

EFFECTS BASED ASSESSMENT IN THE UNITED STATES
AIR FORCE:

RHETORIC OR REALITY?

by

NEIL T. ALLEN, Major, USAF

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COLONEL JAMES W. FORSYTH, PHD

(DATE)

LT COLONEL STEPHEN ROTHSTEIN

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About the Author

MAJOR NEIL T. ALLEN WAS COMMISSIONED THROUGH OFFICER TRAINING SCHOOL, LACKLAND AFB, TX. IN 1990. AFTER GRADUATING FROM SPECIALIZED UNDERGRADUATE NAVIGATOR TRAINING (SUNT) AT MATHER AFB, CALIFORNIA IN 1991, HE WENT ON TO FLY F-15ES AS A WEAPONS SYSTEM OFFICER. DURING HIS FIRST OPERATIONAL ASSIGNMENT AT RAF LAKENHEATH, UK, HE FLEW 150 COMBAT HOURS DURING OPERATIONS PROVIDE COMFORT AND DENY FLIGHT. HIS NEXT ASSIGNMENT WAS AT THE 422 TEST AND EVALUATION SQUADRON AT NELLIS AFB, NEVADA, WHERE HE WAS AN INTEGRAL PART OF SEVERAL CUTTING EDGE INITIATIVES, INCLUDING GPS-AIDED MUNITIONS AND FIGHTER DATA LINK. HIS NEXT TWO ASSIGNMENTS WERE TO SEYMOUR JOHNSON AFB, NORTH CAROLINA AND NELLIS AFB, NEVADA, WHERE HE WAS AN INSTRUCTOR WSO AND EVALUATOR. MAJOR ALLEN IS A SENIOR NAVIGATOR WITH OVER 2,000 FLYING HOURS. HE HAS CONTRIBUTED ARTICLES TO THE *USAFWS WEAPONS REVIEW* AND *ACC COMBAT EDGE*. HE HAS A BACHELOR'S DEGREE IN MECHANICAL ENGINEERING FROM THE UNIVERSITY OF TEXAS AT AUSTIN, A MASTER'S DEGREE IN BUSINESS ADMINISTRATION FROM THE UNIVERSITY OF PHOENIX, AND A MASTER'S DEGREE IN MILITARY OPERATIONAL ART AND SCIENCE FROM THE USAF AIR COMMAND AND STAFF COLLEGE. IN JULY 2005, MAJOR ALLEN WAS ASSIGNED TO US FORCES KOREA AS THE AIR PLANS OFFICER ON THE J35 STAFF. HE CURRENTLY LIVES IN SEOUL, KOREA WITH HIS WIFE DEBBE JO, AND THEIR THREE CHILDREN, TAYLOR, ZACHARY, AND HANNAH GRACE.

Acknowledgements

THIS THESIS REPRESENTS A MAJOR PORTION OF THE GRADUATION REQUIREMENT FOR THE USAF SCHOOL OF ADVANCED AIR AND SPACE STUDIES. DURING THE PAST YEAR, I READ BOOKS AND WROTE PAPERS WITH SOME OF THE FINEST OFFICERS AND FACULTY OUR COUNTRY HAS TO OFFER. SINCE THIS COURSE BEGAN IN JULY 2005, 744 AMERICAN SOLDIERS HAVE DIED IN IRAQ WHILE DEPLOYED IN SUPPORT OF THE CAMPAIGN THAT BEGAN AS OPERATION IRAQI FREEDOM. THESE FINE MEN AND WOMEN WERE FATHERS AND MOTHERS, SONS AND DAUGHTERS, AND HUSBANDS AND WIVES. I HUMBLY DEDICATE THESE PAGES TO THEM. IF ANY PART OF THIS THESIS HELPS EVEN IN THE SMALLEST WAY TO DO IT BETTER THE NEXT TIME, THEN IT HAS SERVED ITS PURPOSE.

Abstract

ASSESSMENT IS THE GUIDING LIGHT OF STRATEGY. IT IS THE GLUE THAT BINDS THE PLAN TO THE ULTIMATE END-STATE. UNFORTUNATELY, ASSESSMENT CONTINUES TO PLAGUE AIRMEN, AS CONSISTENTLY REFLECTED IN POST-WAR ANALYSES DATING BACK TO WW II. A MAJOR PROBLEM WITH ASSESSMENT STEMS FROM A TENDENCY TO FOCUS ON ATTRITION-BASED METHODOLOGY. RATHER THAN ANALYZING THE EFFECTIVENESS OF A GIVEN ACTION WITH RESPECT TO THE PLANNED STRATEGY, AIRMEN REMAIN SHACKLED TO THE DIRECT EFFECTS OF A GIVEN ATTACK. A RELATIVELY RECENT MOVE TO INCORPORATE EFFECTS-BASED THINKING ACROSS THE AIR FORCE HAS BROUGHT THE SUBJECT OF EFFECTS-BASED ASSESSMENT (EBA) IN THE LIGHT. A COMPARISON OF EBA TO ITS ATTRITION-BASED PREDECESSOR REVEALS KEY STRENGTHS TO THE EFFECT-BASED METHODOLOGY.

DURING OPERATION IRAQI FREEDOM, CENTAF PLANNERS ATTEMPTED TO IMPLEMENT THE EBA CONSTRUCT INTO THE JFACC'S OPERATIONAL ASSESSMENT PROCESS. UNFORTUNATELY, THE EBA CONSTRUCT WAS NOT CONDUCIVE TO THE RAPID PACE, SHORT DURATION, HIGHLY DYNAMIC NATURE OF OIF. GIVEN CURRENT ORGANIZATIONAL, DOCTRINAL, AND TECHNOLOGICAL LIMITATIONS IN THE CAOC, EBA CANNOT SUCCEED IN A FUTURE OIF-TYPE WAR. HOWEVER, CHANGES WITHIN THESE THREE BROAD CATEGORIES CAN HELP MAKE EBA RHETORIC A REALITY. FURTHERMORE, THE METHODOLOGY IN DETERMINING THE UTILITY OF THE EBA CONSTRUCT MAY BE APPLIED TO OTHER CONSTRUCTS AS WELL. SINCE THE FAST PACE, SHORT DURATION, AND DYNAMIC NATURE OF OIF REFLECTS THE TYPES OF WARS THE AIR FORCE WILL FIGHT IN THE FUTURE, THIS ANALYSIS IS NOT ONLY RELEVANT FOR THE EBA CONSTRUCT, BUT ANY ADDITIONAL CONSTRUCT THE AIR FORCE ADOPTS AS WELL.

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Introduction

BDA is broken.

