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**TITLE:**

THE NEED TO CHANGE THE CULTURAL BIAS IN THE UNITED STATES AIR FORCE  
AGAINST CLOSE AIR SUPPORT AND TO REACTIVATE THE ABCCC

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## Executive Summary

**Title:** The Need to Change the Cultural Bias in the United States Air Force Against Close Air Support and to Reactivate the ABCCC

**Author:** Major Michael J. Pfingsten, United States Air Force

**Thesis:** The omission of close air support planning for Operation *ANACONDA* illustrates a profound short sightedness in US air and land force component commanders. This shortsightedness is a logical consequence of a cultural bias in the USAF that originates from its earliest beginnings. It is critical the USAF change its culture to build an efficient CAS capability to help ensure victory in future wars. Next the USAF must build up enablers to optimize its entire fighter-bomber inventory for efficient CAS execution. Specifically, the USAF should reconstruct its Airborne Battlefield Command and Control Center (ABCCC) capability and significantly increase the number of terminal air controllers to embed in small conventional and special operations ground units. Ultimately, the USAF needs to ensure the viability of its CAS mission in order to secure the asymmetric advantage tactical air promises to deliver in future warfare.

**Discussion:** The USAF has viewed CAS historically as an ancillary mission for tactical air, prioritized behind air superiority and air interdiction. The USAF cultural attitude can be traced back to the earliest advocates of air power. Operational need and pragmatic leadership in World War II led to the refinement of techniques and the maturation of doctrine that still defines CAS principles today. However, the USAF failed to wholly adopt CAS as a primary mission, and had to learn the lessons for effective CAS in Korea and relearn them again in Vietnam. As a consequence of institutional blindness, CAS weapon system design, doctrine revision, and training has remained a very low priority for the USAF. Despite the doctrinal push to fight joint, the USAF is not currently organized, trained, or equipped to optimally support the US Army with CAS. This will prove problematic for our country in future wars against non-conventional and conventional adversaries alike as the USA and USMC transform into a lighter, dispersed force which require more flexible firepower uniquely afforded by CAS.

**Conclusion:** In order to fully realize its potential for effective and efficient CAS, the USAF must first change its organizational culture by promoting CAS as a prominent mission. Next, it must invest in the enablers that will facilitate effective CAS orchestration by its entire fleet of multi-role fighters. Specifically, the USAF should reconstruct its ABCCC capability and significantly increase the number of terminal air controllers. The USAF must ensure the viability of its CAS mission to secure the asymmetric advantage tactical air promises to deliver in future warfare.

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## PREFACE

The following thesis is a result of the author's experience as an Airborne Intelligence Officer aboard the USAF Airborne Battlefield Command and Control Center (ABCCC) and as Director of Operations for Pacific Air Forces Air Intelligence Squadron, Distributed Ground Station Five (DGS-5). My experiences as a member of the ABCCC battlestaff from 1999-2002 shaped my perception of how well the USAF could effectively orchestrate close air support. My unit, the 42<sup>nd</sup> Airborne Command and Control Squadron, was the only organization in the USAF equipped for the ABCCC mission. The seven EC-130E equipped ABCCC were never deployed to support Afghanistan Operations despite the obvious utility ABCCC could offer as the only airborne command element for close air support in the USAF inventory. The 42 ACCS was subsequently deactivated in 2003. However, it was my experiences from 2005-2007 at DGS-5 directing exploitation of Predator feeds in support of coalition ground forces in Afghanistan and Iraq that drove me to look closer at why the USAF was not fully invested in the close air support mission. Contrasted with my experience at DGS-1 nearly ten years earlier when we introduced Predator operations into Iraq for Operation *SOUTHERN WATCH*, Predator operations had become much more responsive to ground commanders' needs. My research into the evolution of close air support in the USAF has given me a better appreciation of the resource competition that exists between airpower mission types. This thesis represents the culmination of a year of learning that would not have been possible without LtCol B.J. Payne, Dr. Eric Shibuya, and my mentor Dr. Paul Gelpi.

## INTRODUCTION

On 19 October 2001 two special operations forces (SOF) teams of 12 men each flew into Afghanistan, aboard two Boeing MH-47E Chinook helicopters, from Karshi Kandabad (K2) airbase in Uzbekistan.<sup>1</sup> By 21 October 2001 SOF teams, embedded with local opposition fighters to the Taliban known as the Northern Alliance (NA), were vectoring B-52's orbiting 20,000 ft above to hammer Taliban front line forces with great effect.<sup>2</sup> Operation *ENDURING FREEDOM* represented a new transformation in the American way of fighting, featuring small special forces teams and deadly accurate close air support (CAS) to defeat a ground force three times the coalition's size. US air strikes vectored by SOF teams enabled coalition forces to liberate every major city in Afghanistan, accomplishing in weeks what the Russians were unable to do in 10 years.<sup>3</sup> Airpower had finally delivered on its promise to achieve decisive battlefield success. Despite the significant asymmetric advantage airpower provided coalition forces during the first few months of the campaign, air support was omitted largely from planning for the largest conventional ground force attack of the war known as Operation *ANACONDA*. When coalition ground forces launched *ANACONDA* on 2 March 2002, they encountered an enemy better supplied, three times as large, and offering much more resistance than was initially assessed.<sup>4</sup> The only planned CAS came from organic rotary-wing assets, Boeing AH-64s, that were attrited quickly from seven to one operational aircraft during the first day of the battle due to devastating counter-air fire from the entrenched insurgent force.<sup>5</sup> Ultimately, the USAF was able to surge airpower planned for use elsewhere in the Middle East in an intensive ad hoc CAS operation to wrench operational success out from what would otherwise have been an abysmal failure.

The short sightedness of the air and land force component commanders in omitting CAS from the original plan for Operation *ANACONDA* is a logical consequence of a cultural bias in the USAF originating from its earliest beginnings. This bias precluded development of CAS as a mainstream mission in the USAF. It is critical the USAF change its culture and build an efficient CAS capability to help ensure victory in future wars. Next the USAF must build the enablers to optimize its entire fighter-bomber inventory to efficiently execute CAS. Specifically, the USAF should reconstruct its Airborne Battlefield Command and Control Center (ABCCC) capability and significantly increase the number of terminal air controllers. Ultimately, the USAF needs to ensure the viability of its CAS mission in order to secure the asymmetric advantage tactical air promises to deliver in future warfare.

