

The kill box, particularly the Combined Forces Command technique, provides a capability to overcome this doctrinal limitation. As shown, CFC is unique in its creation of a third kill box category – the purple or jointly controlled kill box. As with the open, active and blue kill boxes of Central, European and Combined Forces Commands respectively, the Air Force agrees that targets in purple kill boxes are suitable AI targets, no matter where the kill box is on the battlefield in relation to the FSCL. Furthermore, with a spatial separation feature (a 10,000 feet MSL artillery altitude, for example; see Figure 5), it is possible to put surface-to-surface fires (typically MLRS) and AI on the same target and, with some coordination, at the same time.

It is the final criterion, flexibility, which gives the kill box its stiffest test. First, flexibility implies that the proposed coordination measure can support full-spectrum operations in all types of terrain. The acceptance of the kill box by combatant commands responsible for terrain as diverse as Korean, Kosovar or Afghani mountains and Iraqi deserts, suggest that the joint force believes the kill box can meet these challenges. Exercises in Korea and combat operations in Kosovo and Iraq support this claim – to a point. Some issues remain unresolved.

First, the role of kill boxes in joint urban operations remains problematic. Some suggest that the kill box, even at it smallest (which covers roughly 80 NM^2), is "not applicable for urban

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and European Command, flight over a closed or inactive for air kill box requires the establishment of corridors and other control measures.

operations, [it is] way too big." For perspective, the image shown in Figure 6 is consistent with a planned neighborhood in the United States – straight roads, ordered blocks, and buildings of similar type and structure. However, in an area less than 1 NM^2 (or barely 1% of the smallest kill box), there are over 90 building structures (including houses, businesses, and small warehouses) and dozens of cars and trucks. Each could be a potential target. To even begin to visualize the complex terrain found in the average urban kill box, one must multiply this block by 80 and clutter it with high-rise buildings and underground structures, disparate building types and construction, and a non-parallel street structure. Joint operations in this condensed environment require a level of precision the 10' x 10' kill box cannot provide.[64]

Figure 6. Neighborhood Satellite Photograph

Closely nested with the urban issue is a concern that the kill box is too big to work in any environment. While a single supersonic aircraft can cross 10 nautical miles in seconds, the same distance may contain multiple brigades in open formation on the desert floor or an entire infantry division in a defensive position. Moreover, terrain can change from urban to open plains to mountains in less than this distance. Moreover, in an area the size of a kill box (or much less), a division could be in a firefight in one small village and simultaneously conducting humanitarian

[64] McGee electronic mail message. The Kansas City, Missouri metropolitan area (that area within the Interstate 435 loop) covers approximately 221 NM^2. Parts of six kill boxes would cover an area with close to 1,000,000 inhabitants, at least two airports (one of them an international airport), tens of thousands of homes, businesses, factories, and warehouses, and two major rivers, the Kansas and the Missouri.

assistance operations in another. The latter calls for something other than an "open kill box" designation.[65]

In both of these cases, kill box limitations are technical, not conceptual, in nature. In theory, joint commanders can size and shape the kill box to meet the requirements of individual missions. In reality, however, current battle command system technology, common operating picture platforms, and weapons system characteristics all combine to limit the precision with which the joint force can reasonably sub-divide and manage the battlefield. As these systems – and the personnel and procedures that control them - continue to mature, the joint force will be able to divide the battlefield into even more precise segments. Until this maturation occurs, the kill box, according to at least one senior veteran of Operation IRAQI FREEDOM, will remain of "limited use in the close fight; [they are] not precise enough in the close fight."[66]

At the operational level, the kill box offers greater flexibility. At this level, where the commander manages thousands of kilometers of physical battlespace, the kill box allows a degree of precision the FSCL does not. How would one draw an FSCL to support the battlefield construct found in Figure 7, Kill Box Defined Battlefield**,** on the next page? This picture portrays a complicated operation with converging forces, a lack of linearity, and rotary-wing deep operations. If drawn, the FSCL, even if not necessarily straight, would be linear and fall well short of easing the command and control requirement. The III (US) Corps Fire Support Coordinator recently remarked:

> Kill boxes enable us to do what we have wanted to do for years … rapidly adjust the delineation of battlespace. How many times have we wanted a 'dog-legged' FSCL but could not get one? Now with automation technology and USAF employment of kill

[65] A nautical mile is equal to slightly less than two kilometers (1.86) and slightly more than one mile. The 10' x 10' kill box is approximately 80 nm^2. Based on the curvature of the earth this size varies (as longitudinal lines converge at the poles and diverge at the equator), but in Korea a 10' x 10' kill box is 10 NM by 8 NM in size. This 80 nm^2 kill box is roughly 273 km^2 or 105.8 mi^2.