—General Moseley
Brief to Air Command & Staff College, March 2004

Assessment is the guiding light of strategy. It is the way commanders decide whether their actions are leading to a desired end [state]. Couched in effects-based terms, assessment is the vital thread that bonds effects-based planning and execution. Despite a general recognition of the importance of assessment, and valiant efforts to improve the assessment process, assessment continues to plague the war fighter.

Concerns about assessment are common to virtually every major US air war since WW II. The United States Strategic Bombing Survey (USSBS), published in September 1945, reflected the frustrations analysts faced throughout the entire war.

What the directors and those who sponsored the Survey really hoped to find was some precise measurement of the effectiveness of strategic bombing as an instrument of final victory. What they found they had to settle for, however, was the measure of effects rather than effectiveness.¹

During the next two wars, assessors in Korea and Vietnam remained frustrated, lost in a quagmire of numbers. Noble efforts of counting destroyed trucks, bridges, trains, vehicles, and other vital targets, could still not explain how or even if air power contributed to these campaigns.² In 1991, air power dominated the stage as coalition

¹ David MacIsaac, *Strategic Bombing Survey in WW II: The Story of the United States Strategic Bombing Survey* (New York, N.Y.: Garland Publishing, Inc., 1976), 161.

² Col Philip S. Meilinger, "A History of Effects-based Air Operations," *RAF Airpower Review* 6, no. 3 (Autumn 2003): 1-26.

forces successfully ousted Iraqi forces from Kuwait. Yet again, commanders remained unimpressed with assessment. General Norman Schwarzkopf often raged at the “caveated, disagreed with, footnoted, watered-down” assessment reports he received.³ Four years later, Major General Michael Short, Vice Commander AIRSOUTH commented, “[battle damage assessment] BDA success criteria and methodology were not conceptually determined before the campaign [Operation Deny Flight].”⁴ Finally, in typical blunt fashion, General T. Michael Moseley, Operation Iraqi Freedom (OIF) Joint Forces Air Component Commander (JFACC), succinctly described OIF assessment when he said, “BDA [was] broken.”⁵ These complaints share one common theme: the assessment process did not provide the commander the feedback he required to decide whether his actions were producing the desired results and ultimately achieving the planned strategy.

In 2003, a US-led coalition invaded Iraq. After only three weeks, the war was over. During these three weeks, Moseley’s air component provided crucial support to Frank’s joint campaign. In order to assess how well the air component was supporting the joint campaign, Moseley looked to the Operational Assessment Team (OAT) within his Combined Air Operations Center (CAOC) Strategy Division (SD). The OAT attempted to use effects-based methodology to guide the operational assessment process. The negative report regarding OIF assessment suggests that effects-based assessment (EBA) did not succeed in this particular war.

Thesis Statement & Research Question

There is an assessment problem in the Air Force. It is not a new problem, as commanders from virtually every major US air campaign since WW II can attest. Much of the blame for the assessment problem stems from the attrition-based mindset that has dominated the Air Force way of thinking. For years, airmen have assessed the effects of

³ Richard P. Hallion, *Storm Over Iraq: Air Power and the Gulf War* (Washington D.C.: Smithsonian Institution Press, 1992), 204.

⁴ Quoted in Maj Mark C. McLaughlin, “Combat Assessment: A Commander’s Responsibility,” in *Deliberate Force: A Case Study in Effective Air Campaigning*, ed. Col Robert C. Owen, USAF, (Maxwell AFB, Ala.: Air University Press, 2000), 183.

⁵ Maj Gen T. Michael Moseley, “OIF Lessons Learned,” lecture, Air Command and Staff College, Maxwell AFB, AL, 15 March 2004.

bombing the enemy, yet the vital leap to evaluating the effectiveness these efforts had with respect to their strategy remained elusive.

Current rhetoric in the Air Force maintains that EBA should permeate the overall assessment process. Despite valiant efforts to implement EBA, the reality during OIF was that assessment was greatly lacking. EBA simply did not achieve its desired effect—to significantly guide and adjust the air strategy—during this short, fast-paced, highly dynamic war. In other words, effects-based operations did not help the JFACC answer the question, “is the air and space strategy doing what it is meant to do?”⁶ As such, the main proposition of this thesis is: In a short, fast-paced war like OIF, where the JFACC is a supporting commander, the EBA construct is difficult, if not impossible, to achieve given the doctrine, organizational structure, and technology within the CAOC. This thesis statement generates a basic research question: Given the doctrine, organization, and technology in the CAOC, can airmen hope to make EBA operational enough to yield useable information for the JFACC in a future war similar to OIF? Since OIF reflects the type of war the USAF will likely fight in the future, analyzing EBA efforts in OIF is extremely relevant. This analysis suggests that changes in organization, doctrine, and technology are required to enable useful EBA. By implementing these changes through comprehensive training, EBA rhetoric can become a reality.

Methodology and Relevance of OIF Case Study

In order to analyze any assessment methodology, it is important to understand assessment from different perspectives. This thesis presents two assessment approaches, the attrition-based and effects-based models, as ways to think about the issue. Comparing and contrasting each model provides solid footing as to which perspective is more appropriate. Next, analyzing the preferred model against the backdrop of OIF provides useful insight into its relevance for future, similar wars. Assessing the model through organizational, doctrinal, and technological lenses focuses the analysis. Findings from each of these perspectives provide salient insight on whether the assessment model can be operationalized in the future.

⁶ Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-1.1, *Air & Space Strategy*, 9 Aug 2002, 40.

There are several reasons why OIF provides a fertile setting for analyzing effects-based assessment in the Air Force.⁷ First, the Air Force has spent much time, money and effort on the CAOC model since Desert Storm in 1991. As such, it has had over ten years to evolve and become a test-bed for cutting edge processes. The second reason concerns the nature of OIF, including its lightening pace and short duration, as well as airpower's predominately supporting role in the war. Coalition airmen executed only thirty Air Tasking Orders (ATO) from 19 March 2003 to 18 April 2003.⁸ In those thirty days, the battlespace changed hourly. CAOC assessors quickly realized that the processes, organizational structures, and current technologies at hand could not keep pace with the pace and dynamic nature of OIF. Then, as airmen made valiant efforts to remedy these deficiencies, OIF abruptly ended. As a result, effects-minded assessors did not have time to discover, analyze, and react to the sometimes-subtle trends they so rely on. Furthermore, airmen grappled with these factors while primarily in a support role. Effects-minded assessors struggled to balance the supported commander's requirements with their own EBA-enabling assessment requirements.

