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**A CLASH OF SERVICE DOCTRINES: INTEGRATION VERSUS  
SYNCHRONIZATION IN JOINT OPERATIONS**

By / par Lieutenant-Colonel Gerald M. Pratt

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**AMSC 5**  
**A Clash of Service Doctrines:**  
**Integration Versus Synchronization in Joint Operations**  
**Lieutenant-Colonel G.M. Pratt**

**ABSTRACT**

Inter-service disagreements during the Gulf War and the Balkan campaigns of the 1990s reveal that differing doctrinal philosophies exist between the US Army and the US Air Force (USAF) over the effective use of air power. Whereas the Air Force emphasizes the primacy of air power integration across the entire joint theatre of operations, the Army organizes geographically and emphasizes synchronization of actions. This “clash of service doctrines” has had a negative impact on the conduct of past joint operations.

Through the review of differing US Army and USAF perspectives on the selection of centres of gravity and the depth of the battlespace, this paper demonstrates that integration of air assets must be achieved to ensure the efficient application of air power throughout the theatre of operations. Synchronization of air power with land forces can only be achieved once air assets have been integrated throughout the battlespace at the proper depth and with suitable intensity and effect. Future success in joint operations will be contingent on close cooperation between the US Army and the USAF on the ongoing development of joint and service doctrine.



# **A Clash of Service Doctrines: Integration Versus Synchronization in Joint Operations<sup>1</sup>**

By Lieutenant-Colonel G.M. Pratt

Air power is indivisible. If you split it up into compartments, you merely pull it to pieces and destroy its greatest asset—its flexibility.

— Field Marshal Sir Bernard Law Montgomery<sup>2</sup>

## **INTRODUCTION**

The use of air systems to project military power, commonly known as air power, has been the subject of innumerable studies since its introduction into warfare a century ago. Over the course of the intervening period, air power has undergone an extraordinary evolution—from a mere innovation at the start of the First World War, to its overwhelming impact in the Gulf War in 1991 and the air war over Kosovo in 1999.

By the end of the First World War, air power was fully integrated within land and maritime operations, but its overall significance was not decisive to the outcome of the war.<sup>3</sup> In the Second World War, the importance of air superiority was demonstrated repeatedly, and since 1939, no nation has won a war while the adversary has held air superiority.<sup>4</sup> By

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<sup>1</sup> I am indebted to Colonel William A. Scott, USAF (retired), a Gulf War veteran, former Commandant of the Squadron Officer School and Vice Commander of Headquarters Air Force Doctrine Center, Maxwell Air Force Base, and Vice Commander of First Air Force. Colonel Scott kindly provided me with insightful information on the Gulf War and on US Air Force and joint doctrine. He is presently employed as the Director of Staff, First Air Force Headquarters, Tyndall Air Force Base.

<sup>2</sup> David W. English, *Slipping the Surly Bonds: Great Quotations on Flight* (New York: McGraw-Hill, 1998), 74.

<sup>3</sup> Buckley, 10.

<sup>4</sup> Warden, 10.

1945, air power had integrated itself into all levels of war, and atomic bombing had proven that it “could deliver on air power’s promise of victory through terror without combat.”<sup>5</sup>

During the Cold War, air power was largely regarded as either strategic or tactical in nature. In the strategic sense, air power was linked with long-range bombers and the nuclear weapons they carried. All other air capabilities were used in tactical support of surface forces.<sup>6</sup>

Operation Desert Storm in 1991 represented the first large-scale deployment of US air power since the Vietnam War.<sup>7</sup> The Gulf War symbolized a transformation of air power, as air control over Iraq enabled the swift realization of the coalition’s ground objectives, thereby marking “the final coming of age of air power.”<sup>8</sup>

Subsequent major campaigns were fought in the Balkans. In Operation Deliberate Force in 1995, US and other coalition warplanes destroyed the Serbian command and control structure, quickly leading to a cease-fire that had eluded peacemakers for three years.<sup>9</sup> In 1999, another NATO coalition faced the Serbs over their actions in Kosovo during Operation Allied Force. This campaign was waged entirely through air power and resulted in the destruction of a large portion of Yugoslavia’s industrial and communications

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<sup>5</sup> Kelly, “The Air-Power Revolution,” 19.

<sup>6</sup> Lambeth, 1.

<sup>7</sup> Kelly, “The American Way of War,” 16.

<sup>8</sup> Lambeth, 1.

<sup>9</sup> Kelly, “The American Way of War,” 17.

infrastructure, eventually resulting in the collapse of the Milosevic government.<sup>10</sup> In both operations, air power again enabled strategic success on the ground.<sup>11</sup>

Despite its achievements in the Gulf War and the Balkan campaigns, the use of air power in joint operations has come under scrutiny. Joint operations 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.”<sup>12</sup> Service doctrinal differences, however, have led to differing priorities with respect to the application of the terms *integration* and *synchronization* in the conduct of joint operations. The Air Force emphasizes that air power is a high demand, low density asset that must be controlled centrally; the primacy of air power *integration* across the entire joint theatre of operations will ensure its most effective use. Land force commanders, on the other hand, “retain most of their assets for their own organic manoeuvre,”<sup>13</sup> they organize geographically with all units in each area reporting to a single commander, and they *synchronize* their actions in order to “deconflict in time and space with each other.”<sup>14</sup> These differing philosophies have led to a “clash of service doctrines”<sup>15</sup> that will be investigated in greater depth in this paper.

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<sup>10</sup> Kelly, “The American Way of War,” 17.

<sup>11</sup> Lambeth, 177.

<sup>12</sup> JP 3-0, II-1.

<sup>13</sup> Poynor, 59.

<sup>14</sup> Poynor, 59.

<sup>15</sup> Winnefeld and Johnson, 136.



In joint operations, air power is applied according to the intent of the Joint Force Commander (JFC). The JFC establishes the overall priorities and the Joint Force Air Component Commander (JFACC) then recommends to the JFC how to apportion air assets in the most effective manner in support of those same priorities. During the Gulf War, the JFACC drew criticism from land force commanders over the apportionment of air assets, complaining that the air support they required was not provided in sufficient quantity or in a timely fashion.<sup>16</sup> This criticism points to the clash of service doctrines between the US Air Force (USAF) and the US Army; a condition that has had a negative impact on the conduct of past joint operations.

This paper will explore service doctrinal differences that exist between the USAF and the US Army, and will demonstrate that the *integration* of air power throughout a theatre of joint operations must take precedence over its *synchronization* with land forces.

## INTEGRATION VERSUS SYNCHRONIZATION

Up until the 1970s, combat operations were viewed as two separate fights. Ground forces were to fight the close battle and air power attack the enemy deep.