[66] COL Michael P. Marletto, electronic mail message to MAJ James W. MacGregor, "Kill Box Questions." Received February 4, 2004.

boxes, you really have a very flexible way of delineating battlespace both in time and on the ground.[67]

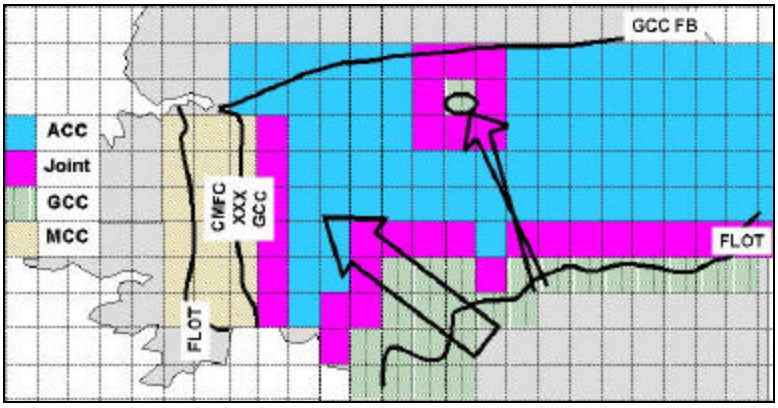

Figure 7. Kill Box Defined Battlefield[68]

Finally, flexibility requires the coordination measure to facilitate current and future operations. Existing standard operating documents at Central, European, and Combined Forces Command all describe a process for deliberate planning to support future operations. Additionally, real-world experience has shown that it is possible to change the status of a kill box in a matter of minutes. The ease with which the joint force can manage each kill box suggests that it can also configure them to meet the current and future needs of the joint force commander. One possible shortcoming, discussed earlier is the inability of the name "kill box" to describe ongoing non-lethal combat or non-combat operations.

Summary

Appendix 3, Kill Box Evaluation Summary, provides a consolidated review of the evaluation discussed above. The kill box fulfills each of the three criteria – efficiency, synchronization, and flexibility – albeit with limitations. Some of these limitations, like those involving automation and multinational interoperability, merely need time – to develop new software or conduct multilateral discussions – to find resolution. Others, like issues of confidence and terminology, suggest that the joint force needs additional doctrinal discourse and training

[67] Formica electronic mail message.

[68] The author reconstructed and slightly modified this figure to improve its reproduction quality. The original slide is from Yaeger, Slide 26.

before it can embrace the kill box and use it more effectively. The remainder, issues of precision and utility in urban terrain, require further refinement in the technique or a recognition of its limitations when applied to situations involving complex terrain in which friendly and enemy forces are in close proximity.

CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS

Since the dawn of industrial age warfare, commanders have sought ways to maximize the combined effects of maneuver and firepower. A demanding task on battlefields cluttered with horse-drawn artillery and foot infantry, the task became more challenging with the advent of mechanization and flight. In the early years of both, the struggle to define the roles of these new weapon systems prevented anything more than ad hoc attempts to integrate their effects.

When double tragedy struck the officers and men of the 30th Infantry Division in Normandy at the end of July 1944, it became apparent that these informal solutions, even those based on detailed planning and professional relationships were inadequate. The problem lacked clear definition and precise solutions. After the Second World War, the armed services sought answers in doctrine. Ultimately, these attempts to coordinate force protection and the effects of "fires not under the control of the corps [but] which may effect current tactical operations" led to the adoption of the Fire Support Coordination Line (FSCL).[69]

The FSCL, however, has not developed into a tool that fully meets the needs of the joint force. Beset by poorly written and incomplete definitions, the FSCL remains an issue debated by military professionals. Is it permissive or restrictive? Does it require one to inform or to coordinate? Where does it belong on the battlefield, deep or close? What is its purpose? Does it deconflict or synchronize effects? In recent years, these unanswered questions have combined with dramatically improved command and control technology and increasingly dispersed and nonlinear battlefields to necessitate an immediate fix or supplement to the FSCL.

