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REDEFINING FIRE SUPPORT CONTROL FOR THE
NONCONTIGUOUS BATTLE FIELD

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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9 February 2004

Abstract of

REDEFINING FIRE SUPPORT CONTROL FOR THE NONCONTIGUOUS BATTLE FIELD

The ultimate objective of joint military operations is to bring to bear a swift, decisive, efficient blow to the adversary. It demonstrates the speed, efficiency, and flexibility the joint fires community strives for, by linking weapons effects to the Joint Force Commander's campaign or operation objectives through component operations. Fire Support Coordination Measures (FSCMs) serve as the primary means of orchestrating joint fires on the battlefield. This paper will discuss three areas where seams exist in the joint force community: (a) deep versus close battle (b) operational definition of the Fire Support Coordination Line (FSCL) and (c) application of the FSCL on a noncontiguous/nonlinear battlefield. Potential solutions are (a) use of a common grid reference system (b) use of a Joint Effects Coordination Line (JECL) and (c) establishment of a Joint Fires Element (JFE).

I. Introduction

The ultimate objective of joint military operations is to bring to bear a swift, decisive, and efficient blow to the adversary.

...the target lay in a location with engagement zones already established. A U.S. forward air controller on the ground contacted the CAOC¹ which passed the target to a B-52 overhead, 19 minutes after initial call the B-52 dropped its load on the enemy...²

This real world example highlights everything that is **good** about joint operations. It demonstrates the speed, efficiency, and flexibility the joint fires community strives for. Joint doctrine facilitates the synchronization and efficiency of joint fires. Yet despite successful operations, joint fire support is difficult and often contentious. Why is joint fire support so important to the operational commander? Joint Publication 3-09, *Doctrine for Joint Fire Support*, states that synchronized and integrated joint fire support links weapons effects to the Joint Force Commander's campaign or operation objectives through component operations.³ This link is very important to military operations because it ensures unity of effort, economy of force, and most importantly, prevents potential fratricide of friendly troops and aircraft. The primary means of communicating fire support coordination on the battlefield is via Fire Support Coordination Measures (FSCMs). However, these control measures were developed

¹ Combined Air Operations Center

² Grant, Dr. Rebecca, "The Afghan Air War" Air Force Association Special Report, Aerospace Education Foundation (Arlington, VA: September 2002), 20.

when the United States military's greatest enemy was the Soviet Red Army, and protracted, somewhat static, contiguous battles on known territory were expected. Operations in Afghanistan and Iraq are recent examples of noncontiguous, fast paced, special operations influenced battles which are becoming the norm. In this environment, current fire support coordination procedures fall short. The joint community needs to use a coordinated grid system as a means to provide a common framework of fire support in the Area of Operations, new terminology to better delineate command and control of the battlespace between the air and land component commander, and the establishment of a standing, effective Joint Fires Element to coordinate and arbitrate FSCMs to meet the Joint Force Commander's objectives.

Since the dawn of aviation, there has been tension between land and air force providers regarding control of fires on the battlefield. Much of a land commander's fire support does not come from organic assets, but instead is provided by other components, thus the need for continual coordination.⁴ Overlaps and redundancies occur primarily in the deep battle area—an ill defined area at the far limits of tactical level operations and at the close limits of operational level operations.⁵ Evolution of joint fires doctrine, exponential improvements in capabilities and changes in threat that have impacted the perceptions of FSCMs, and specifically, the Fire Support Coordination Line (FSCL), are well documented. It is not the intention of this paper to conduct a historical review but rather begin with an analysis of

³ U.S. Joint Chiefs of Staff. Doctrine for Joint Fire Support. Joint Pub 3-09. (Washington, DC: 12 May 1998), x.

⁴ Ibid., IV-1.

where gaps exist between land and air components with regard to FSCMs to set the context. These seams are in the areas of the deep versus the close battle, the operational definition of the FSCL and its application to a noncontiguous battlefield. Having identified the impact of these problem areas, the paper will then suggest potential solutions that mitigate their effects and improve the combatant commander's ability to synchronize joint fires.