— Major General Fred F. Marty, US Army<sup>17</sup>

US joint doctrine publications define integration and synchronization as follows:

**integration**—the arrangement of military forces and their actions to create a force that operates by engaging as a whole.<sup>18</sup>

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<sup>16</sup> Lewis, 16.

<sup>17</sup> Marty, 1.

<sup>18</sup> JP 1-02, 218.

**synchronization**—the arrangement of military actions in time, space, and purpose to produce maximum relative combat power at a decisive place and time.<sup>19</sup>

Both terms are used in joint doctrine to describe *Robust Integration, Synchronization, and Coordination Mechanisms*, one of the tenets of command and control:

Integration, synchronization, and coordination, methods and tools encourage synergistic interaction among joint force components. Integration is achieved through joint operation planning and the skilful assimilation of forces, capabilities, and systems to enable their employment in a single, cohesive operation rather than a set of separate operations.<sup>20</sup>

Integration and synchronization, therefore, are methods and tools that allow the JFC and component commanders to improve the effectiveness of their forces through synergistic interaction. Joint operations doctrine is defined as:

[D]octrine that 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.<sup>21</sup>

From this definition it can be inferred that integration and synchronization are key components of joint operations. But what is the difference between these two apparently similar terms? The definition of *integration* implies large military organizations joining together to create larger, more effective forces. This is the essence of integrated air power: large volumes of air power capabilities coming together by virtue of a centralized planning effort to create overwhelming mass against the enemy. *Synchronization* adds the elements of time, space and purpose.

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<sup>19</sup> JP 1-02, 429.

<sup>20</sup> JP 0-2, III-15.

<sup>21</sup> JP 3-0, II-1.

The *Dictionary of Military and Associated Terms* (JP 1-02) defines the three levels of war as follows:

**strategic level of war** — The level of war at which a nation, often as a member of a group of nations, determines national or multinational (alliance or coalition) security objectives and guidance, and develops and uses national resources to accomplish these objectives. Activities at this level establish national and multinational military objectives; sequence initiatives; define limits and assess risks for the use of military and other instruments of national power; develop global plans or theater war plans to achieve these objectives; and provide military forces and other capabilities in accordance with strategic plans.<sup>22</sup>

**operational level of war** — The level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or other operational areas. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time or space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives.<sup>23</sup>

**tactical level of war** — The level of war at which battles and engagements are planned and executed to accomplish military objectives assigned to tactical units or task forces. Activities at this level focus on the ordered arrangement and maneuver of combat elements in relation to each other and to the enemy to achieve combat objectives.<sup>24</sup>

These definitions would support the premise that *synchronization* (the arrangement of the elements of time, space and purpose) applies primarily at the tactical and operational levels, whereas the *integration* of military forces applies especially at the strategic and operational levels.

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<sup>22</sup> JP 1-02, 420-421.

<sup>23</sup> JP 1-02, 323.

<sup>24</sup> JP 1-02, 434.

The term *synchronization* appeared in the Army’s AirLand Battle doctrine in 1982. “Its central idea was to have the Army operate at a quicker tempo than its adversary by going through the steps of ‘see, analyze, decide, synchronize, and act’ faster than an opponent. This is almost identical to Boyd’s OODA loop theory, except for the synchronized step.”<sup>25</sup> More recently, the Army has included *synchronization* as one of the five tenets of Army operations: *initiative, agility, depth, synchronization, and versatility*.<sup>26</sup>

At the heart of this examination, however, is the notion that, first and foremost, the Air Force interprets the air campaign from a strategic viewpoint. According to the late Carl H. Builder, a former Senior Policy Analyst with the RAND Corporation, “[o]f the three services, the Air Force is clearly the most comfortable with strategy and things strategic—in thinking, theorizing, and planning.”<sup>27</sup> Builder elaborates that “[s]trategy colors almost every action of the Air Force, from defining roles and justifying missions to the development of doctrine and the acquisition of forces.”<sup>28</sup> In support of these views, *Air Force Basic Doctrine* (AFDD 1) defines air power as follows:

[The] application of air...systems to project global strategic military power. Understanding the total capabilities of air...forces, and what they provide the [JFC], is critical to understanding asymmetric leverage and the potent capability that...air...power brings to the fight—and the strategic perspective that must guide it.<sup>29</sup>

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<sup>25</sup> Burton, *The Pentagon Wars*, 51-52. Colonel John Boyd, USAF, developed the Boyd Cycle or OODA Loop to describe the following sequence of events: Observe, Orientate, Decide, and Act.

<sup>26</sup> FM 3-0, 4-15.

<sup>27</sup> Builder, *The Masks of War*, 67.

<sup>28</sup> Builder, *The Masks of War*, 67.

<sup>29</sup> AFDD 1, 44. The full description contained in AFDD 1 reads as follows: “Therefore air and space power is defined as the integrated application of air and space systems to project global strategic military power. Understanding the total capabilities of air and space forces, and what they provide the joint force commander, is critical to understanding asymmetric leverage and the potent capability that integrated air and space power

From the foregoing, therefore, it is clear that Air Force doctrine is founded on the strategic level of war. Conversely, the Army understands the battle or ground campaign from the tactical perspective. Builder supports this contention by adding that “[w]here the sailor or airman thinks in terms of an entire world, the soldier at work thinks in terms of theatres, in terms of campaigns, or in terms of battles.”<sup>30</sup>

That is not to say that the Air Force does not recognize the important role of synchronization in joint operations. Indeed synchronization is a key component in the planning and conduct of all air campaigns, but at the tactical and operational levels of war, whereas the command and control of air power always begins at the strategic level. Synchronization, however, can potentially constrain the application of air power by forcing it to wait in *time* for someone else to achieve an objective, or in *space* by waiting for someone else to reach a phase line or an objective.

Lieutenant Colonel D. Robert Poynor, USAF (retired), a doctrine analyst at the Air Force Doctrine Center, explains that land forces organize “geographically, and seek to achieve tactical-level results sequentially as they move across the surface.... [Land forces] tend to focus on the enemy forces immediately in front of them; airmen talk about achieving theater-wide effects, and tend to focus on targets set throughout the enemy’s territory.”<sup>31</sup>

The Air Force is also aware that inevitably, there are always fewer air assets available than

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brings to the fight—and the strategic perspective that must guide it.” The term *space* was removed from the citation in the text because it is not germane to the discussion in this paper. Further, the word *integrated* was also removed because it refers to the incorporation of air and space power, not the integration of air power into joint operations, and its use in this paper might have caused confusion.

<sup>30</sup> Builder, *The Masks of War*, 88, quoting Rear Admiral J.C. Wylie Jr., USN.