In response, and only after rejecting numerous other proposed techniques, some elements of the joint force – Central Command, European Command, and Combined Forces Command – developed the kill box. All three created techniques repeatedly tested and proven in simulations

[69] Department of the Army. FM 6-20-1, *Field Artillery Tactics* (Washington, D.C.: U.S. Government Printing Office, 1961), 30-31. The use of the term corps is significant as it commonly represented the informal "division" between tactics (at divisions, brigades, and battalions) and what we now refer to as the operational level of war (armies, army groups, and air forces).

and on the battlefield; yet each technique is distinct and not one of them has found its way into joint doctrinal publications in any detail. This lack of standardization breeds unfamiliarity that in turn creates confusion, a potential loss of joint interoperability, and unnecessary risk to mission accomplishment. This led to a question: *Should the joint force standardize the kill box technique in joint military doctrine?*

In the process of answering this question, several conclusions become evident. First, joint doctrine does not provide a clearly understood control measure that the joint force can use to effectively synchronize operational fires. The FSCL is both inadequate and poorly implemented. Second, a lack of procedural standardization, involving the FSCL, the kill box or any other control measure, can inhibit interoperability. Third, the kill box is useful as an operational fire support control measure, but lacks procedural standardization. Finally, there are issues of terminology and automation or digitization that the joint force must address before it includes the kill box in joint doctrine. These conclusions lead to the following three recommendations.

First, the joint force should conduct a review of the joint doctrine development process. Without denying this process the accolades it has earned in the last eighteen years, the doctrinal crosswalk conducted for this paper suggests there remain unresolved conflicts in the system that prevent it from meeting its full potential. For example, reconsider the discussion on the FSCL. The definition found in JP 3-09, *Doctrine for Fire Support*, matches that generally desired by the Army because, even though all of the services staffed the manual, the Army wrote it and defined the terms found within it. One might imagine that if the Air Force had written the same publication, the definition would say, "must coordinate" instead of "must inform." After all, the Air Force has written its own doctrine using these words.

There are several questions worthy of exploration. Who should be responsible for developing joint doctrine? How can the Joint Staff develop sound doctrine unfettered by service-bias and parochialism? Which topics belong in joint doctrine and which in service doctrine? Should they overlap or should some topics exist exclusively in one or the other? If so, how is this

partition determined? Satisfactorily answering some of these questions might go a long way towards increasing the effectiveness and utility of joint doctrine.

Next, the joint force should accept the three criteria – efficiency, synchronization, and flexibility –as tools to analyze and evaluate existing and proposed fire support coordinating measures. Though not required on a routine basis by the military at-large, they are doctrinally based tools useful for the joint doctrine writer or as points of reference during conversations on this subject. At a minimum, they provide reasonably well-defined terms and boundaries within which to structure study in this area.

Finally, and most importantly, this paper recommends that the joint force adopt the kill box technique as a doctrinal method to synchronize the effects of operational fires. Since the term "kill box" is an inadequate description of what the coordination measure seeks to accomplish (the synchronization of all lethal and non-lethal operational fires and effects), doctrine should abandon this term and adopt more inclusive terminology. This paper proposes the term Maneuver-Effects Synchronization Area to highlight the varying activities for which a commander might set aside a particular portion of the battlefield.

To support adoption of the Maneuver-Effects Synchronization Area (MESA), this paper recommends that the joint force standardize the structure and labeling of common grid reference systems. Though all three commands in question – Central, European, and Combined Forces Commands – use variants of the ALSA-defined CGRS, the means by which each command sub-divides the basic 30' x 30' "square" is not standardized. Furthermore, each labels the basic "square" differently. Joint doctrine should standardize the 10' x 10' sub-section and establish a common naming convention for both the square and its subsections. CGRS squares would become MESA when the combatant commander established a joint operations area and a supported commander designated one or more grids for a specific time or activity.

The third part of this recommendation involves a joint definition and description. A properly developed coordinating measure has three elements: a clearly articulated purpose,

clearly identified establishment authority and responsibilities, and a description of employment and coordination requirements. To that end, this paper proposes the following joint definition (for inclusion in JP 1-02, *Dictionary of Military and Associated Terms*):

> Maneuver-Effects Synchronization Area (MESA). A three-dimensional fire support coordinating measure established and adjusted by a supported commander to rapidly integrate the lethal and non-lethal effects of his organic assets with those provided by one or more supporting commanders in order to achieve specific targeting, intelligence, or maneuver objectives.