II. Seams In The Joint Fire Environment

In the past, the close and deep battle areas were effectively separated by component capability, and the division of responsibility was delineated by the FSCL. The land component preferred to set the FSCL as far forward as organic artillery could reach. The air component supported the land battle by providing Close Air Support (CAS) inside the FSCL and interdicting enemy forces beyond the FSCL. Conflicts were minimized because the land component had control of all the battle space it could impact with tube artillery and the air component could attack the enemy beyond the FSCL without fear of fratricide. Special Operations Forces (SOF) are not considered a maneuver force and generally have such a small foot print that coordination was not deemed necessary.⁶ However, with the advent of the Army Tactical Missile System (ATACMS) and the AH-64 Apache helicopter, the Army can now range ahead of the main battle area 150 kilometers and more, blurring the traditional

⁵ Hall, Lt Col Dewayne P. Integrating Joint Operations Beyond the FSCL: Is Current Doctrine Adequate? (Maxwell AFB, AL U.S. Air University Air War College, April 1997), ix.

⁶ Jansen, Lt Col John M., LCDR Nicholas Dienna, Maj Todd Bufkin II, Maj David Oclander, Maj Thomas Di Tomasso and Maj James Sisler "JCAS in Afghanistan: Fixing the Tower of Babel" Field Artillery (March-April 2003): 26.

distinction between the close and deep battle.⁷ New capabilities allow the Army to shape the deep battle before ground forces make contact with the enemy in the close battle.

Additionally, it lessens reliance on the air component and provides the land component with on-call assets for deep operations.

Crossing the FSCL with Army deep attack assets, however, requires coordination. Per Joint Publication 3-09, *Doctrine for Joint Fire Support*, coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and SOF units....this coordination assists in avoiding conflicting or redundant attack operations.⁸ Additionally, Joint Publication 3-60, *Joint Doctrine for Targeting*, says that the Joint Force Commander will normally delegate the authority to conduct execution planning coordination and deconfliction associated with joint air targeting to the Joint Force Air Component Commander (JFACC), to include Army deep air operations.

Over time, Army doctrine has developed a preference to push the FSCL as far forward as possible so that deep attack assets can operate without the requisite coordination with the JFACC. This allows the land component unfettered ability to maneuver. Conversely, the JFACC wants the FSCL as close to friendly troops as possible, allowing for interdiction to take place on the enemy side of the FSCL with little to no interference from

⁷ Laughbaum, R. Kent Synchronizing Airpower and Firepower in Deep Battle. Maxwell AFB, AL. (U.S. Air University, College of Aerospace Doctrine, Research, and Education: January 1999): 10.

⁸ JP 3-09, A-4

the Joint Force Land Component Commander (JFLCC). Air Force Doctrine Document 2-1.3, *Counterland*, recommends the FSCL be placed where the capability to produce the preponderance of effects on the battlefield shifts from the ground component to the air component.⁹ The Air Force institutionally has a legitimate concern about “deep” placement of the FSCL. Deep FSCL placement could create an area of sanctuary for enemy fielded forces—outside of the range of the main thrust of the land component yet inside the area impacted by air interdiction. Neither approach is optimal—both deep and shallow FSCL approaches tend to inhibit overall joint effectiveness and limit potential success.¹⁰

This ineffectiveness was highlighted during the closing days of Operation DESERT STORM. A primary objective for the ground campaign was the destruction of the Iraqi Republican Guard. On 27 February 1991, Army intelligence assets and Joint Surveillance Target Attack Radar System aircraft detected indications that the Iraqi Army was preparing to retreat from Kuwait. In an effort to prevent the escape of the Iraqis by means of maneuver, firepower and CAS, VII and XVIII Corps commanders independently extended the range of the FSCL. These actions had the unintended effect of giving the Iraqis sanctuary from Coalition airpower and ultimately permitted the nearly unimpeded escape of most enemy troops and much of their equipment to Iraq.¹¹

⁹ Air Force Doctrine Center, “Doctrine Watch #9: Fire Support Coordination Line.” 20 April 2000. <<https://www.doctrine.af.mil/doctrinewatch>> [25 January 2004], 1.