As good as OIF is as a case study, there are several qualifiers to be aware of. First, OIF is already two years outdated. Since OIF, the assessment piece has evolved in the three areas this thesis covers. Organizationally, the Chief of Staff of the Air Force (CSAF) recently announced a new A-staff structure that acknowledges the importance of assessment by standing up the A-9, Assessment Directorate. Doctrinally, the latest version of Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-3.2 outlines basic requirements for ensuring EBA efforts are more successful in future wars. Finally, in the area of technology, Air Force and Department of Defense (DoD) contractors continue improving existing software suites and applications, such as Interim Targeting Solution (ITS) and the new Theater Battle Operations Net-Centric Environment (T-BONE), a follow-on to Theater Battle Management Core System (TBMCS).⁹ These are only three of the many assessment-enhancing initiatives the Air Force is involved in. Second, OIF covered a relatively short period of time. Some argue

⁷ The study period is from 19 March 2003 through 18 April 2003.

⁸ *Operation Iraqi Freedom—By the Numbers*, USCENTAF Assessment and Analysis Division (Prince Sultan Air Base, Saudi Arabia: USCENTAF, April 2003), 2.

⁹ "Functional Capabilities Document for the Theater Battle Operations Net-Centric Environment (T-BONE)", (DRAFT Document ver1.0, C2 Battlelab, February 2005), 3.

that this was not enough time to test EBA sufficiently. However, as this thesis argues, any construct the Air Force adopts must be able to function in a short war such as OIF. The final qualifier has to do with the enemy we faced. Many recognize that the US possesses the most dominant military in the world and will continue to do so for the foreseeable future. Overconfidence in this status suggests that assessment is irrelevant; for the US will surely win any war it enters. During OIF, neither the air nor the ground component met with any significant enemy resistance. The failure of EBA to positively guide the JFACC's air campaign was not catastrophic to its overall success. In a different war, this failure could have much worse consequences.

Regardless of the enemy, OIF was an extremely challenging environment for EBA to prosper in and therefore provides an excellent case study in which to critically assess the EBA construct. Furthermore, the challenges airmen faced during OIF are the same challenges they will likely face in the future. In sum, if EBA can work in an OIF-type future war, then it can likely work anywhere.

Challenges

This analysis is not without challenges. First, discussing and recommending improvements to any assessment process is complex. In some regards, the challenge appears insurmountable. Recognizing this, the most useful way to engage is to tackle a portion of the issue. Therefore, this thesis focuses on the effects-based methodology of which the Air Force is currently prescribing to. Also, assessment problems are not confined to the Air Force. The air component assessment process during OIF relied on inputs to the process that were outside the confines of the CAOC and the Air Force. However, venturing much outside the bounds of the specific Air Force process is beyond the scope of this thesis. Furthermore, it is the author's belief that any improvements to the Air Force assessment process must begin from within. Analyzing that process in terms of Air Force performance during OIF is a reasonable compromise. Finally, there are always many sides to any argument. The research for this thesis focuses mainly within the CAOC, specifically in the SD. This is a realistic, albeit regretful limitation that should not greatly detract from the conclusions this thesis offers.

Thesis Outline

Before departing on any journey, it is wise to study the planned course. The first chapter of this thesis outlines two assessment models that frame the two schools of thought: *attrition-style* and *effects-based assessment*, respectively. The former school has roots that reach back to WW II; they are firmly grounded in Air Force culture. The latter school is a component of the relatively new effects-based philosophy. This chapter compares and contrasts both models, and demonstrates why EBA is the correct model to pursue.

To accomplish EBA, airmen must know what to do and how to do it. Furthermore, all agencies associated with the assessment process must be properly organized, and trained and equipped with doctrine and technological tools. The next three chapters describe and evaluate EBA with respect to three different perspectives. Chapter Two considers EBA from an organizational perspective. It reveals that stove piped structures, deficient manning, and nonconductive command relations directly plagued EBA efforts during OIF. Chapter Three analyzes the ‘what to do’ and ‘how to accomplish’ EBA from a doctrinal perspective. It reveals that EBA doctrine was either lacking or insufficient to properly guide the EBA process. Finally, chapter Four delves into the technological equipment of the effects-based assessment as embodied in information technologies. It reveals that airmen did not adequately leverage technology to ensure tactical assessments were in place to facilitate higher-level effects-based assessment. The findings from these chapters illustrates that airmen were not properly organized, trained or equipped with doctrine and technology to effectively accomplish EBA during OIF.

In order to enable EBA in a future OIF-type war, certain changes in organization, doctrine, and technology are required. Discovering whether or not EBA is within reach of the Air Force in an OIF-type war is the basis of this thesis. In analyzing the nature of OIF more deeply, findings in this chapter suggest that an under-developed EBA process will suffer in a short, dynamic, fast-paced war where the JFACC has insufficient control over processes and assets. Since OIF likely reflects future wars, definite changes to organization, doctrine, and technology are required if EBA is to succeed. Conclusions in

this chapter prove that EBA can be operationalized, thereby making EBA rhetoric a reality.

Chapter 1

Assessment Theory, Models, and Lexicon

Theory exists so that one need not start afresh each time sorting out the material and plowing through it, but will find it ready to hand and in good order. It is meant to educate the mind of the future commander, or, more accurately, to guide him in his self-education, not to accompany him to the battlefield; just as a wise teacher guides and stimulates a young man's intellectual development, but is careful not to lead him by the hand for the rest of his life

—Carl von Clausewitz
On War, Book 2, Chapter 2

ANY DISCUSSION OF ASSESSMENT SHOULD BE BOUNDED IN ORDER TO PROVIDE UNIQUE points of reference. There are two different ways one can think about assessment. The first is with an attrition-based mindset, which describes thinking that has dominated the Air Force for many years. The second is with the effects-based model, which describes thinking that many airmen believe the Air Force should aspire to. Comparing these two models provides a foundation for the remainder of the analysis. However, before exploring the models, the reader should first gain a healthy appreciation for the importance of assessment to overall strategy in war.

Assessment in War

The ideal strategy is created with perfect knowledge of the adversary's capabilities and future actions. Although this ideal is worth striving for, experience shows it is virtually impossible to achieve. There are several reasons for this. First, the enemy has a vote. Normally uncooperative, he will do the unexpected, the undesired, and

the unplanned. Next, neither resources nor ways are unlimited. Aircraft break, funds wither, and rules of engagement constrain employment. Finally, Clausewitz's omnipresent fog and friction of war arise. The ideal strategy on day one of the war inevitably requires changing on subsequent days. As Clausewitz suggests, commanders rarely, if ever, get the war that they desire. Efficiency in war requires sound strategy as well as flexibility to alter ways. Timely, accurate, actionable assessment is the feedback that guides the strategy and ultimately cements the campaign.

Assessment in Targeting

In the Air Force, the air tasking cycle defines the process that translates strategy to action. Specific timelines, products and processes accompany the cycle through planning, execution and assessment. In this construct, assessment links execution to subsequent iterations of the cycle. However, effective assessment must also permeate each step of the process. The foundations of the process begin with strategy, which couples with assessment to tie the process together (Figure 1).