In addition, and to stay consistent with current doctrinal formats, JP 3-09, *Joint Fires*, should contain an expanded description. For the MESA, it would look like this:

> Maneuver-Effects Synchronization Area (MESA)
> Purpose. The supported commander establishes maneuver-effects synchronization areas within his area of operations to rapidly integrate the effects of maneuver with lethal and non-lethal fires in support of his concept of operations and targeting objectives. The MESA achieves this purpose by simplifying the clearance of fires process and clearly delineating battlefield coordination requirements between land, maritime, special forces, and air components.
>
> Establishment. Within the limits of his designated area of operations, a supported commander establishes coordination requirements by designating MESA as brown (land, special forces, or maritime operations), blue (air operations), or purple (joint operations). At no time does the supported commander relinquish his responsibility to plan and establish targeting, intelligence, and maneuver priorities and objectives throughout his area of operations.
>
> Graphic Portrayal. The MESA is a three-dimensional area defined by the eastern, southern, western, and northern boundaries of a standard JCGRS grid (and its subsections) and a surface-to-surface fires maximum ordinate altitude (established in theater by the Joint Force Commander).
>
> Employment. A brown MESA implies the presence or close proximity of friendly forces. Surface-to-surface fires may attack targets within the limits of existing maneuver control (boundaries, phase lines, etc.) and fire support coordinating measures (CFL, NFA, RFA, etc.). CAS may engage targets under Type 1 terminal attack control (and Type 2 or 3 as approved by the supported commander). A blue MESA provides reasonable assurance that the area is devoid of friendly forces. The ACC may conduct attacks into these areas without coordination (lethal attacks do not require terminal attack control). Surface-to-surface fires into or through a blue MESA require coordination with the ACC. A purple MESA allows simultaneous fires and may contain a limited number of friendly ground troops (usually special operations forces). The LCC or JSOTF must establish an NFA or RFA to protect these troops and their activities. Verification of active NFA and RFA is the only coordination an aircraft must conduct before engaging targets in a purple MESA. In a purple MESA, only aircraft conducting CAS require terminal attack control. Surface-to-surface fires cannot exceed the maximum ordinate altitude unless coordinated with the ACC. In all MESA, both lethal and non-lethal attacks must comply with the targeting

> priorities of the supported commander. When the LCC does not provide terminal attack control, the ACC must make a reasonable effort to conduct battle damage assessment after each attack. Aircraft may transit a MESA, without regard to its status, at or above the surface-to-surface fires maximum ordinate altitude. Surface-to-surface fires through the airspace above this altitude require coordination with the ACC.[70]

Doctrinal writers must choose their words with deliberation or the spirit and intent of their concept may be lost in application. This definition avoids the use of ambiguous or misleading words (like inform vs. coordinate, "unduly inhibit operational tempo," and "too far forward" in the FSCL definition) because words mean things. Carefully chosen terminology minimizes questions of authority, responsibility, and purpose. In the end, the usefulness of joint doctrine is dependent, in part, on the precision of the words and phrases that form it.

As part of adopting the MESA, the Joint Staff should begin those processes necessary to address automated battle command system shortcomings and bilateral negotiations with allied and coalition partners to establish the MESA as NATO, ABCA, and CFC doctrine. Though a failure in the latter task should not prevent adoption of the MESA by the United States military, an inability to address the former would continue to require some elements of the joint force to manage temporary solutions that increase risk to the mission and friendly forces. The joint force must develop and implement automated battle command systems that not only allow, but facilitate the exchange of information between service components at all echelons of command.

The relationship between the MESA or kill box and the FSCL remains undefined. With the exception of the Combined Forces Korea, which minimized the role of the FSCL during ULCHI FOCUS LENS 2003, no senior Army or Air Force leader or organization has called for the elimination of the FSCL. In fact, senior Air Force leaders maintain that the FSCL serves as an important measure, as an "intellectual framework between close and deep" and as a division of responsibility between elements of the theater air-ground system. This division is of no slight

[70] Establishing the maximum ordinate altitudes for transit through and operations within kill boxes is not a task for joint doctrine. Aircraft and artillery (American, allied, and coalition) limitations and capabilities as well as terrain and weather play a significant factor in establishing this feature of the MESA. As a result, it is a decision best left to the Joint Force Commander and his staff.

importance. Violations of this unofficial boundary could lead to the inefficient application of assets and an increased likelihood of fratricide.[71]

Most of these leaders agree that the joint force can digitally establish the FSCL and that it should do so along the forward edge of open, active, or green/brown kill boxes. Doing so removes the requirement for the FSCL to adhere to recognizable terrain features; this is something almost everyone agrees is permissible. Moreover, using this method to establish the FSCL allows the operational commander to portray current kill box statuses to subordinate units not equipped with an automated battle command system capable of supporting kill box geometry. For now, this is a reasonable means to establish the location of the FSCL on the battlefield. Perhaps, for the first time in years, both air- and ground-proponents have found a solution acceptable to both.