¹⁰ Quintrall, Lt Col Mick., “A Change-Challenge: The Fire-Support Coordination Box,” Air & Space Power Journal, 16 no. 3 (Fall 2002): 2.

¹¹ Laughbaum, 37.

An additional source of friction with regards to the FSCL is that joint doctrine dictates that ground force commanders (usually Corps level) nominate changes to the FSCL to the JFLCC, who approves and then forwards the change via the Battlefield Coordination Detachment (BCD) in the Air Operations Center for dissemination to the Theater Air Control System. The JFACC and his staff are informed but usually have no input into the placement of the FSCL (other than pre-planned FSCL placements developed during deliberate and crisis action planning). Coordination for a change to the FSCL is supposed to take place 6 hours prior to execution of the change, however, 6 hours is a best case scenario.¹² “In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL.”¹³ Like the Operation DESERT STORM example above, when land forces are moving quickly the FSCL can be moved out to a point where it hampers the air component’s ability to interdict enemy forces. Neither the JFACC nor JFLCC want to provide an inadvertent sanctuary to the enemy.

The issues identified thus far are made all the more difficult in the transition from linear to noncontiguous battlefields. “As the scope of military operations continues to grow, the joint task force assumes greater responsibility for a battle space that lacks precise definition and hosts a number of near simultaneous military actions that may extend well beyond the traditional boundaries of passive fire control measures.”¹⁴ Our adversaries are no longer large, state sponsored, fielded forces that are easily identifiable. Today’s adversaries

¹² JP 3-09, A-2

¹³ Ibid., A-2

¹⁴ Kastner, Thomas M. “The Joint Fires Element: An Initial Solution”. Unpublished Research Paper, U.S. Naval War College, Newport, RI. (May 2003): 6.

are transnational, elusive, and embedded in environments that require precision operations to avoid collateral damage. Future operations will require heavy special operations involvement with conventional forces in supported or supporting roles. There may be less of a chance of fratricide due to the small footprint of a SOF team, but the level of detailed integration required between a section of aircraft with live ordinance and a SOF team on the ground is no less important.¹⁵ The result is that the rapid evolution of technology is shortening the decision loop while at the same time the noncontiguous battlefield will require much more coordination to synchronize operations and prevent fratricide.

Whereas in previous times we could chop up the battlespace and delegate the various pieces to the components as battlespace becomes more nonlinear and combat power is applied more asymmetrically this is a luxury we can no longer afford.¹⁶

The fire support seams identified above and the increasing complexity of the non-contiguous battlefield call for another look at fire support coordination.

III. A New Way Of Looking At Joint Fire Control

If joint fires are integrated correctly, they will complement and reinforce each other resulting in synergistic combat power applied at the decisive point in a manner consistent with the combatant commander's priorities and concept of operations.¹⁷ Every Joint Force

¹⁵ Jansen et al, 26.

¹⁶ Thein, Scott Army/Air Force Conflict Over the Deep Fight: Time to Stop the Bickering. (Carlisle Barracks, PA. Army War College: 10 April 2001):18, quote by Gen George Joulwan, USCINCEUR

¹⁷ Quintrall, 2.

Commander starts with a playbook of FSCMs which are formulated depending on the unique characteristics of the situation. Not only do FSCMs facilitate the safe and efficient use of joint fires, but also serve to enhance the expeditious attack of targets, protect forces, populations, critical infrastructure, sites of religious or cultural significance and set the stage for future operations.¹⁸

The coordination of joint fires is complicated by service interpretation and confusion on the meaning and application of fire support coordination measures. Fire support coordination procedures must be flexible and responsive to the ever changing dynamics of warfighting. Simplified arrangements for approval or concurrence should be established.¹⁹ Joint doctrine JP 3-60, *Joint Doctrine for Targeting*, Air, Land, Sea Applications Center *Multiservice Tactics Techniques and Procedures (MTTP) for Time Sensitive Targeting*, and Army Field Manual 3-52, *Army Airspace Command and Control in a Combat Zone* address this issue by describing grid reference systems as a simple and streamlined means to describe FSCMs. Unfortunately, Joint Publication 3-09, *Doctrine for Joint Fire Support*, does not address a grid reference system. Despite this, three major combatant commanders have implemented grid reference systems in their respective area of operations: European Command, Central Command, and Combined Forces Command in Korea.