<sup>31</sup> Poynor, 58-59.

potential missions and targets. Hence, the Air Force contends that central control will ensure the most efficient application of air assets across the battlespace. From the foregoing, therefore, it can be surmised that the term *integration* is closer to the Air Force's strategic doctrinal ideology, whereas *synchronization* embodies a concept that the Army associates more closely with the tactical and operational levels of war.

Why does this dichotomy exist with respect to doctrine? Until the Goldwater-Nichols Act of 1986, individual services developed their own doctrine with little or no consultation with the other services.<sup>32</sup> After 1986, US armed forces were required to develop and adapt to joint doctrine. In the wake of the Gulf War, the Chairman of the Joint Chiefs of Staff, General Colin Powell, recognizing conflicting service doctrinal perspectives, commissioned the development of the joint doctrine capstone publication, *Joint Warfare of the Armed Forces of the United States* (JP 1) in order to promote the development of harmonized doctrine across all services.<sup>33</sup>

By 1997, the Air Force and the Army Chiefs of Staff “openly acknowledged their differences over such basic issues as control of air and missile defenses and deep operations conducted beyond the fire-support coordination line but within the land commander's area of operation. It became clear that neglect of doctrine can translate to less than optimal use of airpower and cloud the debate over future forces.”<sup>34</sup>

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<sup>32</sup> According to Herrly, before 1986, “there were very few people in the doctrine business with an appreciation of the unique capabilities of each service and the skill to think through how such capabilities could best be combined” (Herrly, 99).

<sup>33</sup> Herrly, 100.

<sup>34</sup> Grant, 48.

## ROLE AND FUNCTION OF THE JFACC

Centralized control and decentralized execution of air...forces are critical to force effectiveness. Air...power must be controlled by an airman who maintains a broad strategic and/or theater perspective in prioritizing the use of limited air...assets to attain the objectives of all US forces in any contingency across the range of operations.

— The First Tenet of Air Power, *Air Force Basic Doctrine*<sup>35</sup>

Air...power is intrinsically different from either land or sea power, and its employment must be guided by axioms different than those of surface forces.

— *Air Force Basic Doctrine*<sup>36</sup>

During the conduct of the joint campaign, the JFC can choose to establish functional component commands to conduct operations.<sup>37</sup> “Normally, the JFACC is the Service component commander having the preponderance of air assets and the capability to plan, task, and control joint air operations.”<sup>38</sup> Air assets not organic to the Air Force may be assigned from other services, such as the Navy, the Army, or the Marines. The JFACC exercises tactical control over assigned air assets and the organic air assets other services make available for tasking—this is completed through the Air Tasking Order (ATO).<sup>39</sup> All land and maritime non-air assets will normally be assigned to the Joint Force Land

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<sup>35</sup> AFDD 1, 23. Centralized control and decentralized execution is one of the USAF tenets of air power.

<sup>36</sup> AFDD 1, 21

<sup>37</sup> JP 3-0, II-15.

<sup>38</sup> JP 3-01, II-4. In all joint operations conducted in the 1990s, the JFACC has been appointed from the Air Force.

<sup>39</sup> The JFACC will normally exercise operational control over all Air Force assets, but this is under his authority as Commander, Air Force Forces (AFDD 2, 54). Air assets in theater not assigned to the JFACC would include tactical aviation assets that would normally remain organic to the JFLCC, and anti-submarine and anti-surface air assets that would be assigned to the JFMCC.

Component Commander (JFLCC), and the Joint Force Maritime Component Commander (JFMCC), respectively. Typically, the assigned area of responsibility for the JFLCC and the JFMCC will be restricted to specific geographic areas. In the case of the JFACC, however, there is no geographic area of operations: all air assets are applied across the entire theatre of operations. Consequently, the JFACC is required to operate over the two-dimensional area assigned to the surface component commanders “who retain full authority in their geographic sectors.”<sup>40</sup>

As joint operations require the JFACC to operate throughout the Joint Operations Area (JOA), there can be considerable conflict with the other component commanders over competing demands for scarce resources and coordination of efforts. In recognition of this fact, JP 3-0 states that: “The JFC’s objectives, intent, and priorities, reflected in mission assignments and coordinating arrangements, enable subordinates to exploit fully the military potential of their forces while minimizing the friction generated by competing requirements.”<sup>41</sup> It has been noted that in the Gulf War, “[a] single air commander...allowed a degree of coherence in the conduct of air operations that would not have occurred had most air forces been assigned separate operating areas...as in Vietnam.”<sup>42</sup> Further, JP 3-0 recognizes that the air component can be the lead force, and that the JFACC

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<sup>40</sup> Grossman, “Airpower Gains in the Doctrine Wars,” 47. According to JP 3-01, “Since the attainment of air superiority is normally [a Joint Operations Area wide] priority, the JFC normally designates the JFACC as the supported commander for [Joint Operations Area wide] counterair operations” (JP 3-0, II-4). Consequently, the JFACC is only required to *coordinate* activities with surface component commanders over their respective geographic areas of operation.

<sup>41</sup> JP 3-0, IV-14.

<sup>42</sup> Keaney and Cohen, 136.



can be supported by the other component commanders.<sup>43</sup> In fact, “[t]he JFACC is considered the ‘supported commander’ for all counterair operations. Under a [JFC’s] guidance, the air commander has latitude to control the priority, timing, and effects of counterair fires across the theater. And counterair operations, while under the command of a single individual, can be executed in decentralized fashion,”<sup>44</sup> thereby satisfying the first tenet of air power.

The JFACC controls all sorties for assigned aircraft through the production of the ATO, which is “the final distilled product of the planning involving objectives, aircraft sortie allocation, and target selection, issued in terms of a daily schedule of aircraft sorties matched with missions, targets, times, and all the coordinating instructions necessary for units to accomplish the specific tasks.”<sup>45</sup> Consequently, the targeting process in joint operations has a great impact on the ATO, and ultimately, on the decisive use of air assets. Due to the clash of service doctrines, however, the Air Force and Army hold different views on the selection of centres of gravity (COG), and subsequently, on the targeting process itself.

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<sup>43</sup> Herrly, 101.

<sup>44</sup> Grossman, “Airpower Gains in the Doctrine Wars,” 47.

<sup>45</sup> Keaney and Cohen, 28-29.

## CENTRES OF GRAVITY

The advent of air power, which can go straight to the vital centers and either neutralize or destroy them, has put a completely new complexion on the old system of making war. It is now realized that the hostile main army in the field is a false objective, and the real objectives are the vital centers.