### **CULTURAL BIAS**

Joint doctrine defines close air support (CAS) as “air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces.”<sup>6</sup> Interdiction is defined as “an action to divert, disrupt, delay, or destroy the enemy’s surface military potential before it can be used effectively against friendly forces.”<sup>7</sup> Historically, the USAF classified CAS and air interdiction (AI)—the air and space application of interdiction—together as ground attack sorties despite their vast differences in complexity and temporal effects.<sup>8</sup> CAS is inherently more complex than AI due to the additional fidelity required in air-land coordination to avoid fratricide. Additionally, from the ground commander’s perspective, CAS has a more immediate effect on the outcome of the current battle as compared to AI whose effects the ground commander may never even perceive due to his focus on the pressing fight.<sup>9</sup> However, by merging the disparate mission types, the USAF has historically been able to maintain its bias

against conducting—along with organizing, training, and equipping for—CAS while arguing airpower's relevance to the ground fight. Today, the USAF predominantly views CAS as an ineffective use of airpower in comparison to other missions, namely air superiority, strategic strike, and air interdiction. This cultural attitude stems from the earliest advocates of air power who were unable to realize the desired effects of CAS due to early technology limitations (aircraft, weaponry, and communications), rapid advances in air defenses, difficult battlefield terrain (which hindered target acquisition), and budget limitations.

### **THE FORMATIVE YEARS**

The period between World War I and World War II marks the most influential time period in CAS development, heavily influencing both air and ground commanders. World War I provided air theorists with the proving grounds for developing the roots of air doctrine for ground attack. The key components for ground attack developed from very humble beginnings. Airmen conducting reconnaissance missions in World War I began dropping munitions on enemy ground concentrations, while air-ground command relationships evolved at first to improve reconnaissance and artillery spotting.<sup>10</sup> By 1918, air units were well versed in ground attack missions as illustrated by a major British operation against the Germans in Amiens, France, which featured 800 aircraft to support ground operations.<sup>11</sup> Air support included such varied tasks as revving aircraft engines over German front lines to mask the sounds of maneuvering British tanks, and bombing German troop billets, supplies, and rail facilities miles from the front.<sup>12</sup> Despite initial attempts to develop CAS in World War I, the emergence of fighter aircraft and the ground forces' advancement of anti-air tactics and firepower significantly increased the risk to bomber missions operating along the front lines.<sup>13</sup> Achieving air superiority soon trumped all other efforts, precluding maturation of ground attack doctrine.<sup>14</sup> The ground attack missions that

were flown during World War I were predominantly interdiction due to high attrition rates experienced in CAS operations.

It was the emergence of strategic bombing following World War I however that forever turned the culture of most airmen against CAS. Strategic bombing promised to more prominently feature the advantages airpower enjoyed over surface and naval fire--speed, distance, and the ability to strike the enemy behind their lines where they were more vulnerable. Furthermore, bombing deep behind the front lines gave commanders the ability to strike targets which they hoped would achieve strategic results, a more glamorous application of airpower than ground attack missions in which air was the supporting action. Strategic bombing advocacy was propagated by the prominent air theorists Brigadier General William "Billy" Mitchell, Italian Giulio Douhet, and British Air Marshall Sir H.M. Trenchard. These pioneers argued for the development of strategic bombing to "either destroy an enemy's will to resist or make it impossible for him to resist."<sup>15</sup> This potential for airpower to transform warfare sharply contrasted with CAS which: required more complicated coordination measures with ground commanders, subordinated air power to the ground commanders' objectives, and resulted in attrition of air resources for missions airmen considered "dangerous and unrewarding."<sup>16</sup> Thus, air commanders entering World War II favored using airpower to achieve air superiority, strike at the enemy's rear, and to bomb deep in enemy territory to achieve decisive strategic victory. Meanwhile ground commanders demanded more CAS missions to realize immediate effects on the battlefield.<sup>17</sup>

Despite the pervasive opinion among airmen that strategic bombing was king among airpower applications, operational need and pragmatic leadership in World War II led to the refinement of CAS techniques and doctrine left underdeveloped following World War I. Allied forces first

experimented with air-land coordination in North Africa and Sicily, resulting in a mature tactical air command and control system employed in Italy in 1944.<sup>18</sup> This control system involved heavy air-ground coordination at all levels by employing army and air liaison officers to speed up coordination of tactical air strikes against army-requested ground targets.<sup>19</sup> The process facilitated coordination of two types of army-requested CAS missions, "prearranged" and "call" missions.<sup>20</sup> Prearranged (termed preplanned CAS today) mission taskings were coordinated nightly to support the army's scheme of maneuver for the following day.<sup>21</sup> Once approved, they were rapidly disseminated over the army communications net to tasked air tactical units and originating army units within two hours of approval via teletype; supporting target photography was delivered by courier that same night.<sup>22</sup> Eighty percent of the CAS missions were prearranged.<sup>23</sup> The control system also facilitated more streamlined coordination of "call" CAS (termed immediate CAS today), which originated from VHF radio calls, to strike targets of opportunity. Forward ground or air controllers were used to further reduce aircraft response time, often satisfying requirements within 10 minutes of tasking.<sup>24</sup>

American air commanders fighting in Europe drew on experiences from the Mediterranean campaign to better organize their forces for effective CAS. They developed solid relationships with their supported ground commanders at the operational level, adopted the fighter-bomber as the primary CAS platform, and employed forward air parties to better coordinate immediate and preplanned CAS requests.<sup>25</sup> The resultant command and control processes proved decisive to Allied victory in western France in 1944 by raising morale, reducing enemy artillery fire, and disrupting enemy force cohesion.<sup>26</sup> Close air support missions also achieved significant destructive effects as evident by the role IX Tactical Air Command continuous fighter-bomber

missions played in directly aiding General George Patton's Third Army with capturing 20,000 German troops.<sup>27</sup>

Close air support operations were even more prominent in the Pacific during World War II, due in part to the lack of a strategic bombing campaign which created competition for bomber resources in Europe. The Commander of Fifth Air Force and Allied Air Forces, General George Kenney, in a letter to Commanding General of the US Army Air Forces, General Henry "Hap" Arnold, stated, "whenever the necessity arises, all or an appropriate part of the striking power of the Air Force is assigned to the tasks of supporting the ground forces."<sup>28</sup> The CAS command and control system instituted in the Pacific theater differed from the Allies' system employed in Italy and France but shared many of the same techniques. Common features included assignment of exchange liaison officers, use of forward ground controllers, improvements in air-to-ground radio communications, and a streamlined coordination process for immediate CAS requests.<sup>29</sup> Commanders viewed CAS as most critical when executing amphibious operations in order to counter the Japanese tactic of emplacing artillery on reverse slopes as protection from Allied artillery.<sup>30</sup>