It is worth mentioning briefly that often “grid reference system” and “kill box system” are used interchangeably and ought not to be. A grid system is merely a group of

¹⁸ JP 3-09, A-1

¹⁹ JP 3-09, IV-13

horizontal and vertical lines at standardized distances that can be used for fire support coordination, airspace deconfliction, and target identification. Kill box refers to a generic three dimensional block of battlespace defined by theater determined parameters.²⁰ Thus, a common grid reference system can be used to define the lateral dimensions of a kill box. It is not the intent of this paper to determine which of the three is best, but rather to focus on one example to further explore the relevance of general grid reference systems.

Headquarters U. S. Central Command (CENTCOM) concept of operations (CONOPS) for Joint Fires dated November 1999 used a system of three dimensional boxes often referred to as kill boxes, arranged on grid lines aligned with latitude and longitude. The intent of the CENTCOM grid reference system was to take, “a first step towards improving our coordination and control measures on the battlefield and will help take us beyond the linear and synchronized measures of today toward a more fully integrated joint effort tomorrow.”²¹ CENTCOM’s use of a grid reference system helped to enable their success during recent operations: “As part of a targeting and coordinating process . . . grid boxes proved their worth as a more dynamic and flexible battle-space fire-support measure.”²²

The overlaying of the grid system on latitude and longitude is important in that weapons, target acquisition, and navigation systems will increasingly utilize global

²⁰ U.S. Air Force Department. Airspace Control in the Combat Zone. Air Force Doctrine Document 2-1.7. (Washington, DC: 9 May 2001)41.

²¹ AF Doctrine Watch #9, 2.

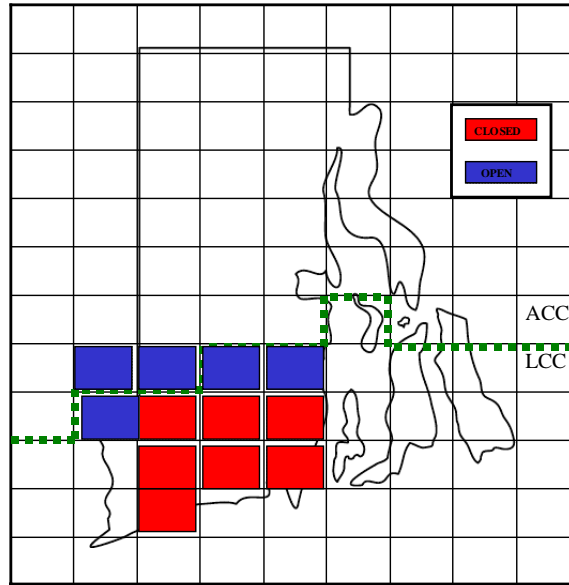
²² Quintrall, 11.

positioning satellites (GPS) vice visual points of reference. The requirement to relate FSCMs to a prominent geographical features is difficult in austere terrain, and impossible at night and during inclement weather. Using the grid system will mean that FSCMs and other control measures on the battlefield will no longer depend on prominent geographical features for identification, and given a platform's GPS capability, can be located far more accurately.