[71] Major General Leaf, cited on several occasions earlier in this paper, received his third star subsequent to the publication of those sources referenced. The source bibliography carries his rank at the time of publication. He made his comments on the FSCL during a visit to the School of Advanced Military Studies in January 2004. Others suggest that, during OPERATION IRAQI FREEDOM, a strong desire by the Coalition Air Operations Center to "do something" caused it to attempt operations short of the FSCL, where the ASOC possesses better situational awareness, without properly coordinating them with the ASOC. Some of these attacks occurred against targets that had moved, some struck targets that the ASOC had already killed, and others endangered friendly forces.

APPENDIX 1: COMPARING FSCL DEFINITIONS

	Joint Publication 1-02 ***Dictionary of Terms (2002)***	**Joint Publication 3-09,** ***Joint Fire Support (1998)***	**Field Manual 101-5-1,** ***Operational Terms and Graphics (1997)***[1]	**Air Force Doctrinal Document 2-1.3,** ***Counterland (1999)***
Purpose	"Facilitate expeditious attack of surface targets of opportunity beyond" the measure	"Facilitate the expeditious attack of targets of opportunity beyond" the measure	"Ensure[s] coordination of fire not under the commander's control but which may affect current tactical operations … used to coordinate fires of air, ground, or sea weapons systems using any type of ammunition against surface targets."	"Ensure the coordination of fire not under the surface commander's control but which may affect his current tactical situation"
Establishment	LCC or MCC establish in consultation with superior, subordinate, supporting, and affected commands	LCC or MCC establish in consultation with superior, subordinate, supporting, and affected commands	Land or amphibious force commander establish; "must be coordinated with the appropriate tactical air commander and other supporting elements."	LCC establishes after coordinating with all affected commands
Graphical Portrayal	1. Linear 2. Should follow well-defined terrain features	1. "Portrayed by a solid black line extending across the assigned areas of the establishing headquarters." 2. "FSCL do not have to follow 'traditional' straight-line paths. Curved and/or enclosed FSCL have applications in nonlinear joint operations." 3. Should follow well-defined terrain features	1. Linear 2. Should follow well-defined terrain features	1. Place the FSCL "where the capability to produce the preponderance of effects on the battlefield shifts from the ground component to the air component."
Employment	1. Forces attacking targets beyond an FSCL must inform affected commands 2. In exceptional circumstances, the inability to conduct this coordination will not preclude attack 3. Short of an FSCL, air-to-ground and surface-to-surface controlled by the land or amphibious force commander	1. Forces attacking targets beyond an FSCL must inform affected commands 2. In exceptional circumstances, the inability to conduct this coordination will not preclude attack 3. Short of an FSCL, air-to-ground and surface-to-surface controlled by the land or amphibious force commander.	1. Forces attacking targets beyond must inform affected commands (second definition) 2. Short of an FSCL, all "attacks … must be coordinated with the establishing component"	1. When the "ground component attacks targets beyond the FSCL … it is required to coordinate with the air component to ensure deconfliction ..." 2. Short of an FSCL, all "attacks … must be coordinated with the establishing component"
Remarks	1. Not "a boundary between close and deep operations or a zone for close air support"	1. "Use of an FSCL is not mandatory" 2. "Does not divide" AO 3. "Generally 6 hours is adequate … to coordinate an FSCL change." 4. The "location of enemy forces … concept and tempo of the operation, organic capabilities, and other factors are all considered" when placing the FSCL.	1. "… not a boundary; synchronization of operations on either side of the FSCL is the responsibility of the establishing commander out to the limits of the land component forward boundary."	1. "The FSCL is often used as the forward limit of the airspace controlled by the TAGS." 2. "Primarily used to establish command and control procedures … [the FSCL] does not define mission types [CAS / AI]

Table 2. Joint and Service FSCL Definitions

Note 1. FM3-0, *Operations*, published in 2001, has a description, not a definition, of the FSCL that matches the joint definition. FM 3-09, *Fire Support*, and FM 1-02, *Operational Terms*, with definitions mirroring the joint definition, will supersede FM 101-5-1, *Operational Terms and Graphics*, when completed.