Despite the strong leadership support for CAS and significant improvements made in air-ground cooperation in three theaters, CAS fell out of favor among airmen in the USAF following World War II. This bias against CAS occurred for several reasons. First, CAS effectiveness in the Pacific was significantly hampered due to dense triple canopy which hindered target acquisition, unfamiliar terrain and inadequate maps which impacted pilot CAS proficiency, and fluid front lines which complicated de-confliction with friendly forces.<sup>31</sup> Second, media coverage extolled the effectiveness of strategic bombing in Germany, fighter defense of Chinese cities, and air attacks on Japanese shipping; little mention was made of CAS successes.<sup>32</sup> These

factors reinforced the Air Force perspective that CAS was an inefficient use of air resources as compared to air superiority, strategic bombing, and interdiction missions.<sup>33</sup>

## **KOREA**

Following World War II, the USAF prioritized development of its strategic bomber force above all else in order to fight an atomic war in Europe, ignoring the Army commanders' requirement for more tactical air to fight in a large conventional ground war against the Soviets in Europe. The US government under President Eisenhower adopted a policy called "New Look" to deter any threats with nuclear annihilation, endorsing the USAF strategic bomber force while reducing the size of the army.<sup>34</sup> While the strategic airpower forces were building up, USAF tactical air proficiency atrophied as post war joint training disappeared over fundamental disagreements in air-ground cooperation doctrine between the Army and now independent USAF.<sup>35</sup> When war in Korea commenced, the USAF had to patch together a capability to fight a conventional ground war. Initially, the preponderance of air sorties were directed against CAS targets to help the army overcome a significant disadvantage in artillery combat power.<sup>36</sup> CAS missions amounted to 62% of the total sorties flown in the first month of operations, compared to only 13% for interdiction.<sup>37</sup> Meanwhile, a doctrinal debate between the USAF and USA ensued over control of the tactical air assets supporting ground operations.<sup>38</sup>

## **VIETNAM**

The debate between the USAF and USA over CAS doctrine continued to rage even as the US entered combat in Vietnam.<sup>39</sup> The Army and Air Force Chiefs of Staff eventually agreed to a joint concept for CAS in April 1965 that continues to influence CAS doctrine four decades later.<sup>40</sup> Under this agreement, called the "Concept for Improved Joint Air-Ground Coordination," the Joint Force Commander was given the authority to apportion CAS; the Air

Force was responsible for supplying the communications network and the liaisons to request and orchestrate CAS; USAF Tactical Air Control Parties (TACP) were embedded down to the battalion level and were given direct access to the Direct Air Support Centers for coordinating emergency CAS; and the ground commander retained responsibility for ensuring the safety of supported troops.<sup>41</sup> In practice, this agreement led to a formalized system of tactical air command and control similar in structure to those successfully used in World War II.<sup>42</sup> Airborne forward air controllers, prominently used in World War II but minimally employed in Korea, were reintroduced in Vietnam to better identify targets and coordinate CAS. These forward air controllers proved critical to conducting CAS due to the enemy's effectiveness at concealment in the jungle.<sup>43</sup>

The air war in Vietnam was independently prosecuted by all three military branches possessing fixed wing aircraft. The USAF identified the need to better de-conflict CAS assets leading to their decision to deploy the ABCCC for the first time in Vietnam in 1965. Seventh Air Force (7AF) soon found that ABCCC was uniquely suited to coordinating strikes against the enemy operating in one of their largest seams. ABCCC enabled the 7AF to overcome targeting restrictions which had formerly provided safe-haven to Communists using the Ho Chi Minh trail in Laos to supply operations in South Vietnam.<sup>44</sup> Target approval was granted for most strikes by a Laotian host nation rider (HNR) flying aboard ABCCC. If the targets were assessed as too close to Laotian villages, the HNR radioed the nearest Air Operations Center to gain strike approval while still airborne.<sup>45</sup> The net result was often immediate target approval (within a few minutes of request) for strikes within Laos prior to passing the strike aircraft to the forward air controller.<sup>46</sup> The ABCCC afforded 7AF, as well, the ability to rapidly reassign Navy diverted missions from North Vietnam to Laos with little or no notice, maximizing sortie utility even in

the face of sudden weather changes.<sup>47</sup> Since the ABCCC was delegated authority as the acting 7AF Commander to determine which targets to strike in Laos, it proved particularly effective at coordinating immediately strikes on “perishable” targets.<sup>48</sup> With this authority ABCCC often controlled up to 300 unplanned sorties a day in addition to its normal control of 200-250 sorties, providing an unprecedented level of flexibility for coordinating ground attack sorties.<sup>49</sup>

The CAS mission was the top priority for airpower in Southern Vietnam from the beginning of the war according to the Commander-in-Chief, Pacific.<sup>50</sup> Air and ground commanders at the highest levels concluded air power was effective in this non-conventional war, both as a “substitute for ground forces” and for the psychological impact it achieved.<sup>51</sup> Yet despite the great demand for and the relative success CAS realized in Vietnam, USAF doctrine failed to see CAS as a primary mission. This cultural attitude continued to resonate with USAF leadership for the next 30 years, which risked US operational success in Afghanistan.

### ***OPERATION ENDURING FREEDOM***

During the first few months of OEF, the US war in Afghanistan, SOF teams armed with custom radios, laser designators, and GPS designators guided precision air munitions from tactical and bomber aircraft alike.<sup>52</sup> US SOF teams reinforced with airpower proved extremely effective waging war throughout Afghanistan despite numbering only about 130 plus a few special tactics air strike controllers.<sup>53</sup> The combination of precision air munitions and TACP targeting and terminal guidance minimized collateral damage, a feat strategically critical to maintaining indigenous and international support for the war. Constant aerial bombardment directed by SOF commenced on 21 October 2001, and culminated in the fall of Mazar-e-Sharif, the second largest Afghan city, on 10 November 2001. This had a domino effect in central, northern, and western Afghanistan as Taliban forces rapidly surrendered for fear of unexpected

night attacks by AC-130 gunships and airstrikes guided by US Special Forces targeting with “death rays.”<sup>54</sup> On 14 November 2001, the Taliban held capital of Kabul was “hastily abandoned” in less than 24 hours.<sup>55</sup> Additionally, the Taliban lost Jalalabad, effectively cutting off the main supply route from their Pashtun supporters in Pakistan.<sup>56</sup> Finally, on 7 December 2001, the Taliban surrendered in Kandahar signifying the liberation of every major city in Afghanistan. Small SOF teams vectored US airpower to accomplish in weeks what the Russians were unable to do in 10 years.<sup>57</sup> Yet despite the overwhelming success of airpower as the primary kinetic arm, fixed-wing airpower support was not planned for the two week conventional force attack against massed Al Qaeda troops known as Operation *ANACONDA*.