The benefits of using a grid system to build and promulgate FSCMs cannot be overstated. If adopted as a standard, both air and ground based fire support providers will be completely familiar with the FSCMs in any theater. This will only apply if a standard convention of establishing and naming grid coordinate boxes is adopted. While the actual boxes in use will change as the threat changes and the campaign evolves, the coordinates describing potential FSCMs will not change. Therefore, the only required coordination for a change in FSCMs will be passing to ground and air units whether a box is "on" or "off" thus making prior coordination far less complicated. As an example, the CENTCOM CONOPS for Joint Fires promulgates the following delineation of fire support control responsibilities:

1. Grid Boxes short of the FSCL remain closed to air attack until opened by the land component commander. An open grid box short of the FSCL represents clearance from that commander for the air component commander assets to fire on specified targets in accordance with land commander's priorities without direct, positive terminal control.
2. Grid boxes in the area beyond the FSCL and short of the land component's outer boundary are open for air attacks against targets in accordance with the land component's targeting priorities unless the land component commander closes the boxes through the Air Operations Center Combat Operations director. See Figure 1 as an example.

Figure 1



Basic Grid Box System

Additional yet simple rule sets allow time for clearance of ground and or airborne forces before action can be taken on a change in kill box status.

Another area requiring improvement is the employment of the FSCL. Despite the best efforts of joint doctrine definitions, the FSCL is used as a de facto border delineating control of fires between the JFLCC and the JFACC. However, the FSCL was designed to “facilitate the expeditious attack of targets of opportunity beyond the coordinating measure”²³ rather than serving as a division of battlefield responsibilities. A management tool is needed to separate areas where functional components have the preponderance of assets to employ, while they are not the primary force providers in adjacent areas.²⁴ Several combatant

²³ JP 3-09, A-2

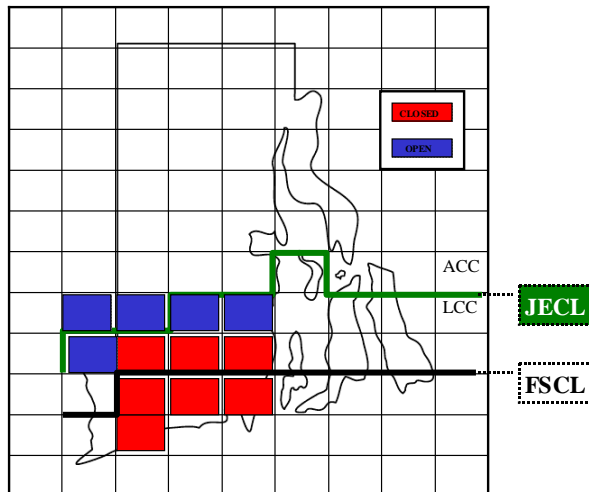
²⁴ New, Terry L., “Where to Draw the Line Between Air and Land Battle,” Airpower Journal, 10, no. 3 (Fall 1996): 39.

commands have resolved this quandary by defining and naming a unique coordination line. In Europe and Korea the border's between close and deep operations are defined as the Reconnaissance and Interdiction Line and the Deep Battle Synchronization Line respectively.²⁵ A study of relevant literature has also revealed recommendations for Phase Lines and a return to the Bombing Coordination line. These are all indications that doctrine is missing an important FSCM.

In a 2001 paper entitled "Army/Air Force Conflict Over the Deep Fight: Time to Stop the Bickering," Lt Col Thein recommended a new alternative, the Joint Effects Coordination Line (JECL). In his concept, the ground component would still use the FSCL to emphasize close air support requirements. The area of operations from the FSCL to the JECL would be open to attack by anyone unless specifically prohibited by the ground component commander. The JFLCC would have an avenue to easily restrict fires if dictated by movement of friendly or enemy forces. Outside the JECL the air and or SOF component would be the supported components, and would be free to pursue targets without fear of fratricide of friendly ground forces (see Figure 2).

Figure 2

²⁵ Thein, 15.