APPENDIX 2: COMPARING KILL BOX TECHNIQUES[72]

	Joint Publication 3-60 *Joint Targeting*	Combined Forces Command	Central Command	European Command
Purpose	"expedite clearance and deconfliction process"; "focus combat power"	"reactive, timely, and simple tools for combined force employment and component integration."	"killboxes [sic] are integral to Joint Fire operations"; used "to coordinate, deconflict, and synchronize attack operations"	"speed the destruction of emerging or lucrative target areas or groups ... [and] protect land component assets or operations beyond the FSCL from air attack."
Establishment	JFC should appoint one proponent to establish and maintain the common reference system	1. FSCL is optional 2. All grids in the KCGRS between the FLOT and the LCC forward boundary assigned a status, changes executed by supported commander	1. Used in conjunction with the FSCL 2. Short of FSCL: closed unless LCC opens 3. Between FSCL and FB: open unless LCC closes 4. Beyond FB: all open, ACC opens or closes	1. Used in conjunction with the FSCL 2. ACC is proponent, but makes decisions with LCC input 3. Target reference grids active for air, deactive for air, or non-coded
Graphical Portrayal	Not specified	1. Alpha-numeric label 2. Four unique color-coded status options 3. Two divisions – 15'x15' and 10'x10'	1. Alpha-numeric label 2. Open or closed status 3. Three divisions – 15'x15', 10'x10', and 30'x15' or 15'x30'	1. Alpha-numeric label 2. Active, deactive, or not coded 3. Three divisions - 10'x10', 5'x5', 5'x2.5'
Employment	Not specified	1. Green/Brown – ground operations, air must coordinate 2. Blue – air operations (including AI), ground must coordinate 3. Purple – joint attack deconflicted by altitude	When open – 1. Short of FSCL: positive direct control not required 2. Between FSCL and FB: ACC free to attack within LCC priorities 3. Beyond FB: ACC free to attack within JFC priorities When closed – no impact on LCC, ACC requires positive direct control	When active for air – 1. Short of FSCL: positive direct control not required 2. Between FSCL and FB: ACC free to attack within LCC priorities 3. Beyond FB: ACC free to attack within JFC priorities When deactive for air – no impact on LCC, ACC requires positive direct control When not coded – actions guided by FSCL

Table 3. Kill Box Characteristics

[72] The rows of this table follow the format used by JP 3-09, *Joint Fire Support*, to describe existing fire support coordinating measures.

APPENDIX 3: KILL BOX EVALUATION SUMMARY

Criterion	Remarks
Efficiency • Supports the mission and intent of supported commanders • Protects the force • Allows rapid coordination without excessive procedural steps • Is simple, usable, and applicable for the entire joint force • Is understandable and usable for allied or coalition partners	Positive: 1. Allows the joint force commander or supported commander to establish localized targeting priorities 2. Minimizes "sanctuary" space on the operational battlefield 3. Protects friendly forces, but eases target engagement and clearance procedures in large areas of the battlefield. Negative: 1. Not supported by all automated battle command systems 2. Not accepted by NATO, ABCA, or any other alliance partner 3. Terminology issues exist in the name itself and the labels used to distinguish individual boxes
Synchronization • Maximizes the integration, not simple deconfliction, of all assets	Positive: 1. Allows simultaneous engagement particularly when artillery or maximum ordinate altitude exists to separate ground based ballistic trajectories and airborne assets 2. Features of color-coded kill boxes maximize integration of assets more than mere open or active designation does Negative: No significant limitations.
Flexibility • Supports full-spectrum operations in all terrain regardless of battlefield construct (contiguous or noncontiguous, linear or nonlinear) • Supports current and future operations • Allows precise solutions to battlefield management challenges	Positive: 1. Facilitates detailed deliberate planning, but can be adjusted in minutes to less than an hour 2. Supports all forms of action – operational maneuver (air assault, rotary-wing deep attacks, etc.) and operational fires Negative: 1. Even the smallest kill box, at 10' x 10', is too imprecise to support urban operations or tactical action 2. Creates sanctuary on the tactical battlefield (but no more so than the FSCL)

Table 4. Kill Box Evaluation Table

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