Operation *ANACONDA* was designed from the beginning as a largely conventional ground force attack. The plan was to launch the main offensive of US SOF supported Afghan forces from the west, hitting the enemy enough hard to force them into a US blocking position established in the east by air assault.<sup>58</sup> Omitting airpower proved to be a costly mistake as the opening moves of *ANACONDA* were wrought with disaster. The Afghan main effort stalled under mortar attack and was unable to press to the Taliban since the only preplanned CAS assets, AH-64 Apache helicopters, were withdrawn to cover the US air drop which hit unexpected heavy resistance.<sup>60</sup> The seven AH-64 Apaches participating in *ANACONDA* took a beating during the opening wave, and were attrited down to a single operational AH-64 due to unexpectedly stiff resistance.<sup>61</sup> Additionally, only half the air assault forces were inserted due to heavy Al Qaeda resistance in the landing zone and poor weather.<sup>62</sup> An operational plan that featured land attack, exclusively, was scrapped for one dependent on fixed-wing CAS.<sup>63</sup> Since little air support was pre-planned, the Combined Air Operations Center (CAOC) was inundated with CAS requests as events turned sour for the coalition ground forces. The CAOC scrambled

far more air than was planned for the entire Afghanistan area of operations over the next 72 hours.<sup>64</sup> During the 10 days of *ANACONDA*, fixed wing aircraft dropped more than 2,500 bombs on Al Qaeda in an area the size of Washington D.C.<sup>65</sup> “Ten heavy bombers, more than 30 fighters, and two AC-130s continuously operated within a 70-square-mile battle area.”<sup>66</sup> In the end CAS brought the US operational success in *ANACONDA*, ultimately removing Afghanistan as a safe haven for Al Qaeda.

## **FUTURE WAR**

As described above, the organizational culture of the USAF is deeply rooted against CAS. Yet until the USAF accepts that its role as CAS provider is critical to the joint fight, reforms to increase CAS effectiveness will not be seriously pursued. General Billy Mitchell foresaw the potential for CAS to provide a decisive edge in asymmetric warfare as it did for the US against the Taliban and Al Qaeda in Afghanistan, saying:

This branch of aviation [tactical air] will have most of its future application against what are termed partisan or irregular troops...that is not equipped with large air forces and which do not move in large numbers but in comparatively small mobile detachments.<sup>67</sup>

Following the fall of the Soviet Union and the subsequent end of the Cold War in the early 1990s, much of the US attention shifted to bringing peace to failing states, combating ethnic strife, and countering rising extremist insurgencies. As illustrated in OEF, CAS may prove to be the prominent role for airpower in such wars. Airpower did not need to achieve air superiority since the Taliban had no effective air force to counter the coalition. Air interdiction against Al Qaeda and Taliban were not effective since they relied primarily on stockpiled weapons and the local community for supplies. Politics also prevented the US from striking at their adversaries' source of logistical support in Pakistan. However, the air component enjoyed great success as the primary strike arm of the coalition, permitting the US to keep a minimal footprint in theater

while achieving devastating moral and physical effects. As with all small wars, effective, rapid CAS coordination is key to protecting friendly ground forces while minimizing fratricide and collateral damage, factors critical to winning domestic, international and local public support.<sup>68</sup>

Success in OEF illustrated to ground commanders that airpower could finally deliver decisive effects through CAS. This increased ground commanders' faith in USAF capability, resulting in US ground force transformation more reliant on CAS support to increase ground forces' survivability. The ground force transformation sought to fully leverage the asymmetric advantage USAF precision air power affords. The Army is developing into lighter brigade size forces to increase battlefield maneuverability. These forces will operate over more dispersed areas and use less division and corps fire support.<sup>69</sup> Likewise, the USMC is developing tactics for distributed operations which will likewise result in smaller ground elements dispersed across a larger battlefield.<sup>70</sup> Both services' transformations will increase the likelihood that USAF CAS will be in higher demand, if not essential to mission success, in small wars.

Just as the USAF must prepare to fight more efficiently in small future wars, it must also place a high priority on countering threats from more industrialized nations. The February 1976 edition of *Air Force Magazine* reflected on the concern of whether US and NATO tactical air could successfully interdict second echelon forces of the Warsaw Pact before they could reach NATO ground forces.<sup>71</sup> While air strategists pondered whether they could adequately perform battlefield interdiction, they also foresaw a continued need for effective CAS in Europe. Strategists postulated that the use of precision munitions and employment of aircraft capable of flying through the weather were paramount to success, and even advocated reserving A-10 CAS sorties to fill breaches in the battlefield lines.<sup>72</sup> The same logic in the Cold War which drove

ground commanders to demand more CAS in Europe applies today. Thus, large wars, as with small wars, will require airpower to be effective at CAS.

Changing the organizational culture of the USAF will be difficult given its historical opposition to the CAS mission. However, the nation can ill afford its primary air arm to turn a blind eye to improving CAS readiness as it did following World War II, Korea, and Vietnam. The USAF must first change its organization culture and embrace CAS as a critical contribution to the joint fight to achieve maximum effectiveness. Interestingly, the USAF recently broke from a long held opposition to giving the supported ground force control of its airborne intelligence collectors when it began chopping the Predator unmanned aerial vehicle to the ground forces in Operations *IRAQI FREEDOM* (OIF) and OEF. From 2005-2007, all OIF and OEF Predator missions directly supported special operations and conventional ground forces. Enabled by technology that supplies forward ground units with live full motion video, the supported ground force was given the authority—and often exercised this authority—to tell the sensor operator how to steer the sensor in real time. In effect Predator missions were chopped to the supported ground force once the platform reached the target area, resulting in a more effective use of the high demand asset in OIF and OEF than it achieved in Operation *SOUTHERN WATCH*.<sup>73</sup>