— Brigadier General William “Billy” Mitchell<sup>46</sup>

Differing historical doctrinal philosophies exhibited by the Army and Air Force have had a significant impact on the perception of COGs. Whereas the Army has traditionally focused on the enemy facing them, the Air Force prefers to review the entire theatre of war—which is understandable, as the Air Force can carry out simultaneous and parallel operations (strategic, operational, tactical) to a depth unrivalled by the Army. As evidence, AFDD 1 states that “[t]he ability to integrate a force quickly and to strike directly at an adversary’s strategic or operational COG is a key theme of air and space power’s maneuver advantage.”<sup>47</sup> The disparate philosophies of the Air Force and the Army were manifested as recently as Operation Allied Force when “[t]he regional commander-in-chief (an Army officer) declared that the fielded Serb forces in Kosovo should be the primary targets in the air campaign, while the air commander wanted to ‘go downtown’ into Belgrade and apply pressure to the Serbian decisionmakers.”<sup>48</sup>

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<sup>46</sup> AFDD 1, 45.

<sup>47</sup> AFDD 1, 17.

<sup>48</sup> Poyner, 59. It should be noted that the air commander’s perspective in this case closely followed the Air Force’s definition of strategic attack: “Military action carried out against an enemy’s center(s) of gravity or other vital target sets, including command elements, war-production assets, and key supporting infrastructure in order to effect a level of destruction and disintegration of the enemy’s military capacity to the point where the enemy no longer retains the ability or will to wage war or carry out aggressive activity.” (AFDD 1, 85).

All services agree that the key to success in war is to neutralize or destroy the enemy's COGs. In fact, joint doctrine states that this course is the "most direct path to victory."<sup>49</sup> Both the Air Force and the Army also agree that COGs exist at all levels of warfare, and all must be considered during the evaluation of the battlespace.<sup>50</sup> Further, Air Force doctrine states that "[b]ecause of the theaterwide scope of aerospace operations, the JFACC will typically maintain the same... theaterwide scope as the JFC."<sup>51</sup>

Colonel Mark F. Cancian, US Marine Corps Reserve, points out that "[a]ir power, almost from its inception, has looked for decisive results from strategic effects against enemy [COGs].... The prospect of 'jumping over the trenches' to strike directly at an enemy's critical vulnerabilities has been extremely attractive."<sup>52</sup> The Army on the other hand, and in true Clausewitzian fashion,<sup>53</sup> usually maintains that the enemy's main force is the COG.<sup>54</sup> Consequently, during Desert Storm, when the Army determined that the Republican Guard was the obvious COG,<sup>55</sup> and held that air power should be directed there, the JFACC was considering targets throughout the entire theatre.<sup>56</sup> Eventually, the Republican Guard became the object of intense Air Force targeting in the days leading to the

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<sup>49</sup> JP 3-0, III-22.

<sup>50</sup> AFDD 2-1, 40 and FM 100-7, 3-1.

<sup>51</sup> AFDD 2, 54.

<sup>52</sup> Cancian, 32.

<sup>53</sup> Handel, 55.

<sup>54</sup> FM 100-7, 1-5.

<sup>55</sup> Walters, 78.

<sup>56</sup> According to Cancian, 31: "[o]riginally, the Air Force planners had not even targeted the Republican Guard, which they regarded as a tactical distraction."

ground offensive when the tactical level of war was the appropriate focus, and the corps commanders became the supported commanders.

In its appraisal of Operational Art, JP 3-0 emphasizes the importance of striking the enemy from all directions and dimensions:

JFCs strive to maintain friendly force balance while aggressively seeking to disrupt an adversary's balance by striking with powerful blows from unexpected directions or dimensions and pressing the fight. Military deception, special operations, offensive information operations, direct attack of adversary strategic centers of gravity..., interdiction, and maneuver all converge to confuse, demoralize, and destroy the opponent.<sup>57</sup>

In fact, the Air Force emphasizes that the elimination of strategic targets can be *the most direct path to victory*, with the added advantage of reducing friendly casualties to a minimum—a significant element attractive to politicians in the present climate of casualty aversion. As a result, “in a world in which few public officials are willing to risk casualties..., airpower alone has become the policy tool of choice for active combat operations since 1992.”<sup>58</sup>

Air Force doctrine does not focus on *output*, but rather on *outcome* or *effects*. Consequently, a strategic attack is not defined by the weapon system, nor by the method of delivery, but rather by the target and the overall effect that the elimination or neutralization of that target has on the conduct of the war.<sup>59</sup> Further, Air Force doctrine is clear that in joint operations, air power must be developed strategically from the start of the conflict, and indeed,

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<sup>57</sup> JP 3-0, III-13.

<sup>58</sup> Herrly, 103.

<sup>59</sup> AFDD 2-1, 14.

It is not prudent to wait for a theater strategy, emphasizing surface maneuver to be developed, and then create a supporting air strategy.... [W]ithout adequate air and space expertise at [the strategic] level, planning has historically devolved to an emphasis on surface warfare operations and objectives and how they can be supported by aerospace power. This does not imply that aerospace power is the answer in every case, but it does mandate that theater-level planning include examining aerospace power options from the beginning.<sup>60</sup>

It can be reasoned that strategy focuses more properly on the *ends* (or the *outcome*), whereas tactics are expected to focus on the *means*. In a similar vein, strategic thinking should concern itself with the enemy's *vulnerabilities*, whereas the tactician is more concerned with the enemy's *military capabilities*.<sup>61</sup> Prior to the 20th century, "strategic thinking was mostly positional,"<sup>62</sup> and strategic objectives could not be attained without first defeating enemy military forces. The advent of air power, however, provided strategists with the first opportunity to hurdle long-standing barriers to the attainment of national strategic objectives, without directly engaging the enemy's surface forces. Builder sums this up by stating that "military power can sometimes be brought to bear most effectively and efficiently when it is applied directly toward a nation's highest purposes without first defeating defending enemy forces."<sup>63</sup> Modern war, therefore, especially with recent technological advances, has demonstrated that "air power...now permits the achievement of strategic goals...from the outset of fighting."<sup>64</sup>

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<sup>60</sup> AFDD 2-1, 1.

<sup>61</sup> Builder, "Keeping the Strategic Flame," 77-78.

<sup>62</sup> Builder, "Keeping the Strategic Flame," 78.

<sup>63</sup> Builder, "Keeping the Strategic Flame," 77-78.

<sup>64</sup> Lambeth, 270.