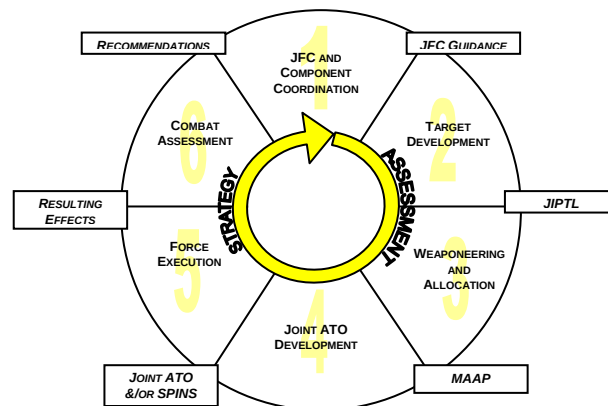


Figure 1. Air Tasking Cycle

If the assessment piece is missing, planners lose the ability to observe and reorient for the enemy's response to previous actions (Figure 2). A lack of reliable feedback removes the common thread of strategy from the process. Without strategy to lash the

cycle together, the air campaign progressively migrates away from the commander's intent. The cycle degrades into a target servicing exercise.

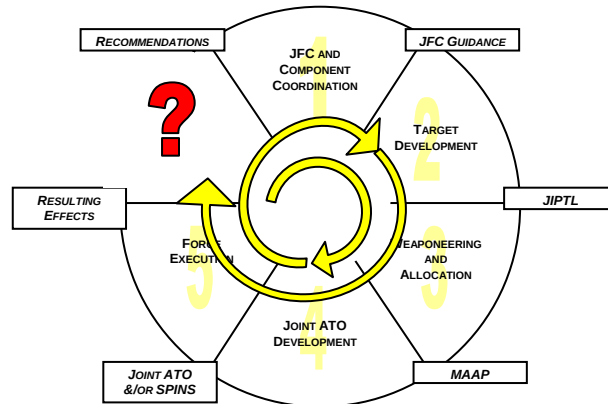


Figure 2. Air Tasking Cycle without Assessment

Servicing targets carries an attrition-based stigma. Features of attrition warfare include large conventional forces accomplishing frontal assaults. Land, sea, and air forces diligently grind away at the enemy. Tenacity, patience, and a reluctant acceptance of losses are common. In the broadest sense, the strategy of attrition warfare is to bleed the opponent until he capitulates. This mindset is the basis of attrition-based operation.

Attrition-based Operations

Wars of attrition aim to gradually reduce an opponent's ability or will to wage war by destroying enemy soldiers and equipment while at the same time forcing the enemy to consume money and resources at an impossible rate. In theory, when the enemy has neither the resources nor the determination to continue fighting, he capitulates. Due to their gradual nature, wars of attrition are relatively long. Some commonly cited examples of classic attrition wars include the Peloponnesian Wars, the Napoleonic Campaigns, World War I, and World War II.

The US military is well schooled in attrition warfare. By definition, attrition warfare carries a heavy price in money, material, and human life. Continental forces during the Civil War proved this point, as Union and Confederate forces clashed for five

long years, costing an estimated 620,000 American lives.¹⁰ In WW I, the US sacrificed another 116,000 troops in Western Europe, all in just over one year of fighting.¹¹ During WW II, four long years of fighting in two separate theaters claimed another 294,000 Americans.¹² Another 87,000 US soldiers perished during eleven combined years of fighting in Korea and Vietnam.¹³ Attrition warfare relies mainly on brute force tactics and sometimes appears devoid of subtlety in planning and execution. These legacies carried over into the early days of airpower evolution and ultimately into the way the USAF operates even today.

Early airpower theorists like Douhet, Mitchell, and Trenchard had unique and sometimes wildly varied views on the significance of airpower, but they agreed on one thing—airpower is inherently offensive. From its developmental years during WW I through its dominating years during WW II, airpower provided the means to attack and destroy enemy targets. It also allowed attrition warfare to blossom to amazing new heights. During the Combined Bomber Offensive alone, Allied bombers pounded German targets for nearly two years; some 26,000 Eighth Air Force airmen perished.¹⁴ This use of airpower changed little during Vietnam and Korea, where the airplane was the ultimate attrition vehicle. During Korea, between November 1950 and February 1951, Far East Air Forces (FEAF) flew an estimated “60,000 sorties ...and damaged 266 bridges, hit 139 locomotives, destroyed 1,710 rail cars and 5,575 trucks, gutted 36 marshalling yards, sealed 91 tunnels, and inflicted 67,000 casualties on the enemy.”¹⁵ In Vietnam, the attrition-based mindset continued during Rolling Thunder. Between February 1965 and November 1968, “643,000 tons of bombs that fell...destroyed 65 percent of the North’s oil storage capacity, 59 percent of its power plants, 55 percent of

¹⁰ Richard Holmes, ed. *The Oxford Companion to Military History*, (Oxford, U.K.: Oxford University Press, 2001), 39.

¹¹ “Casualties”, 7 August 2002, taken from Michael Clodfelter, *Warfare and Armed Conflicts: A Statistical Reference to Casualty and Other Figures, 1618-1991*, (London: McFarland & Company, 1992, 2 vols), online, Internet, 15 February 2005, available from <http://www.nv.cc.va.us/home/cevans/Versailles/greatwar/casualties.html>.

¹² David Eggenberger, *An Encyclopedia of Battles: Accounts of Over 1,560 Battles from 1479 B.C. to the Present*, (New York, N.Y.: Dover Publications, 1985), 480.

¹³ Ibid, 956.

¹⁴ Mark K. Wells, *Courage and Air Warfare: The Allied Aircrew Experience in the Second World War*, (London: Frank Cass, 1995), 45.

¹⁵ Conrad C. Crane, *American Airpower Strategy in Korea: 1950-1953*, (Lawrence, Ks.: University Press of Kansas, 2000), 65.

its major bridges, 9,812 vehicles and 1,966 rail cars.”¹⁶ During an attrition war, losses of life and equipment grow to enormous levels, so it is understandable when they command the most attention when it comes to assessment.

Although attrition warfare is extremely costly, it can also be brutally effective. This is illustrated by the German strategy during WW I. In 1916, the German army laid siege on French fortifications at Verdun. Their strategy was quite simple: to bleed the French white. Some sources claim as many as 600,000 men perished in the six-month siege.¹⁷ Although the Germans ultimately lost WW I, there is little doubt that the German strategy of attrition took major tolls on the French army. Indeed, the attrition-style thinking literally bled the French white. Nevertheless, in discussing assessment from an attrition-based perspective, the usefulness of attrition warfare is not in question. Instead, the issue is in the methodology of assessing the overall effectiveness of the strategy.