#### **SUFFICIENCY OF CURRENT INVENTORY**

Presuming the USAF successfully sheds its culture bias and gives priority to CAS, as a primary mission, the USAF must properly equip for the mission. One of the longest standing disputes between the USAF and USA concerns whether or not the USAF inventory of multi-role tactical strike and bomber aircraft are suitable for CAS, a debate waged between the services immediately following World War II. Agreements between the USA and USAF placed

responsibility for acquiring aircraft for the CAS mission squarely on the USAF. In the 1948 Key West Agreement, the newly independent USAF, despite the overwhelming resource priority given to develop a strategic bomber force, agreed to continue to support the Army with CAS.<sup>74</sup> The 1949 Air Force-Army accord further obligated the USAF to perform CAS while restricting Army acquisition to small liaison aircraft.<sup>75</sup> The USAF preferred multi-role aircraft—much to the army's consternation—in large part from necessity, for financial realities precluded significant investment in aircraft limited to just one mission type.<sup>76</sup> The issue of army owned CAS aircraft was far from settled though following both Korea and Vietnam as ground commanders questioned the USAF commitment to CAS when the air arm selected multi-role jet fighters for the mission. Multi-role fighter-bombers were better suited for air-to-air combat than for CAS, exasperating ground commanders who saw this as proof the USAF was not committed to their needs. The "Century Series" jets used in Vietnam illustrates this point. Their design bolstered supersonic speeds to survive enemy air defenses during nuclear runs at the cost of design features most critical for CAS: maneuverability, loiter time, pilot visibility, and munitions capacity.<sup>77</sup> The debate was further inflamed when the USA began arming helicopters in Vietnam. The USAF viewed attack helicopters as an aggressive attempt by the USA to build its own CAS force which could infringe on the USAF budget. General LeMay, Commander of USAF Strategic Air Command, exemplified the bitterness over the issue when he said to the Army's Chief of Staff, "you fly one of these damned Huey's and I'll fly an F-105 and we'll see who survives. I'll shoot you down and scatter your peashooter all over the...ground."<sup>78</sup>

Nearly forty years after the debate began the USAF position was validated through its success in OEF. The extensive use of precision munitions and insightful war planners who effectively integrated terminal air controllers with forward ground forces enabled fighters and strategic

bombers alike to prove decisive on the battlefield. Not only did CAS provide the overwhelming firepower for the OEF campaign but it also achieved the psychological effects sought from tactical air as early as World War I.<sup>79</sup> The ability of US SOF to call in accurate, timely air strikes seemingly at will provided a major boost to the morale of the NA forces from the onset of OEF operations.<sup>80</sup> Likewise, Taliban forces rapidly surrendered out of fear of unexpected night attacks by AC-130 gunships and airstrikes guided by US Special Forces targeting with “death rays”.<sup>81</sup> Finally, the addition of Predator unmanned air vehicles helped fill the one CAS gap multi-role fighters have been unable to satisfy, that is, the ability to loiter over forward forces to better identify and destroy adversary forces in the close battle. The Predator can loiter over the target area for up to 16 hours and has an extensive target acquisition suite of electro-optical, infrared, and radar sensors. Attack versions of the Predator used in Iraq and Afghanistan were able to quickly detect, track, and strike mobile targets operating near friendly forces.

## **ENABLERS**

As argued above, the USAF does not need to develop specialty strike aircraft to effectively perform CAS as long as precision munitions are available and long loiter, target acquisition aircraft—like the Predator—are made available to support the army. However, one glaring shortfall in the USAF arsenal is the lack of an airborne element in the Theater Air Control System (TACS) optimized to command and control CAS. The current “War on Terrorism” involves a protracted struggle against an ever changing, adaptive, and elusive adversary who is constantly searching for asymmetric advantages to minimize the superior firepower of the US goliath. Defeating such an adversary is especially taxing on CAS assets, as forces must be able to rapidly change missions from special ops, to major combat operations, to counterinsurgency operations with little to no notice.<sup>82</sup> Airborne command and control is key to flexibly

coordinating CAS forces across the battlespace. Indicative of the low priority given to CAS in the USAF, the EC-130E configured ABCCC was deactivated in September 2003 after 34 years of service.<sup>83</sup>

The ABCCC missions included airborne extension of the ASOC, limited airborne extension of the AOC, as well as airborne command post for specialty missions like Combat Search and Rescue. The crew composition and extensive suite of 23 securable air-to-ground and air-to-air radios made ABCCC uniquely suited for orchestrating CAS when the ASOC was out of range—or altogether missing as in OEF—of ground operations, when CAS requests over saturated coordination elements as in *ANACONDA*, or when a CAS force is needed to rapidly deploy as part of a contingency response. The ABCCC battlestaff was comprised of: an experienced field grade fighter pilot to lead the battlestaff, coordinate CAS resources with the AOC, optimize munitions selection, and monitor air tasking order execution; an officer and enlisted strike controller section versed in air control procedures to stack fighters, flow CAS assets, and conduct CAS in-briefings; an enlisted TACP to coordinate CAS requests and control measures with the TACP embedded in the ground units below; an intelligence officer and NCO to build battlestaff situational awareness, evaluate the air and ground threat picture, coordinate and de-conflict electronic warfare measures and intelligence collection, and develop time sensitive targets; and a communications and maintenance section to ensure system reliability. The modified EC-130E airframe provided ample loiter time (up to 12 hours without refueling), and typically flew directly overhead of supported ground forces to maximize air-to-ground communications effectiveness, addressing a key limitation of the ASOC when ground forces fight in mountainous terrain or over great distances.

The ABCCC was first flown in Vietnam primarily as a means to better coordinate USAF and Marine CAS. Since then ABCCC had undergone three generations of capsule upgrades prior to use in Operation *DESERT STORM* to make it the preeminent airborne element of the TACS to.<sup>84</sup> During Operation *DESERT STORM* ABCCC played a critical role coordinating air interdiction “killer-scout” missions.<sup>85</sup> The success ABCCC afforded US commanders with “real-time control of the battle” during Operation *DESERT STORM* prompted Lt General Gordon Fornell, commander of the Air Force Systems Command’s Electronic Systems Division, to declare “we will never again fight in combat without such a platform airborne.”<sup>86</sup> Ironically, ABCCC was not deployed for OEF ten years later, a war that more than all previous wars was ideally suited for bringing to bear the full capabilities of ABCCC.<sup>87</sup> Airspace congestion and an unanticipated surge in CAS requests during OEF, caused in large part by a failure to pre-plan CAS, over saturated the TACP. This led the AOC to assemble a specialized crew to fly on JSTARS to execute ABCCC-like functions.<sup>88</sup> Several A-10 sorties were even tasked to perform some ABCCC functions.<sup>89</sup> Although the USAF mitigation plan called for JSTARS and RIVET JOINT to assume ABCCC roles, these platforms and crews do not provide true parity for ABCCC due to radio shortfalls, differences in crew composition, and the immensity of their primary missions.