It could be argued that the Gulf War did not represent the acme of air power in the *strategic* sense. After all, only ten percent of sorties flown were directed toward Iraqi infrastructure (with the presumed aim of attacking directly at Saddam Hussein's hold on power—a *strategic* objective). The majority of sorties, however, were actually directed against Iraqi forces—a *tactical* objective—in an effort to achieve the coalition's mission of liberating Kuwait from Iraqi military occupation: the principal *strategic* objective of the Gulf War.<sup>65</sup> It could also be argued that Operation Allied Force did symbolize the pinnacle of air power as it was used to achieve decidedly *strategic* goals (the withdrawal of Serbian troops from Kosovo and the toppling of Milosevic's government) without significantly engaging enemy military forces.

On the other hand, the Army's entire *raison d'être* is to hold ground and defeat enemy forces—an obvious *tactical* mindset. Even Army commanders at the corps level understand their role in tactical terms, as they are more concerned with the enemy's tactical military capabilities than with the enemy's overall strategic vulnerabilities. And so it should be: as leaders of ground forces, Army commanders must be focused on the enemy facing them and the immediate means to defeat them. Contrast this notion with the Air Force vision of thinking strategically first, and then working down to the tactical level. It is little wonder that joint operations have engendered long debates, especially between land and air proponents, on the proper use of air power in war.

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<sup>65</sup> Lambeth, 267. According to Lewis, on 4 August 1990, the JFACC briefed the President on “air capabilities and options. From this meeting the [JFACC] brought back to his staff the president's objectives: [1] Force Iraq out of Kuwait. [2] Destroy Iraq's nuclear, biological, and chemical (NBC) capability (5-10 year setback). [3] Minimize loss of life (but do not draw out the war). [4] Minimize civilian casualties” (Lewis, 4).

Differing philosophies with respect to COGs had an impact on targeting during Desert Storm. As the JFACC was responsible for the control of all air assets, de facto, he also controlled the joint targeting process, commensurate with the overall guidance of the JFC.

As the opening of the ground operation approached, corps commanders believed that they were not receiving their fair share of air support from the JFACC. According to Colonel Michael R. Moeller, USAF, National Defense Fellow at the Center for Strategic and International Studies, by mid-January, ground commanders complained that “the JFACC had placed less than one-half of their requested targets on the [ATO].”<sup>66</sup> According to Moeller, there were three reasons for this professed lack of support:

1. Intelligence support lagged behind the execution of the air campaign. As a result, the targets identified by corps commanders did not exist or had already been destroyed in previous attacks.
2. Unbeknownst to the corps commanders, the JFACC was under instructions by the JFC to decrease the strength of the Iraqi Republican Guard. Hence, the JFACC was prohibited from targeting enemy units who were less than half-strength, even if these had been identified by corps commanders.
3. The JFC was double-hatted as the JFLCC. Consequently, corps commanders did not have a superior equal in status to the JFACC to whom they could bring their targeting concerns.<sup>67</sup>

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<sup>66</sup> Moeller, 14.

<sup>67</sup> Moeller, 14.

Brigadier General Richard B.H. Lewis, USAF, Director of the Joint Theater Air and Missile Defense Organization, notes that:

[a]lthough the ground campaign was a complete success, the Army corps commanders were not satisfied with JFACC operations. Corps commanders during Desert Storm wanted each corps, not [the] JFACC, to have responsibility for shaping the battlefield through air interdiction both prior to and after [the start of ground operations]. In addition, each corps commander wanted to receive a set number of daily sorties.<sup>68</sup>

Further, according to Lewis,

[w]ithout question, corps were denied air power prior to [the start of the ground offensive], but not by the JFACC. The JFACC attacked every target on the [JFC-approved] target list. What was missing in Desert Storm was feedback to the corps on the targets they submitted to [US Army Forces Central Command] that ‘didn't make the cut.’<sup>69</sup>

Two conclusions can be drawn from the above. First, land force commanders do not always have the necessary intelligence to identify the most suitable targets, especially since they are largely restricted to the *tactical* level. And second, “in order to exploit air power and avoid its misuse, air must be kept centralized at the theater level under a JFACC.”<sup>70</sup> This centralization of air assets once more supports the first tenet of air power: centralized control and decentralized execution.

The Army and Air Force’s recent doctrinal emphasis on Effects-Based Operations (EBO), will clearly link strategic and operational objectives to desired results or outcomes, not to enabling actions or means. It is anticipated that in future joint operations, the JFC will identify objectives, including their desired end-state, to the component commanders, but not

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<sup>68</sup> Lewis, 16-17.

<sup>69</sup> Lewis, 21.

<sup>70</sup> Lewis, 19.



how to accomplish these end-states. EBO will allow the JFACC to focus on strategic and operational results through the centralized command of air power, as opposed to the detailed management of target lists. The ATO process would now become “an EBO tool seeking to produce effects in accordance with JFC priorities.”<sup>71</sup> For example, a “stated objective such as ‘Render 50% of the enemy’s mechanized brigade combat ineffective’ allows many ways to achieve the desired results.... A poorly defined objective like ‘Destroy 50% of the enemy’s tanks,’ forces a task-based operation of attacking and killing a predetermined number of fielded tanks,” forcing a JFACC to waste sorties “when the result could be more effectively achieved by other means.”<sup>72</sup>

## DEPTH OF THE BATTLESPACE

[T]he Air Force views the Army’s continued efforts to control Air Force assets for deep interdiction beyond the [Fire Support Coordination Line] as a serious threat to air power’s single greatest comparative advantage, namely, its flexibility to meet the theatre-wide needs of a [JFC] as they may arise.

— Benjamin S. Lambeth<sup>73</sup>

What was deep battle for the Army, ... was not deep to the Air Force

— Peter F. Herrly<sup>74</sup>

The Air Force does not share the same understanding of depth as the Army does.

Depth, the third tenet of Army operations,<sup>75</sup> is defined in *Operations* (FM 3-0), the Army’s

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<sup>71</sup> Air Force Doctrine Center. “Doctrine Watch #13: Effects-Based Operations (EBO)” (30 Nov 2000), accessed 16 Sep 2002; available from <https://www.doctrine.af.mil/DoctrineWatch/DoctrineWatch.asp?Article=13&Print=1>.

<sup>72</sup> Ibid. For example, cutting the fuel supply would be an alternative method of rendering an enemy mechanized brigade combat ineffective.

<sup>73</sup> Lambeth, 294.