Attrition-based Assessment

Since attrition-style warfare is about destroying resources, whether they are material assets or human lives, attrition-style assessment is about tracking destroyed targets. Attrition-based assessors are interested in holes in bunkers, burning tank hulks, charred aircraft remains, and human corpses. Attrition-style assessment focuses on the direct outcome of attacks on specific targets. But this view of assessment subtracts from what attacking targets are supposed to do—achieve desired effects.

Thus emerges the very important distinction between assessing destruction and assessing effectiveness. The attrition-style assessor reports the direct effect of an attack on a target, but stops short of analyzing the effectiveness of the attack. For example, Vietnam-era analysts correctly assessed the effects of bombing during Operation Rolling thunder: 643,000 tons of bombs destroyed 65 percent of North Vietnam’s oil storage capacity.¹⁸ Had they assessed how effective this air campaign was at achieving the

¹⁶ U.S. Grant Sharp and William C. Westmoreland, *Report on the War in Vietnam (as of 30 June 1968)*, (Washington D.C.: U.S. Government Printing Office, 1969), 53; in Mark Clodfelter, *The Limits of Air Power: The American Bombing of North Vietnam*, (New York, NY: The Free Press, 1989), 134.

¹⁷ David Eggenberger, *An Encyclopedia of Battles*, 459.

¹⁸ U.S. Grant Sharp and William C. Westmoreland, *Report on the War in Vietnam*, 53; in Mark Clodfelter, *The Limits of Air Power: The American Bombing of North Vietnam*, , 1989), 134.

ultimate objective to ensure a free and stable South Vietnam, Rolling Thunder would likely have been different. In this example, the attrition-style assessment process failed to provide commanders and strategists with the vital feedback they needed to make appropriate adjustments in the air campaign. Instead, commanders continued to churn out sortie after sortie, count and measure the ever-increasing destruction, and wonder why US forces were still in Vietnam.

In summary, the attrition-based model represents the failed attempts of assessment to provide useful guidance to the strategist. The attrition-style assessor is consumed with measuring destruction vice measuring how the destruction influenced the enemy. The attrition-style assessor must expand the assessment to study subsequent effects of the attack. This expanded analysis leaves the realm of the attrition-based assessment model by assessing how effective an attack is at supporting its governing strategy. This is the essence of effects-based operations, which includes effects-based assessment.

Effects-based Operations

Effects-based operations (EBO) are not new.¹⁹ Throughout history, decision-makers have sought to create conditions that would achieve their objectives and political goals.²⁰ One of the Air Force's strongest proponents of EBO, Major General David Deptula, agrees with this and adds, "Discussing EBO with a common reference provides a fresh alternative to traditional, attrition-based operations."²¹ For the military commander, the alternative EBO provides is a methodology for engaging the enemy. Rather than focusing directly on destroying enemy forces and materiel, effects-based planners seek to link desired effects through operational objectives, tactical objectives and tactical tasks. They carefully select these effects, then work backwards to determine how to best achieve them.

¹⁹ "Effects-based Operations," (ACC White Paper, ACC/XP, Langley AFB, Va.: May 2002), 9.

²⁰ Ibid, 1.

²¹ Maj Gen Dave Deptula, PACAF/DO, interviewed by author, 10 December 2004.

There are dozens of different effects associated with EBO, including functional, systemic, psychological, cumulative, and cascading effects.²² However, a handful of the most basic terms are sufficient to gain an understanding of effects-based operations. Direct effects are those that result from direct actions. Indirect effects are created through the direct action. Collateral effects are those that were not intended; they may be positive or negative. Finally, unintended effects were not anticipated and can negatively influence the overall campaign. An example will help clarify these terms.

In late spring 1953, the Far East Air Forces (FEAF) Formal Target Committee began to study the irrigation system that sustained 422,000 acres of rice in North Korea. Planners believed that by breaching twenty critical dams, the ensuing floods would devastate rice production and substantially reduce the enemy's food supply. In May 1953, Fifth Air Force F-84s attacked the Toksan Dam in North Korea as part of this effort. The direct effect of the bombing action was the successfully breached dam. Flood waters from this reservoir cleared a twenty-seven mile swath of river valley, washed away rail lines and roads, inundated villages and rice fields, and flooded Pyongyang. Affecting the rice fields was an indirect effect; the remaining consequences were collateral effects (assuming they were not necessarily intended). Once the first dams were breached, the North Koreans rushed into action. Not only did they repair the initial breaches in record time, but also astutely lowered the water levels in surrounding reservoirs to reduce the effects of subsequent attacks. This action was a collateral effect in that it was not intended and negatively affected the remainder of the dam-busting operation.²³

THE RELATIONSHIP BETWEEN DIRECT AND INDIRECT EFFECTS IS NOT ALWAYS LINEAR. FIGURE 3 DEPICTS THREE SEPARATE RELATIONSHIPS BETWEEN THESE TWO EFFECTS. ASSUMING A CONSTANT LEVEL OF EFFORT, THREE SEPARATE EFFICIENCY CURVES RESULT IN AS MANY DISTINCT INDIRECT EFFECTS. EFFECTS-BASED PLANNERS ATTEMPT TO ACHIEVE EFFECTS THROUGH THE MOST EFFICIENT MEANS POSSIBLE. CURVE 'A' IS MOST EFFICIENT, WHERE THE 50% LEVEL OF EFFORT YIELDS 80% OF THE DESIRED EFFECT. LINE 'B' IS A 1:1 RELATIONSHIP, WHERE THE 50% LEVEL OF EFFORT YIELDS AN EQUAL PERCENTAGE OF EFFECT. FINALLY, CURVE 'C' IS LEAST EFFICIENT, WHERE THE SAME LEVEL OF

²² "Effects-based Operations," 9, glossary; Edward C. Mann III, Colonel, USAF (ret), Gary Endersby, Lt Col, USAF (ret), and Thomas R. Searle, "Thinking Effects: Effects-based Methodology for Joint Operations," CADRE Paper No. 15, College of Aerospace Doctrine, Research and Education, (Maxwell AFB, Ala.: Air University Press, 2002), 33.

²³ Crane, 160-163.