During OEF vast improvements in long haul communications connectivity to the central USAF authority, the AOC, allowed the USAF to orchestrate a massive theater CAS campaign without an ABCCC, although as indicated above ABCCC roles were required several times to orchestrate CAS. When evaluating the need for an ABCCC in future war, one must consider the vulnerability of reach-back communications nodes and the possibility that reach-back satellite communication may be unavailable. Over centralized command and control is an inherent vulnerability to technologically advanced adversaries. Soviet doctrine in the 1980s was aimed at

degrading US command and control system with either EW and/or direct attack.<sup>90</sup> Russia and now China (and possibly others) have been developing technology to counter the US use of space as an asymmetric advantage. Chinese anti-satellite efforts continue to highlight the vulnerability of over centralizing command and control as does the wide proliferation of Soviet EW capabilities around the world to potential adversaries. Decentralization through employment of TACS airborne elements which can maintain line of sight communications with supported forces helps mitigate this threat. An ABCCC would also offer advantages in span of control versus a centralized approach to coordinating CAS through the AOC. The USAF needs to be able to decentralize CAS decisions to better adapt to the fluid battlefield, the same approach US Army transformation took in the 1980's to adapt to changes to future warfare.<sup>91</sup> The extensive air-ground communications suite of ABCCC coupled with its diverse battlestaff possessing all the skill sets needed to establish a robust air strike coordination net would prove critical in small wars where robust forward ground-based C2 centers may not be feasible due to the required response times or political constraints. Planners cannot assume that host nation satellite landing rights required for long haul communications will always be secured in time (if ever). An airborne command and control platform like ABCCC greatly expands US planning options to rapidly respond to a contingency.

Finally, the importance of the ABCCC role as a robust air-to-ground radio coordinator cannot be underscored enough. At a minimum, ABCCC provided an effective means to mitigate interoperability problems between air and ground radios, greatly adding to ground force commanders' assurances that they could reach out for airpower when needed. Communications gaps between air assets and land units will be further exasperated as US forces increase dependency on coalition forces. In short, the need for a robust ABCCC capability is greater than

ever before now that ground forces have witnessed the asymmetric advantage USAF CAS delivered during OEF.

In addition to ABCCC, OEF highlighted another Air Force enabler shortfall of CAS which much be addressed in future war. The insufficient number of USAF terminal air controllers available to embed with small Special Forces and conventional units during OEF was widely identified as a key limitation.<sup>92</sup> USAF planners need to increase live CAS training opportunities to build a larger pool of terminal air controllers to meet USA requirements. As argued above, the demand for terminal air controllers will likely increase beyond OEF requirements as the US Army transforms to fight in smaller brigade sized elements. The TACP training shortfall will be further exasperated if the USAF draws the wrong conclusion about the success of multi-role fighters at CAS during OEF by underestimating the criticality of preparing its forces for CAS. The USAF must guard against realigning its few dedicated CAS (A-10) squadrons into multi-role units. Refocusing these CAS units on multi-role missions would reduce pilot proficiency at CAS and significantly decrease training opportunities needed to qualify more terminal air controllers, precluding satisfaction of the CAS requirements of a transformed US Army. USAF planners need to be vigilant against reducing CAS training in favor of other airpower missions, and should seek to increase the live training opportunities for CAS to build a larger pool of terminal air controllers.

## **CONCLUSIONS**

Unlike the Marine Air Ground Task Force where air support is as critical—and is nearly as easy to integrate—as artillery support to the infantry, the USAF has viewed CAS historically as an ancillary mission for tactical air, behind air superiority and air interdiction. The USAF cultural attitude can be traced back to the earliest advocates of air power who pursued

development of a strategic bombing force at the expense of tactical air. Operational need and pragmatic leadership in World War II led to the refinement of techniques and maturation of doctrine that still defines CAS principles today. However, the USAF failed to wholly adopt CAS as a primary mission, and had to learn the lessons for effective CAS in Korea and relearn them again in Vietnam. As a consequence of institutional blindness (or amnesia), CAS weapon system design, doctrine revision, and training has remained a very low priority for the USAF. This has caused much friction between air and ground commanders since World War II, and will greatly reduce joint force commanders' flexibility for future campaign plan design if not addressed. Close air support finally proved decisive to victory during OEF in a war against an insurgent enemy largely immune from interdiction and strategic bombing. This same war also highlighted shortsightedness by both the air and land force components in failing to integrate air into the ground attack plan, evidence that institutional bias against CAS still exists in the USAF today. Despite the doctrinal push to fight joint, the USAF is not currently organized, trained, or equipped to optimally support the US Army through CAS. This will prove problematic for our country in future wars against non-conventional and conventional adversaries alike as the USA and USMC transform into a lighter, dispersed force which will require more flexible firepower uniquely afforded by CAS. In order to realize its potential for CAS, the USAF must first change its organizational culture and adopt CAS as a primary mission. Additionally, the USAF should reconstruct its ABCCC capability and significantly increase the number of terminal air controllers to enable its multi-role aircraft to more effectively conduct CAS. The USAF must ensure the viability of its CAS mission to secure the asymmetric advantage tactical air promises to deliver in future warfare.