<sup>74</sup> Herrly, 100.

keystone doctrine manual, as “the extension of operations in time, space, and resources.”<sup>76</sup> There is no official definition for *depth* in Air Force doctrine, nor (curiously enough) in joint doctrine.<sup>77</sup> Although the Army definition could be adopted by the Air Force, its implications would be virtually meaningless. Arguably, *the extension of operations in time, space, and resources* is something the Air Force carries out as part of all its operations. In fact, the very nature of the Air Force causes it to operate in depth all of the time—at least from an Army perspective. During the 1990s, for example, Air Force bombing operations were carried out in the Middle East and Europe from as far away as Diego Garcia and the continental United States.<sup>78</sup> Consequently, the term *depth* means very little to the Air Force—which makes sense, if one accepts the precept that Air Force doctrine is based on the strategic level of war. To the Army, however, *depth* is very real and has been expanding in absolute terms over the past decades as weapons technology and range has extended. With an operational range of over 300 km, for example, the Army Tactical Missile System (ATACMS)<sup>79</sup> gives the corps commander an *extension of operations in time, space, and resources* (or depth) previously unheralded in the annals of land warfare—and an area of operations which has been held within the dominion of the Air Force for over half a century.

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<sup>75</sup> FM 3-0, 4-15.

<sup>76</sup> FM 3-0, 4-17.

<sup>77</sup> There is no definition for “depth” or “deep” in either AFDD 1-2 or JP 1-02. According to Hochevar et al., “Deep strike operations ... [are] not defined in service doctrine, much less joint publications. It takes various forms and meanings. The Army uses *deep battle*, *deep attack*, and *deep strike* interchangeably; the Navy adopts the holistic term *strike warfare*; and the Air Force refers to *interdiction*, *air interdiction*, and *battlefield air interdiction*” (Hochevar et al., 81).

<sup>78</sup> Lambeth, 194.

<sup>79</sup> Quintrall, 7.

Hence, the concept of deep operations has become a controversial issue, especially since the Gulf War.

According to Benjamin S. Lambeth, senior staff member at the RAND Corporation, Desert Storm taught the Army that:

the deep battle [has] becom[e] progressively more decisive than the close battle in major wars. In a natural response to this development, which has called into question its most time-honoured combat role, it...is now endeavoring instead to claim more of the likely battlespace for the [JFLCC] in the next war. That, in turn, has led to a renewed controversy between the Air Force and Army over which component commander should control joint firepower application in future theaters of operations.<sup>80</sup>

At the heart of the controversy over depth in the battlespace, is the location of the Fire Support Coordination Line (FSCL), one of several Fire Support Coordination Measures (FSCM). In the AirLand Battle doctrine of the 1980s, the Air Force was made solely responsible for prosecuting the deep battle, leaving the Army to concentrate on the close battle. It fell upon the component commanders to ensure that air and land operations were synchronized in time and purpose.<sup>81</sup> At the start of the Gulf War, the Army and the Air Force held differing interpretations of the FSCL based on doctrinal grounds. The Air Force viewed the FSCL as a method of dividing the battlefield, whereas the Army considered the FSCL as a permissive fire control measure.<sup>82</sup> As the JFLCC controlled the position of the

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<sup>80</sup> Lambeth, 291.

<sup>81</sup> Laughbaum, 21.

<sup>82</sup> A permissive FSCL will allow the JFLCC, in exceptional circumstances, to attack targets beyond the FSCL without coordinating the attack with the JFACC (Laughbaum, 19-20). A restrictive FSCL, on the other hand, does not allow the JFLCC any attack beyond the FSCL without coordination with the JFACC under any circumstance (Laughbaum, 35).

FSCL, often at the maximum range of organic Army firepower, the Air Force was worried of “being pushed out of the battle area.”<sup>83</sup>

Inevitably, many concerns did arise during the Gulf War over deep operations and the position of the FSCL. Army commanders complained that the JFACC used the FSCL in a restrictive way, detailing that all Army fire power employed beyond the FSCL would require inclusion “on the ATO or receive real time clearance to fire from the [Air Operations Centre]”<sup>84</sup> in order to reduce the likelihood of surface-to-air fratricide. The Air Force complained that the corps commanders placed the FSCL too far forward, beyond the area in which the corps intended to carry out its own deep operations. Although the Army had traditionally located the FSCL 10 to 20 km from the Forward Line of Own Troops (FLOT), the Army’s acquisition of long-range weapons meant that, during Desert Storm, the FSCL was placed well beyond those customary limits.<sup>85</sup> In the closing hours of the Gulf War, the corps commanders “independently extended the range of the FSCL [approximately 80 km beyond the FLOT]. These actions had the unintended effect of giving the Iraqis sanctuary from...airpower and ultimately permitted the nearly unimpeded escape of most enemy troops...to Iraq.”<sup>86</sup>

In the years following the Gulf War, both the Army and the Air Force revised their doctrine manuals to reflect the lessons learned in that conflict. The result is that both doctrines are currently incompatible because the Air Force and the Army claim that their

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<sup>83</sup> Laughbaum, 21.

<sup>84</sup> Laughbaum, 40.

<sup>85</sup> Laughbaum, 40.

<sup>86</sup> Laughbaum, 37.

respective component commanders have ultimate authority over deep operations.<sup>87</sup> The Air Force believes that a shallow FSCL (close to the FLOT—normally set at the maximum range of the Army’s organic tube artillery)<sup>88</sup> is required to delineate deep operations from the close battle, and that the FSCL should be a restrictive FSCM whereby all air and fire power beyond the FSCL would require synchronization and coordination within the ATO. Army doctrine, on the other hand, details that land force commanders, are responsible for the synchronization of all air and firepower within the land area of operations where the JFLCC is considered to be the supported commander. Further, the Army believes that the FSCL is a permissive FSCM that “unshackle[s] long-range firepower from detailed coordination requirements.”<sup>89</sup>

Joint Doctrine does not fully clarify the issue. Whereas *Doctrine for Joint Interdiction Operations* (JP 3-03) states that “[t]he JFACC is the supported commander for the JFC’s overall air interdiction effort,”<sup>90</sup> *Doctrine for Joint Fire Support* (JP 3-09) details that the JFLCC is the supported commander within the land area of operations, and that within that area the JFLCC is responsible for the synchronization of interdiction operations.<sup>91</sup> (The Air Force and the Army were the lead agencies for the development of JP 3-03 and JP 3-09, respectively, thereby demonstrating an underlying problem with the

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<sup>87</sup> Laughbaum, 56-57.

<sup>88</sup> Laughbaum, 71.

<sup>89</sup> Laughbaum, 57.

<sup>90</sup> JP 3-03, II-8.