EFFORT YIELDS ONLY 20% OF THE DESIRED EFFECT. OBVIOUSLY, THE EFFECTS-BASED PLANNER ATTEMPTS TO MAXIMIZE EFFECT WITH MINIMUM EFFORT.²⁴

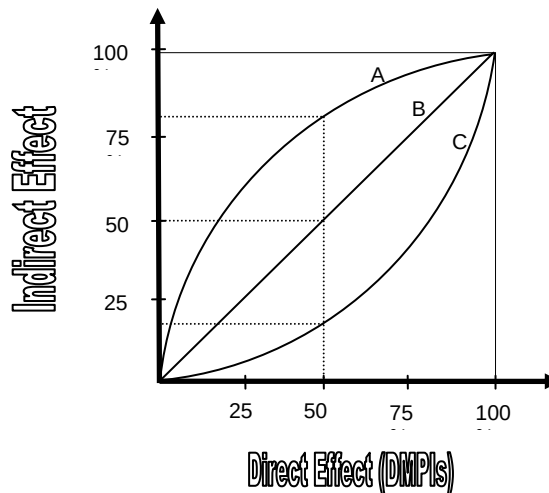


Figure 3. Efficiency in Achieving Direct vs. Indirect Effects

Effects-based actions may be through kinetic or non-kinetic means. Destroying a telephone switchboard to reduce enemy communications is an example of kinetic means. Jamming that communication signal to achieve the same effect is a non-kinetic option. Because kinetic means normally result in target destruction, they are often confused with attrition-based means. The delineation between the attrition-based and effects-based model lies in the “effect that is achieved by destroying the target [rather than] the destruction of the target itself.”²⁵ Therefore, a kinetic, effects-based alternative is not necessarily an attrition-based one. Effects-based planners often attempt to achieve desired effects through indirect, possibly less destructive, non-kinetic means. Nonetheless, the effects-based planner will not hesitate to use destructive kinetic means if the situation warrants it.

²⁴ Clarence Olschner, 505 TRS Contractor, “Effects-based Operations,” lecture, 505 TRS Command and Control Warrior Advanced Course, 7 April 2005.

²⁵ “Effects-based Operations,” 9.

WHEN COMPARING STRATEGIC EFFECTIVENESS WITH AN ENEMY'S ABILITY TO RECONSTITUTE, AN OMNIPRESENT FEATURE OF EBO IS RISK. IN AN ATTRITION-BASED WAR, THE RISK OF ENEMY RECONSTITUTION IS RELATIVELY LOW, BUT THIS LOWERED RISK GENERALLY CARRIES A GREATER PRICE OF RESOURCES. AN EFFECTS-BASED ALTERNATIVE MAY ACHIEVE THE SAME EFFECT MORE EFFICIENTLY, BUT COULD MEAN THE ABILITY FOR THE ENEMY TO RECONSTITUTE IS GREATER. THE FOLLOWING EXAMPLE CLARIFIES THIS CRUCIAL BALANCE BETWEEN RISK AND EFFICIENCY OF EFFORT.

AIR SUPERIORITY ALLOWS FRIENDLY AIRCRAFT TO OPERATE RELATIVELY UNHINDERED BY BOTH ENEMY FIGHTERS AND MISSILE SYSTEMS. DURING THE EARLY STAGES OF OIF, IRAQI MISSILE BATTERIES WERE FULLY OPERATIONAL, ESPECIALLY IN BAGHDAD. TO REDUCE THEIR EFFECTIVENESS, MOSELEY RELIED ON F-16 CJ FIGHTERS EQUIPPED WITH HIGH-SPEED ANTIRADIATION (HARM) MISSILES. HE TASKED THESE AIRCRAFT ON SUPPRESSION OF ENEMY AIR DEFENSE (SEAD) MISSIONS, AIMED AT KEEPING ENEMY RADAR MISSILE BATTERIES OFF THE AIR. IN MANY CASES, THEIR MERE PRESENCE ACHIEVED THE DESIRED EFFECT OF KEEPING ENEMY RADARS OFF THE AIR. THIS NON-KINETIC APPROACH DIFFERS GREATLY FROM ITS KINETIC ALTERNATIVE, DESTRUCTION OF ENEMY AIR DEFENSES (DEAD). DEAD GENERALLY REQUIRES DIRECT ATTACK ON THE HOSTILE MISSILE SIGHT. WHILE DESTRUCTION OF THE SIGHT MINIMIZES OPERATIONAL RISK FOR FUTURE MISSIONS IN THE AREA, THE AIRCRAFT TASKED TO ACTUALLY DESTROY THE SIGHT INCURS GREAT TACTICAL RISK. IF THE JFACC CAN ACHIEVE THE DESIRED EFFECT WITHOUT PLACING A VALUABLE ASSET IN HARM'S WAY, THEN SEAD IS ADEQUATE AND PREFERRED. HOWEVER, SUPPRESSING ENEMY AIR DEFENSES CARRIES A TEMPORAL COMPONENT VIS-À-VIS DESTROYING THEM. ALTHOUGH THE SEAD MISSION IS GENERALLY LESS RISKY FOR THE ATTACKING PILOTS, THE JFACC MUST ACCEPT RISK THAT THE SITE IS STILL ALIVE TO POSSIBLY FIGHT ANOTHER DAY. FURTHERMORE, HE MUST DEDICATE ASSETS TO MONITOR THE SITE TO PROVIDE CONFIDENCE THAT THE SITES ARE NOT PLANNING TO SHOOT.

IN CONCLUSION, EFFECTS-BASED STRATEGISTS MUST ASK FOUR CRITICAL QUESTIONS WHEN PLANNING THE AIR CAMPAIGN. FIRST, WHAT IS THE DESIRED EFFECT? SECOND, HOW LONG SHOULD THE DESIRED EFFECT LAST? THIRD, WHAT IS THE MOST EFFECTIVE, EFFICIENT, AND PRACTICAL METHOD TO ACHIEVE THE DESIRED EFFECT? FOURTH, HOW WILL THE EFFECT BE ASSESSED? THE FIRST THREE QUESTIONS NORMALLY RECEIVE THE MOST EMPHASIS IN THE PLANNING ROOM, BUT WITHOUT ANSWERING THE FOURTH QUESTION, EFFECTS-BASED OPERATIONS ARE DESTINED FOR FAILURE.²⁶

Effects-based Assessment

Effects-based thinking is becoming increasingly prevalent in air campaign strategy doctrine. In recent years, the Air Force Doctrine Center (AFDC) and assessment community have greatly improved and expanded upon previous assessment terminology,

²⁶ Colonel Mason Carpenter, OIF USCENTAF Chief, Strategy Division, interviewed by author, 7 December 2004.

further defining the now notorious phrase ‘battle damage assessment.’ Terms such as tactical, operational, campaign, component, and national assessment will soon stratify the assessment lexicon.²⁷ Additionally, adding components such as the Targeting Effects Team (TET) reflect this positive move towards EBO.²⁸

Although the word ‘operations’ in effects-based operations suggests EBO is mostly about execution, it actually includes much more than that. In his article “Ten Propositions Regarding Airpower,” USAF Col (retired) Phillip Meilinger stresses the importance of assessing effects: “In essence, airpower is targeting; targeting is intelligence; and intelligence is analyzing the effects of air power.”²⁹ Components of EBO include effects-based planning, execution, and assessment. In shortened form: **EBO = EBP + EBE + EBA.**