## NOTES:

- <sup>1</sup> Charles H. Briscoe, et al., *Weapon of Choice: U.S. Army Special Operations Forces in Afghanistan*. Fort Leavenworth, KS: Combat Studies Institute Press, 2003, 96.
- <sup>2</sup> Briscoe, 96, 126.
- <sup>3</sup> Michael DeLong, Lt. Gen.(Ret.) and Noah Lukeman. *A General Speaks Out: The Truth About Wars in Afghanistan and Iraq*. St. Paul, MN: Zenith Press, 2007, 55.
- <sup>4</sup> Rebecca Grant. "The Airpower of Anaconda," *Air Force Magazine*, September 2002.
- <sup>5</sup> Benjamin S. Lambeth. *Airpower Against Terror: America's Conduct of Operation Enduring Freedom*. Santa Monica, CA: RAND Corporation, 2005, 181.
- <sup>6</sup> Joint Publication 3-09.3, 2 September 2005, page IX.
- <sup>7</sup> Joint Publication 1-02.
- <sup>8</sup> *Air Force Basic Doctrine: Air Force Doctrine Document 1*, 17 November 2003, 43-45. In current doctrine, the USAF classifies CAS and AI, the air and space application of interdiction, collectively as counterland missions.
- <sup>9</sup> David Syrett. "The Tunisian Campaign, 1942-1943." *Case Studies in the Development of Close Air Support*. Ed. Benjamin Frank Cooling. Washington, D.C.: U.S. Government Printing Office, 1990, 155.
- <sup>10</sup> Lee Kennett. "Developments to 1939." *Case Studies in the Development of Close Air Support*. Ed. Benjamin Frank Cooling. Washington, D.C.: U.S. Government Printing Office, 1990, 15.
- <sup>11</sup> Kennett, 16.
- <sup>12</sup> Kennett, 16.
- <sup>13</sup> Kennett 21-23, 25, 29. While ground commanders' appetite for CAS increased, so did their drive to build better counter-air defenses by adapting more firepower for use against aircraft and advancing anti-air tactics. Anti-aircraft fire ultimately led airmen to view CAS as too costly a mission given the limited success CAS missions achieved against a fortified enemy along the front. Royal Flying Corps reports attribute groundfire to the attrition of 30% of their ground attack aircraft each day. In response, they increased bomber survivability by flying above the effective range of anti-aircraft, but this reduced the bomber's accuracy. Luftwaffe statistics showed that their best bombing crews could only get two percent of their bombs to hit within an area the size of a football field. By the end of World War I, most airmen concluded air power would achieve more decisive results by targeting the enemy's rear which was less well defended and beyond the range of artillery.
- <sup>14</sup> Kennett, 15-16.
- <sup>15</sup> Joe Gray Taylor. "American Experience in the Southwest Pacific." *Case Studies in the Development of Close Air Support*. Ed. Benjamin Frank Cooling. Washington, D.C.: U.S. Government Printing Office, 1990, 297.
- <sup>16</sup> Benjamin Frank Cooling. *Case Studies in the Development of Close Air Support*. Washington, D.C.: U.S. Government Printing Office, 1990, 1.
- <sup>17</sup> David Syrett. "The Tunisian Campaign, 1942-1943." *Case Studies in the Development of Close Air Support*. Ed. Benjamin Frank Cooling. Washington, D.C.: U.S. Government Printing Office, 1990, 155. Rear targets included communications, transportation, and logistics.
- <sup>18</sup> Alan F. Wilt. "Allied Cooperation in Sicily and Italy 1943-1945." *Case Studies in the Development of Close Air Support*. Ed. Benjamin Frank Cooling. Washington, D.C.: U.S. Government Printing Office, 1990, 205.
- <sup>19</sup> John Schlight. *Help From Above: Air Force Close Air Support of the Army 1946-1973*. Washington D.C.: Air Force History and Museums Program, 2003, 44.
- <sup>20</sup> Wilt, 206. Pre-arranged CAS missions (called preplanned today) were submitted at the Division level and above for strikes planned for the next 24 hours. Inputs were consolidated and validated at the corps level and then forwarded for integration into the army's tactical plan. Army-approved targets for air strike then had to be coordinated during a nightly joint army-air force conference. The tactical air component determined which requests it could fill with available resources from those not already committed to Allied Air Forces taskings. Following the conference the air staff developed detailed orders to task specific wings or groups, directing the number of aircraft to be used and the time of the attack, and providing background information on the target.
- <sup>21</sup> Schlight 43; Wilt, 206
- <sup>22</sup> Wilt, 206.
- <sup>23</sup> Schlight, 44.
- <sup>24</sup> Wilt, 207-210. Forward controllers radioed target specifics from the air-army control center to orbiting fighter-bombers, talked the pilot onto the target (sometimes marking the target by calling in colored artillery smoke), and forwarded strike results. The use of forward ground controller teams known as Rover teams, which consisted of at least one combat pilot and one army officer, was formalized by 1943. Fighter-bombers often hit their targets within ten minutes of tasking to the forward controller.

<sup>25</sup> W. A. Jacobs. "The Battle for France, 1944." *Case Studies in the Development of Close Air Support*. Ed. Benjamin Frank Cooling. Washington, D.C.: U.S. Government Printing Office, 1990, 245, 246.

<sup>26</sup> Jacobs, 282.

<sup>27</sup> Schlight, 46.

<sup>28</sup> Schlight, 48.

<sup>29</sup> Schlight, 48-49.

<sup>30</sup> Taylor, 310.

<sup>31</sup> Taylor, 299, 313.

<sup>32</sup> Taylor, 316.

<sup>33</sup> In contrast to the Air Force, the USMC retained a positive, lasting impression of Marine CAS in the Pacific due to their successes supporting amphibious operations and the exceptional desire Marine pilots portrayed in supporting the infantry. In 1945, CAS became the primary mission of the Marine air element. (Taylor 298) Marine air units had the same on-station response times and used the same air request approval process as Army Air Force units. However, Marine pilots typically visited the front lines to familiarize themselves with the target and terrain the day prior to their mission, evidence of a significant cultural difference with the Army Air Forces who were exerting more independence. (Taylor 325) The USMC air element today remains as committed to supporting their infantry.

<sup>34</sup> Douglas N. Campbell. *Warthog and the Close Air Support Debate*. Annapolis, Maryland: Naval Institute Press, 2003, 36.

<sup>35</sup> Schlight, 114

<sup>36</sup> Schlight, 120

<sup>37</sup> Schlight, 120

<sup>38</sup> Schlight, 176-177. The debate was spurred on by the Army belief that they could achieve on a larger scale what the Marines did with their supporting CAS assets.

<sup>39</sup> John J. Sbrega. "Southeast Asia." *Case Studies in the Development of Close Air Support*. Ed. Benjamin Frank Cooling. Washington, D.C.: U.S. Government Printing Office, 1990, 428.

Major differences centered around four primary issues: operational control of CAS aircraft, CAS specialty aircraft versus the use of multi-role aircraft, the army requirement for guaranteed CAS sorties (apportionment), and the role of the Army's helicopters.