<sup>91</sup> JP 3-09, I-3.

integration of joint doctrine.)<sup>92</sup> Although joint doctrine specifies how the battlefield will be divided, it does not provide the necessary guidance for deep battle synchronization: “the core of the problem is [FSCL] doctrine.”<sup>93</sup> The JFLCC can be easily persuaded to set the FSCL deep with the area of operations, thereby increasing span of control over the battlefield and reducing coordination requirements with the JFACC. A deep FSCL also complicates the JFACC’s job of providing air power short of the FSCL where the use of forward air controllers is mandatory. In addition, joint doctrine gives the JFLCC tactical control over air interdiction sorties short of the FSCL—thereby contradicting the first tenet of air power, which is completely unacceptable to the Air Force. Finally, joint doctrine supports the Army’s doctrine of a permissive FSCL, thereby allowing non-coordinated attacks beyond the FSCL, “generating a situation where the risk of fratricide is balanced against the possibility of destroying a target.”<sup>94</sup>

In a paper published in 2002, Lieutenant-Colonel Mick Quintrall, USAF, suggests that the traditional FSCL should be replaced by a three-dimensional grid-box scheme that would support a more reactive and functional FSCM. This new procedure would

result in more permissive air fires, allow rapid ground maneuver across a three-dimensional battlefield, reduce the chance of fratricide, and mute parochial FSCL fights among the services by minimizing the overlap of battle-space fires and clearly defining the supported/supporting relationships in the ground commander’s areas of operations.<sup>95</sup>

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<sup>92</sup> Morneau, 3-4.

<sup>93</sup> Laughbaum, 62.

<sup>94</sup> Laughbaum, 63.

<sup>95</sup> Quintrall, 16.

Further, this suggested system may prove valuable in modern warfare, where the linear battlefield is slowly giving way to the non-linear battlefield.<sup>96</sup>

The ongoing debate over the control over deep operations and the position of the FSCL is another potent illustration of the fundamental doctrinal philosophical differences between the Army and the Air Force. At the heart of the matter, the Army is concerned primarily with the defeat of enemy forces within a delineated geographic area, whereas the Air Force, with its strategic doctrinal viewpoint, emphasizes the need to integrate and control air power over the entire theatre of war to achieve the JFC's objectives.

### **CONCLUSION—THE CLASH OF SERVICE DOCTRINES**

[I]nstilling a genuine joint perspective in the future leaders of the Armed Forces (while preserving the expertise of each service in its respective operational medium) [will] require at least ten to fifteen years to develop.

— Attributed to General Colin Powell, 1991<sup>97</sup>

The Army continues to hold to the doctrine “that the proper role of air power is to support land combat”<sup>98</sup> and that “only an invading and occupying ground force can impose ‘decisive defeat’ on an enemy and bring a conflict to a successful termination.”<sup>99</sup> More to the point, the former CINC of Central Command stated that “[t]he principal business of

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<sup>96</sup> According to Murphy, “Evolving Army doctrine has moved increasingly to a nonlinear battlefield without traditional front lines, where ground, air, and naval forces fight simultaneously throughout the depth of the battlefield” (Murphy, 72).

<sup>97</sup> Herrly, 100. Attributed to General Colin Powell in 1991 (in the wake of the Gulf War) when he commissioned JP 1.

<sup>98</sup> Lambeth, 286.

<sup>99</sup> Lambeth, 287.

war—inflicting decisive defeat on the enemy—could be carried out only by land forces—‘boots on the ground’—not air forces.”<sup>100</sup>

For its part, the Air Force accepts the premise that ground forces are an essential element of joint operations and that no other component “so clearly commits the prestige of [a] nation to a major operation.”<sup>101</sup> In the case of Desert Storm, the ground operation at the end of the war provided “a credible anvil to backstop the hammer of...air power.”<sup>102</sup> To the Air Force, the real question to be resolved is where does the land battlespace give way to deep operations—air power’s area of expertise, where no other component can compete with the same intensity and effect. Finally, the Air Force consistently emphasizes the important role that its strike aviation can carry out against ground threats from long range, thereby reducing the need for the Army “to engage enemy ground forces within lethal range of return fire.”<sup>103</sup>

These differing views exemplify the fundamental doctrinal disparity that distinguishes the Army from the Air Force. The Army understands the campaign in terms of the enemy military forces that it is preparing to engage—a classic Clausewitzian viewpoint.<sup>104</sup> The Air Force, by contrast, is concerned with enemy vulnerabilities throughout the theatre of war—a more *strategic* doctrinal baseline. Hence, the Air Force prefers to centralize and *integrate* all air power assets in order to ensure that its resources are

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<sup>100</sup> Grossman, “Duel of Doctrines,” 30.

<sup>101</sup> Lambeth, 287.

<sup>102</sup> Lambeth, 287.

<sup>103</sup> Lambeth, 289.

<sup>104</sup> Builder, *The Masks of War*, 89.



applied rigorously throughout the entire area of operations, from the strategic level down to the tactical. Consequently, the role of the JFACC is fundamental to Air Force doctrine: central control of all air assets on behalf of the JFC, with the ATO as the coordinating tool.

The *integration* of air power in joint operations emphasizes the Air Force's doctrinal contention that potentially sparse air assets in the joint campaign must be controlled from the centre to ensure its most efficient application across the battlespace. *Synchronization* is a term that defines the coordination of military forces in time and space. To the Air Force, *synchronization* is an important concept, especially when it concerns the coordination of air power with land forces at the tactical level of war. But *synchronization* will always follow *integration* in order of significance, as air power can only be *synchronized* with land power once it has been *integrated* throughout the battlespace at the proper depth and with suitable intensity and effect.

Air power is a high demand, low density asset—the key to its successful application is to respect the priorities set by the JFC, rather than the competing requests of the tactical commanders. *Integration* is all about knowing when the demands of the air campaign take precedence, and when the air support requirements of the component commanders must be adhered to. The key to the success of joint operations is acknowledging the requirements of the component commanders and then applying the JFC priorities accordingly.

Both the USAF and the US Army agree that success in future joint operations can only be achieved through close coordination and cooperation. The best method to resolve the clash of service doctrines will be to work diligently to strengthen their ties at the joint level, and to ensure that their respective service doctrines are consistent with joint doctrine.