EBO is not a linear process, but rather an iterative effort that combines the planning, executing, and assessment components. One component of EBO is effects-based planning (EBP). Strategists tie the desired end-state to operational objectives and ultimately to tactical tasks. But there is more to EBO than simply executing a plan. A pure effects-based operation plans not just for execution but also for assessment. Additionally, the execution phase requires constant assessment to ensure planned actions are achieving the desired effects, for “assessment is not the end of an operational cycle, but the continuation of concurrent cycles promoting the desired outcome.”³⁰ Since

²⁷ For years, the term “battle damage assessment” (BDA) was an all-inclusive term that described anything from munitions effects to campaign effectiveness. Even during OIF, pilots estimated “BDA” on MISREPS, analysts assessed “BDA” from imagery, and Moseley grumbled that “BDA” was broken. Joint and Air Force doctrine from the past decade reflect extensive effort to clarify what “BDA” really is. When OIF began in March of 2003, a generally accepted set of terms permeated the joint assessment community (See Appendix A). However, many of these terms focused on the lower echelons of operational assessment. The terms themselves suggested an attrition-style way of thinking, including words like *munitions* and *damage*. Most assessment doctrine made very little reference to effects-based thinking. The two years since OIF have witnessed a frenzy of activity in the Air Force assessment community to redefine assessment (See Appendix B). In fact, many of the authors of these newly touted terms were involved directly during OIF. In reality, some of these effects-based terms were likely used in the CAOC during OIF. For clarity sake, this thesis attempts to use terminology that was in current doctrine during OIF to the maximum extent possible. However, in an attempt to reflect reality to the maximum extent possible, some terms that have been defined since the end of OIF are also included.

²⁸ Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-3.2, *Air and Space Operations Center*, 13 December 2004, 4-5.

²⁹ Col Phillip S. Meilinger, USAF, “Ten Propositions Regarding Airpower,” *Airpower Journal*, Spring 1996.

³⁰ “Effects-based Assessment: Closing the Loop,” (CAF White Paper, ACC, Langley AFB, Va.: March 2004), 3.

desired effect(s) are at the heart of the air tasking cycle, strategy and assessment are the glues that bind the process together (Figure 4).

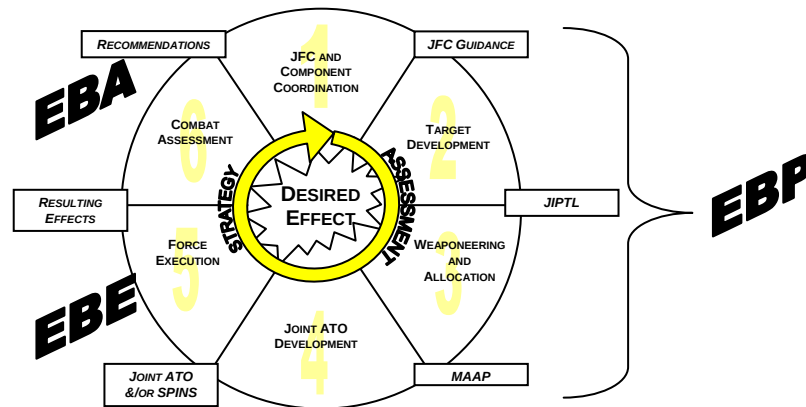


Figure 4. Effects-based Air Tasking Cycle

Measuring Effects

In order to measure desired effects, assessors must gather enough information to see if their objectives have been met.³¹ Therefore, objectives should be realistic, definable, achievable, and measurable. Current doctrine provides terminology for this aspect of assessment.

During OIF, US Central Command Air Forces (CENTAF) used two main measurement devices, Success Indicators (SIs) and Measures of Effectiveness (MOEs), to measure objectives and tasks, respectively.³² Success Indicators (SI) measure progress toward achieving operational level objectives, providing broad, qualitative guidance for operational assessment. As the definition suggests, SIs apply to the operational level of war. For example, decreased numbers of enemy sorties flown is a positive and measurable SI for achieving air superiority.³³ The JFACC analyzes SIs to determine if he

³¹ John Schlight, "The War in South Vietnam: The Years of the Offensive (1965-1968)," *The United States Air Force in Southeast Asia* (Washington D.C.: Office of Air Force History, 1988).

³² The USAF C2 AOC course at Hurlburt Field, Florida, currently relate MOEs to the tactical level (to measure Tactical Tasks and Tactical Objectives) and relate SIs to the operational level (to measure Operational Objectives).

³³ Joint Publication (JP) 3-30, *Command and Control for Joint Air Operations*, 5 June 2003, III-10.

is “doing the right things.”³⁴ At the tactical level, Measures of Effectiveness (MOE) are “tools used to measure results achieved in the overall mission and execution of assigned tasks.”³⁵ As such, they must be meaningful, reliable, and observable. For the JFACC, achieving set MOEs translates into “Doing things right.”³⁶

MOEs and SIs are absolutely central to EBA and must be considered in the planning process. Crucial elements of proper MOEs and SIs are desired effect and timing. Desired effect describes what to do and timing describes when to do it and how long to maintain the effect. Therefore, EBA must consider both components in analyzing whether a desired effect has been met. Even with this precise measurement jargon, it is sometimes not at all obvious what to assess, no matter which model of assessment one follows.

The Attrition-based/Effects-based Assessment Dilemma: What to Assess?

IMAGINE FOR A MOMENT THE PERFECT WARTIME STRATEGY. STRATEGISTS POSSESS COMPLETE AND FLAWLESS AWARENESS OF ALL PAST, PRESENT, AND FUTURE FRIENDLY AND ENEMY THOUGHTS AND ACTIONS. IN TRANSLATING THIS STRATEGY TO ACTION, PLANNERS HAVE TOTAL CONFIDENCE THAT A GIVEN COURSE OF ACTION, SUCH AS DESTROYING A TARGET, CAUSES A PREDICTABLE AND DESIRED EFFECT. ASSESSORS NEED ONLY CONFIRM SUCCESSFUL COMPLETION THE COURSE OF ACTION TO ENSURE THE EFFECT IS ACHIEVED. IN FACT, THERE IS NO REASON TO ASSESS ANYTHING OTHER THAN COMPLETION OF THE SPECIFIC COURSE OF ACTION, FOR THE DESIRED EFFECTS ARE GUARANTEED.

In a simple example, a commander plans to keep enemy forces from crossing a river. The selected course of action, which happens to be kinetic, is to destroy the bridge across that river. After the attack, assessors confirm the bridge is destroyed. The

³⁴ Michael Short, USAF Senior Mentor, interviewed by author, 4 January 2005.