<sup>40</sup> Sbrega, 428

<sup>41</sup> Sbrega, 429

<sup>42</sup> Sbrega, 431

Direct Air Support Centers [called Air Support Operations Centers (ASOC) by the USAF today] were stood up as regional CAS coordinators for the Tactical Air Control Center (similar to the USAF Air Operations Center today) who exercised centralized control of theater air assets. TACP's consisted of an air liaison officer, one forward air controller, and one radio operator.

<sup>43</sup> Sbrega, 433

<sup>44</sup> William W. Momyer, General, USAF. *Airpower in Three Wars (WWII, Korea, Vietnam)*. Washington, DC: Dept of the Air Force, 1978, 97.

<sup>45</sup> Momyer, 97.

<sup>46</sup> Momyer, 97.

<sup>47</sup> Momyer, 100.

<sup>48</sup> Momyer, 109, 228.

<sup>49</sup> Momyer, 109, 227.

<sup>50</sup> Sbrega, 448

<sup>51</sup> Sbrega, 469-470, 473

<sup>52</sup> DeLong, 46.

<sup>53</sup> Briscoe, 102.

<sup>54</sup> Briscoe, 103.

<sup>55</sup> Briscoe, 103.

<sup>56</sup> Briscoe, 102-103.

<sup>57</sup> DeLong, 55.

<sup>58</sup> Briscoe, 282.

<sup>60</sup> Lambeth, 179-183.

<sup>61</sup> Lambeth, 179-183.

<sup>62</sup> Briscoe, 286.

Lambeth, 179-183.

<sup>63</sup> Lambeth, 182.

<sup>64</sup> Grant.

<sup>65</sup> Grant.

<sup>66</sup> Lambeth, 195.

<sup>67</sup> Kennett, 46.

<sup>68</sup> Phil M. Haun, Lt Col, USAF. "The Nature of Close Air Support in Low Intensity Conflict." *Air and Space Power Journal*; Fall 2006.

<sup>69</sup> RAND Corp Study, *Beyond Close Air Support. Forging a New Air-Ground Partnership*. Santa Monica, CA: RAND Project Air Force, 2005, 102-112.

<sup>70</sup> Vincent J. Goulding Jr. "Distributed Operations." *Marine Corps Gazette*; Apr 2005; 46.

<sup>71</sup> Robert S. Dotson, LtCol, AFRES, "Tactical Air Power and Environmental Imperatives" *Air University Review*; July-August 1977.

<sup>72</sup> Dotson.

<sup>73</sup> Personal observation as Director of Operations for Distributed Ground Station Five (DGS-5) from 2005-2007. DGS-5 is one of four worldwide sites comprising the USAF Distributed Common Ground System that collectively are responsible for exploiting all Predator full motion video in support of coalition operations in Iraq and Afghanistan.

<sup>74</sup> Campbell, 30.

<sup>75</sup> Campbell, 30.

<sup>76</sup> Campbell, 10.

<sup>77</sup> Campbell, 37-38.

<sup>78</sup> Campbell, 49.

<sup>79</sup> Kennett, 21. While CAS did not ultimately prove decisive to victory in WWI, its psychological effects left an indelible impression on ground forces and drove their strong desire to obtain more CAS. Both Allied and Axis powers attempted to harness the morale effect of air power along the front lines on friendly and enemy forces. The Germans specifically massed aircraft in close formation and "swarmed" over the battlefield to intimidate opposing forces. Likewise, German instructions noted, "in defense, the appearance of battle aeroplanes affords visible proof to heavily engaged troops that the higher command is in close touch with the front and is employing every possible means to support the fighting troops." The Royal Flying Corps had similar observations.

<sup>80</sup> Briscoe, 127.

<sup>81</sup> Briscoe, 103.

<sup>82</sup> Richard Bohn, Lt Col, USAF, "Joint Close Air Support Transformed" *Air and Space Power Journal*; Spring 2007.

<sup>83</sup> [www.globalsecurity.org/military/systems/aircraft/ec-130e-abccc.htm](http://www.globalsecurity.org/military/systems/aircraft/ec-130e-abccc.htm)

Jay A. Stout. *Hammer From Above: Marine Air Combat Over Iraq*. New York: Ballantine Books, 114. The USMC still flies an ABCCC mission, called the Direct Air Support Center (airborne), to assist in C2 of air operations supporting the Marine ground element.

<sup>84</sup> Schlight, 331.

<sup>85</sup> Brian W. Jones, Lt Col, USAF, "Close Air Support A Doctrinal Disconnect." *Airpower Journal*; Winter 1992.

Killer-scout missions involved tasking fighter aircraft with sensor suites to perform armed reconnaissance in kill boxes. AI targets were then relayed to ABCCC and/or incoming fighters to destroy the targets. The "kill box" methodology was adopted by USCENTCOM to provide rapid, flexible targeting against time-critical targets such as Scuds, air defenses, and even ground forces, even though it was not formal CAS doctrine.

<sup>86</sup> Myron Struck. "Airborne C2 Platform Proves Indispensable in Gulf War." *Defense Electronics*; May 1991; 22.

<sup>87</sup> Global Security.org [www.globalsecurity.org/military/agency/usaf/42accs.htm](http://www.globalsecurity.org/military/agency/usaf/42accs.htm) The history of ABCCC, specifically the 7 Airborne Command and Control Squadron (ACCS) later redesignated the 42 ACCS, spanned most major operations beginning with South Vietnam in 1965 through operations in Cambodia in 1972; the American student rescue in Grenada during Operation URGENT FURY (1983); invasion of Panama during Operation JUST CAUSE (1989); Kuwait during Operations DESERT SHIELD/DESERT STORM (1990-1991); Bosnia-Herzegovina during Operations DENY FLIGHT (1993); government restoration in Haiti during Operation UPHOLD DEMOCRACY (1994); Operation VIGILANT WARRIOR in Kuwait to deter Iraqi invasion (1994); and ALLIED FORCE/JOINT ENDEAVOR (1994). ABCCC was a low density (seven aircraft) high demand asset in every sense due to the extreme versatility it afforded joint forces as a multi-mission airborne command post.

<sup>88</sup> Lambeth, 182-183.

<sup>89</sup> Lambeth, 218-219.

<sup>90</sup> Thomas H. Buchanan, Maj, USAF. "The Need for Battle Managers in the Tactical Air Control System." *Airpower Journal*; Summer 1987.

<sup>91</sup> Buchanan.

<sup>92</sup> RAND Study, 59-60.

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