Joint Effects Coordination Line

Joint fire support planning and coordination must be continuous and its execution decentralized.²⁶ As discussed in section II above, the JFLCC has the responsibility for setting the FSCL. However, movement of the FSCL can impact the air component and its ability to support the land component. Liaisons exist in the Air Operations Center in the form of the BCD, and the air component often has liaisons at the JFLCC headquarters. The Air Force is taking steps to formalize the Air Component Coordination Element (ACCE) or “reverse BCD” concept. According to a member of the Combined Air Operations Center during Operation IRAQI FREEDOM, ACCE’s were used very effectively at the land and special operations components as well as at the combined joint task force headquarters.²⁷

Flexibility, speed and range are nullified if fire support coordination measures are used without consideration for the impact on theater wide employment of limited air power

²⁶ JP 3-09, III-1

²⁷ Auld, Lt Col Greg H., <greg.auld@ramstein.af.mil> “Air Component Coordination Element,” [E-mail to Maj Elisabeth Auld <elisabeth.auld@nwc.navy.mil>] 8 February 2004

resources.²⁸ As such, a better way to synchronize and integrate the land and air components is required. Better synchronization can be achieved by establishing a standing joint fires element (JFE) that works directly for the Joint Task Force Commander. Current doctrine states that a joint force commander may form a JFE within the Operations Department.²⁹ This organization should be party to the entire planning process taking place on the joint staff, rather than an ad hoc or as required organization. The JFE should have first hand knowledge of the joint task force commander's intent. Additionally, the JFE will have a seat at the Joint Targeting Coordination Board, ensuring that all aspects of joint fires are synchronized with the commander's intent. The JFE would not circumvent current targeting processes, but rather implement targeting guidance by ensuring that fire support coordination supports the Joint Force Commander's objectives.

The JFE should be made up of representatives from the land and air component as well as naval, marine, and special operations forces. Lt Col Kastner, in his paper "The Joint Fires Element: An Initial Solution" stated that "there is a compelling need for a standing joint fires element at the joint task force headquarters to plan, coordinate and integrate joint fires into the commander's concept of operations." Lt Col Kastner proposed the following organization schematic for a Joint Fires Element:

²⁸ Ales, Ricky R "Airpower's Battlespace" Air Force Doctrine Center. (26 January 1996), 3.

²⁹ JP 3-09, I-5

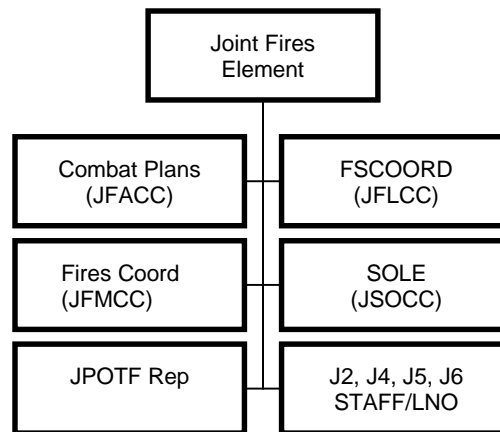


Figure 3, Joint Fires Element

This organization should coordinate and implement FSCMs to include the FSCL and JECL and includes liaisons from the organizations identified in Figure 3.

An organization to coordinate joint fires at the joint force command-level is not a new idea. The Air, Land, Sea Application Center conducted a study in 1997 on the Joint Force Fires Coordinator (JFFC). At the request of the Joint Staff, the study was asked to consider advantages/disadvantages, long range implications, impact on joint doctrine and joint targeting procedures, and lessons learned from joint exercises.³⁰ The study concluded that “Adopting the JFFC should provide an improvement in joint operations efficiency regarding synchronization of joint fires with the JFC’s campaign plan; but it will be accompanied with a moderate price in personnel, training, and C4 systems support.”³¹ The concept has been contentious and therefore is not fully developed in joint doctrine. Two potential disconnects are the role of the JFE in the joint targeting process which is often delegated to the JFACC.

³⁰ Hubner, Bob “Joint Force Fires Coordinator Study” A Common Perspective, 5 no.1 (March 1997): 9.

³¹ Hubner, 11.