## GLOSSARY

AFDD	Air Force Doctrine Document (published by the USAF)
ATACMS	Army Tactical Missile System
ATO	Air Tasking Order
COG	Centre of Gravity
EBO	Effects-Based Operations
FLOT	Forward Line of Own Troops
FM	Field Manual (published by the US Army)
FSCL	Fire Support Coordination Line
FSCM	Fire Support Control Measures
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JFLCC	Joint Force Land Component Commander
JFMCC	Joint Force Maritime Component Commander
JOA	Joint Operations Area
JP	Joint Publication (published by the US Joint Chiefs of Staff)
JTF	Joint Task Force
USAF	United States Air Force

## BIBLIOGRAPHY

- Buckley, John. *Air Power in the Age of Total War*. London: UCL Press Limited, 1999.
- Builder, Carl H. "Keeping the Strategic Flame." *Joint Force Quarterly*. 14 (Winter 1996-97): 76-84.
- . *The Masks of War: American Military Styles in Strategy and Analysis*. Baltimore: Johns Hopkins UP, 1989.
- Burton, James G. *The Pentagon Wars: Reformers Challenge the Old Guard*. Annapolis: Naval Institute Press, 1993.
- Cancian, Mark F. "Centers of Gravity Are a Myth." *US Naval Institute Proceedings*. 124 no. 9 (Sep 1998): 30-34.
- Grant, Rebecca. "Closing the Doctrine Gap." *Air Force Magazine*. 80 no. 1 (Jan 1997): 48-52.
- Gray, Peter W. "Air Power and Joint Doctrine: An RAF perspective." *Royal Air Force Power Review*. 3 no. 4 (Winter 2000): 1-12.
- Grossman, Elaine M. "Airpower Gains in the Doctrine Wars." *Air Force Magazine*. 83 no. 3 (Mar 2000): 46-7.
- . "Duel of Doctrines." *Air Force Magazine*. 81 no. 12 (Dec 1998): 30-34.
- Handel, Michael I. *Masters of War: Classical Strategic Thought*. 3rd ed. London: Frank Cass Publishers, 2001.
- Herrly, Peter F. "The Plight of Joint Doctrine After Kosovo". *Joint Force Quarterly*. 22 (Summer 1999): 99-104.
- Hochevar, Albert R., James A. Robards, John M. Schafer, and James M. Zepka. "Deep Strike: The Evolving Face of War." *Joint Force Quarterly*. 9 (Autumn 1995): 81-85.
- Joulwan, George A. "Doctrine for Combined Operations." *Joint Force Quarterly*. 14 (Winter 1996-1997): 46-49.
- Keaney, Thomas A. and Eliot A. Cohen. *Revolution in Warfare?: Air Power in the Persian Gulf*. Annapolis: Naval Institute Press, 1995.
- Kelly, Michael. "The Air-Power Revolution." *Atlantic*. 289 no. 4 (Apr 2002): 18-19.
- . "The American Way of War." *Atlantic*. 289 no. 6 (Jun 2002): 16-18.

- . "Slow Squeeze." *Atlantic*. 289 no. 5 (May 2002): 20-21.
- Lambeth, Benjamin S. *The Transformation of American Air Power*. Ithaca: Cornell UP, 2000.
- Laughbaum, R. Kent. *Synchronizing Airpower and Firepower in the Deep Battle*. Maxwell Air Force Base: Air UP, 1999.
- Lewis, Richard B.H. "JFACC Problems Associated with Battlefield Preparation in Desert Storm." *Airpower Journal*. 8 no. 1 (Spring 1994): 4-21.
- MacGregor, Douglas A. "Joint Operational Architecture: the Key to Transformation". *Strategic Review*. 28 no. 4 (Fall 2000): 27-36.
- Marty, Fred R. "Synchronizing Fires in Joint and Combined Operations." *Field Artillery Journal*. (Feb 1993): 1-2.
- Moeller, Michael R. *The Sum of Their Fears: The Relationship Between the Joint Targeting Coordination Board and the Joint Force Commander*. Maxwell Air Force Base: Air UP, 1995.
- Morneau, J.J. *US Joint Doctrine: Services Influence and "Disjointness."* Toronto: Canadian Forces College, 1998.
- Mowbray, James A. "Air Force Doctrine Problems 1926—Present." *Airpower Journal*. 9 no. 4 (Winter 1995): 21-41
- Murphy, Timothy G. "A Critique of *The Air Campaign*." *Airpower Journal*. 8 no. 1 (Spring 1994): 63-74.
- Poynor, D. Robert. "Organic Versus Joint: Thoughts on How the Air Force Fights." *Strategic Review*. 29 no. 1 (Winter 2001): 58-62.
- Quintrall, Mick. "A Change-Challenge: The Fire-Support Coordination 'Box'." *Air & Space Power Journal*. 16 no. 3 (Fall 2002): 7-16.
- RisCassi, Robert W. "Doctrine for Joint Operations in a Combined Environment: A Necessity." *Military Review*. 77 no. 1 (Jan-Feb 1997): 103-114.
- Strange, Joe. *Centers of Gravity and Critical Vulnerabilities*. Quantico: Marine Corps University, 1996.
- United States Air Force. *Air Force Basic Doctrine*. Air Force Doctrine Document 1 (AFDD 1). Washington: Department of the Air Force, 1997.

---. *Air Warfare*. Air Force Doctrine Document 2-1 (AFDD 2-1). Washington: Department of the Air Force, 2000

---. *Organization and Employment of Aerospace Power*. Air Force Doctrine Document 2 (AFDD 2). Washington: Department of the Air Force, 2000

United States Army. *Decisive Force: The Army in Theater Operations*. Field Manual No. 100-7 (FM 100-7). Washington: Department of the Army, 1995.

---. *Operations*. Field Manual No. 100-5 (FM 100-5). Washington: Department of the Army, 1982.

---. *Operations*. Field Manual No. 3-0 (FM 3-0). Washington: Department of the Army, 2001.

United States Joint Chiefs of Staff. *Department of Defense Dictionary of Military and Associated Terms*. Joint Publication 1-02 (JP 1-02). Washington: Joint Chiefs of Staff, 2001 (amended through Aug 2002).

---. *Doctrine for Joint Fire Support*. Joint Publication 3-09 (JP 3-09). Washington: Joint Chiefs of Staff, 1998.

---. *Doctrine for Joint Interdiction Operations*. Joint Publication 3-03 (JP 3-03). Washington: Joint Chiefs of Staff, 1997.

---. *Doctrine for Joint Operations*. Joint Publication 3-0 (JP 3-0). Washington: Joint Chiefs of Staff, 2001.

---. *Joint Doctrine for Countering Air and Missile Threats*. Joint Publication 3-01 (JP 3-01). Washington: Joint Chiefs of Staff, 1999.

---. *Joint Warfare of the Armed Forces of the United States*. Joint Publication 1 (JP 1). Washington: Joint Chiefs of Staff, 2000.

---. *Unified Action Armed Forces (UNAAF)*. Joint Publication 0-2 (JP 0-2). Washington: Joint Chiefs of Staff, 2001.

Walters, A.J.C. "Manoeuvre Warfare and Air Power – the Seven 'T's.'" *Royal Air Force Air Power Review*. 3 no. 3 (Autumn 2000): 72-95.

Warden, John A. *The Air Campaign*. San Jose: toExcel Press, 2000.

Winnefeld, James A. and Dana J. Johnson. *Joint Air Operations: Pursuit of Unity of Command and Control, 1942-1991*. Annapolis: Naval Institute Press, 1993.