Additionally, the JFLCC makes the final determination on placement of the FSCL, to ensure freedom of maneuver. Several solutions to these concerns are:

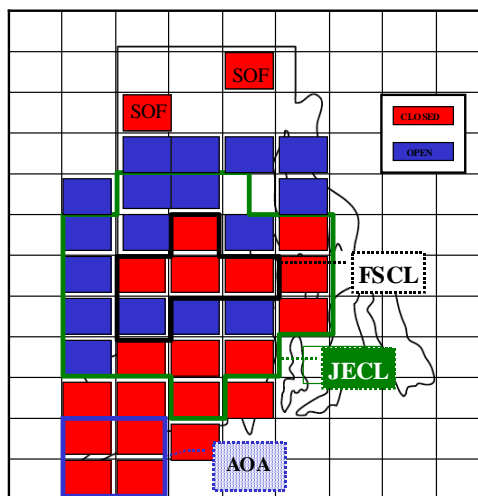
1. Structure the JFE as a function of the joint force commander directly and not organized under either the JFACC or the JFLCC
2. Ensure the JFE participates (but does not control) the targeting or development of scheme of maneuver process
3. Give the JFE the authority to act as the arbiter of all fire coordination issues to include placement of the FSCL, JECL, and activation of any FSCMs within and without the battlespace boundaries

Tying together the concepts of a grid box system, a standing Joint Fires Element and the JECL into a completely new way of controlling joint fires is the answer to better synchronization of joint fires on the noncontiguous battlefield. The standing JFE would act as a clearing house for all fire support issues, maintaining the “big picture” to synchronize air, land, amphibious, and SOF operations. The JFE would be responsible for promulgating the grid box system and other FSCMs such as the FSCL and the JECL throughout the area of operations after final coordination with appropriate components.

Taking the grid coordination system a step further, Quintrall states “Functionally, the leading edge of a grid box lattice closed to air attack acts as the FSCL and moves with the opening and closing process with consequential results. Instead of the typical four-to-six-hour FSCL movement coordination process, grid boxes are opened and closed in minutes.” The FSCL and JECL are depicted in Figures 1 and 2 using the grid system.

Moving the concept into a nonlinear/noncontiguous battlefield (for a visual definition of nonlinear and noncontiguous see Attachment 1), the grid system can be used to define FSCMs and coordination lines throughout the battlespace. One indication of a means to use FSCM in such an environment is found in Air Force Doctrine Document 2-1.3, Counter Land. It suggests creating a new FSCL-type measure based upon a box or a circle around friendly forces.³² The grid reference system can be used to delineate this as well as other coordination measures in the area of operations. As an example, see figure 4.

Figure 4



FSCL, JECL, and Other Coordination Measures Delineated by Grid Reference System

IV. Counter arguments

³² Pearce, John W., "Airpower in the Killbox: Fire Support Coordination and Airspace Deconfliction in the Future Nonlinear Battlespace," Unpublished Research Paper, U.S. Air University School of Advanced Airpower Studies, Maxwell AFB, AL: (June 2003): 40

FSCL within his boundaries should be responsible for all operations within his boundaries.”³³

Because the JFLCC will be focused on the current battle and preparing for the immediate threats to follow, he is likely to pay less attention to deeper areas bordering the FSCL.

Furthermore, due to the fast paced and changing nature of warfare, it is unlikely the JFLCC can fully assess the impact moving the FSCL would have on operations outside his immediate area of operations. “The emotion of ground combat begs for every available asset to support the present battle.”³⁴ Keeping a big picture view that encompasses the entire joint task force is the primary benefit of the JFE concept.

V. Recommendations

Tying together the concepts of the grid box system, the JECL, and the JFE, a completely new way of controlling joint fires, resolves our longstanding doctrinal disagreements on how to manage and effectively and efficiently employ joint fires. Additionally, using the three concepts outlined above and the flexibility that the concepts offer to the joint force commander ensures that joint fires can be coordinated on a linear as well as a nonlinear/noncontiguous battlefield. All three concepts need to be more fully codified in joint and service publications. Additionally, as with any new warfare concept, the grid coordination system, JECL, and standing JFE must be part of joint training exercises with realistic joint scenarios and force participation. Training as a joint force builds trust among the components and is sure to ease future implementation of these concepts.

³³ Vozzo, Lt Col Martin L, Lt Col James A. Rentz and Lt Col Diann Latham “Who Should Coordinate Fires in the Battle Interdiction Area?” Field Artillery, 5 (September/October 1995): 43.

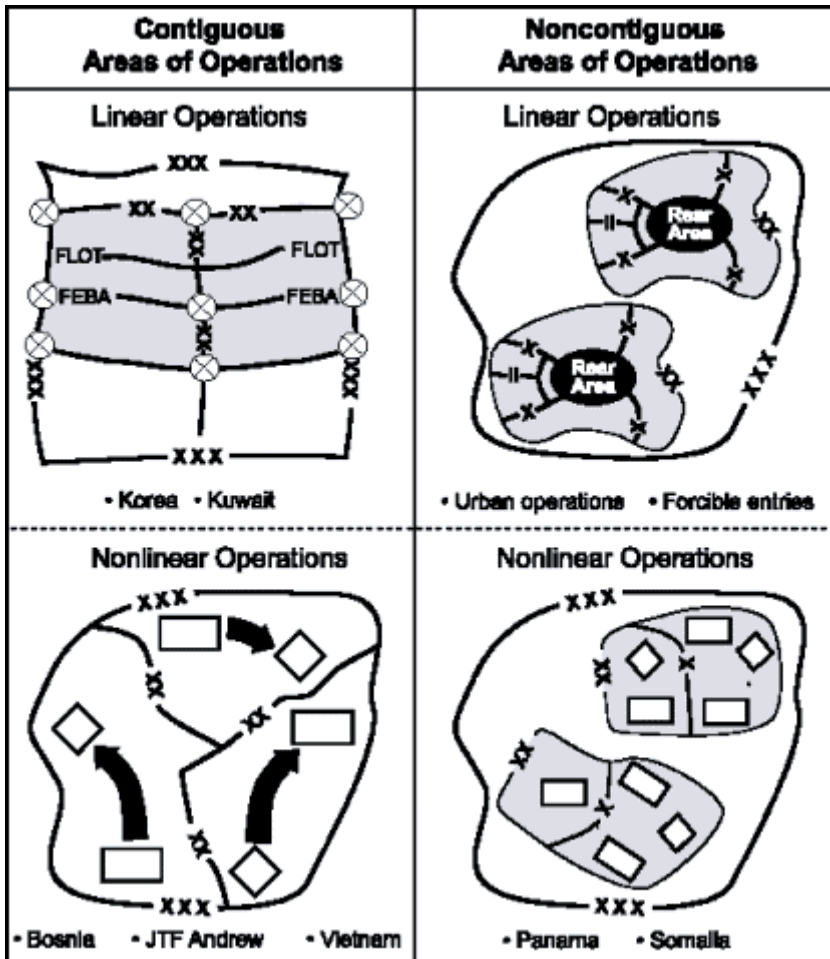
VI. Conclusion

It is clear that tomorrow's battlefields will challenge the traditional linear battlefield configuration. Operation IRAQI FREEDOM dramatically illustrated this, comprising in a single campaign a traditional land component march from the south toward Baghdad, a SOF-dominated noncontiguous battle in Northern Iraq, and a supported air component effort in Western Iraq.³⁵ Additionally, impressive joint fires coordination was required for Naval fires from both the North Arabia Gulf and the Eastern Mediterranean, Special Operations, Marine, and Army forces converging on Baghdad, and air assets operating from across the globe. The Joint Force Commander had an enormous challenge on his hands! This paper has argued that the standardized use of a grid reference system, the use of a Joint Effects Coordination Line, and the establishment of an effective Joint Fire Element at the Joint Force Commander's headquarters will enable the planning and deconfliction of joint fires in order to bring about a decisive victory which minimizes the risk of fratricide to friendly forces.

³⁴ New, 4.

³⁵ Auld, Lt Col Greg H. <greg.auld@ramstein.af.mil> "Air Component Coordination Element" [E-mail to Maj Elisabeth Auld <elisabeth.auld@nwc.navy.mil>] 8 February 2004

Attachment 1, linear v. nonlinear and contiguous v. noncontiguous (Source: FM 3-0)



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