³⁵ Joint Publication (JP) 2-01.1, *Joint Tactics, Techniques, and Procedures for Intelligence Support to Targeting*, 9 January 2003, II-2.

³⁶ A mission is the task, together with the purpose, that clearly indicates the action to be taken and the reason therefore; a duty assigned to an individual or unit (JP 1-02, as amended through 9 June 2004); A task is a discrete event or action, not specific to a single unit, weapon system, or individual, that enables a mission or function to be accomplished—by individuals or organizations (AFDD 1-1); Objectives are clearly defined, decisive, and attainable goals towards which every military operation should be directed (JP 1-02, as amended through 9 June 2004); Joint Publication (JP) 2-01.1, *Joint Tactics, Techniques, and Procedures for Intelligence Support to Targeting*, 9 January 2003, II-2; Short interview.

commander considers the attack a success and is confident that the enemy is unable to cross the river. This utopian environment is ideal for attrition-based assessment. However, the commander cannot be completely sure that the plan of action will have the desired effect.

When the commander redefines success as whether or not the enemy held their position, then his scope of assessment expands. Since the level of damage does not necessarily equate to success, assessment must move beyond the damage assessment of the bridge to consider the desired effect of paralyzing enemy forces on the far side of the river. This is the main difference between attrition-based assessment and EBA.

IN THE PURE EFFECTS-BASED MODEL, STRATEGISTS MAKE INFORMED ESTIMATES CONCERNING HOW SPECIFIC ACTIONS LINK TO DESIRED EFFECTS. IN THE RIVER BRIDGE EXAMPLE, PLANNERS SELECT SEVERAL ADDITIONAL COURSES OF ACTION BESIDES ATTACKING THE BRIDGE. THEY DROP LEAFLETS THAT URGE THE ENEMY TROOPS TO LAY DOWN THEIR WEAPONS AND SURRENDER. THEY ALSO LAY MINES ALONG THE SHORELINE OF THE RIVER. WHEN MEASURING EFFECTIVENESS, ASSESSORS LOOK NOT AT THE TARGETED BRIDGE, BUT AT THE TARGET OF THE DESIRED EFFECT—THE ENEMY TROOPS. IN THIS CASE, THEY NEED ONLY CONFIRM THESE TROOPS REMAIN ON THE ENEMY SIDE OF THE RIVER. IN FACT, THE PURE EFFECTS-BASED PLANNER IS BASICALLY INDIFFERENT AS TO THE METHOD OF ACHIEVING EFFECTS, SO LONG AS THE EFFECT IS ACHIEVED.

HEREIN LAYS A MAJOR DIFFICULTY WITH THE PURE EFFECTS-BASED MODEL. IF THE ENEMY HOLDS ITS POSITION FOR THE DESIRED AMOUNT OF TIME, THEN THE EFFECT IS ACHIEVED. HOWEVER, WHICH TACTICAL ACTION CREATED THE EFFECT? WAS IT THE DESTRUCTION OF THE BRIDGE, THE MINEFIELD OR THE MESSAGE ON THE LEAFLETS? WAS IT A COMBINATION OF SOME OR ALL OF THEM, OR WAS IT NONE AT ALL? SHORT OF INTERVIEWING THE ENEMY COMMANDER, IT IS DIFFICULT, IF NOT IMPOSSIBLE, TO ACCURATELY ASSESS WHY HE DECIDED TO HOLD POSITION. IT IS EXTREMELY DIFFICULT TO ASSESS ACTIONS THAT ARE PREVENTED. IN FACT, COMMANDERS DO CARE WHAT IS ACHIEVING THE EFFECT. KNOWING WHAT IS ACHIEVING THE EFFECT ALLOWS THEM TO REALLOCATE SCARCE RESOURCES TO OTHER TASKS AND OBJECTIVES. FURTHERMORE, UNDERSTANDING HOW A GIVEN EFFECT IS ACHIEVED ALLOWS THEM TO DO THE SAME THING THE NEXT TIME. THEREFORE, COMMANDERS MUST USE APPROPRIATE MEASURES

OF EFFECTIVENESS TO ASSESS PROGRESS TOWARDS OPERATIONAL OBJECTIVES. THE PREVIOUS EXAMPLE CLEARLY ILLUSTRATES THE NUANCES BETWEEN THE ATTRITION AND EFFECTS-BASED MODELS.

Comparing the Models

THE MERE DEFINITIONS AND CHARACTERISTICS OF EACH MODEL SUGGEST THE PRIMACY OF THE EFFECTS-BASED MODEL OVER THE ATTRITION-BASED ONE. TO RECOUNT THESE DEFINITIONS, ATTRITION-BASED ASSESSMENT DEALS SOLELY WITH NUMBERS OF CASUALTIES AND DESTROYED TARGETS. BOMB DAMAGE AND MUNITIONS EFFECTIVENESS ARE TERMS THAT FIT WELL INTO THIS CONSTRUCT. THE ATTRITION-BASED ANALYST ASSESSES THE EFFECTS OF ATTACKS, THEN ASSUMES THE OVERALL EFFECTIVENESS OF THESE ACTIONS WILL ACHIEVE THE PLANNED END-STATE. THE EFFECTS-BASED ASSESSOR MAKES THE CONNECTION BETWEEN CAUSE AND EFFECT BY CORRELATING DIRECT EFFECTS TO INDIRECT, DESIRED EFFECTS. THE EBA CONSTRUCT PROVIDES THE SPRINGBOARD FOR THE ASSESSOR TO ANALYTICALLY LINK THE STRATEGY TO THE END-STATE. MORE IMPORTANTLY, IT PROVIDES THE RATIONALE TO MAKE APPROPRIATE CHANGES TO THE STRATEGY, SHOULD THEY BE REQUIRED.

GIVEN THESE DEFINITIONS, IT SEEMS EVIDENT WHICH CONSTRUCT IS MORE USEFUL TO THE JFACC. STILL, THERE ARE VALID REASONS WHY AIRMEN MAY ATTEMPT EBA, BUT END UP DOING ATTRITION-BASED ASSESSMENT. FIRST, THE AIR FORCE IS GENERALLY WELL PRACTICED AT ATTRITION-BASED ASSESSMENT. COLLECTING, COMPILING, AND ANALYZING IMAGERY, MISSION REPORTS, AND OTHER POST-STRIKE DATA IS A WELL-TRODDEN PATH. IT IS HUMAN NATURE TO FALL BACK ON THAT WHICH IS MOST COMFORTABLE. NEXT, THERE IS ADMITTEDLY SOME AMOUNT OF COMFORT IN COUNTING BURNED TANKS, CHARRED AIRCRAFT, AND DESTROYED BUILDINGS. THIS COMFORT LEADS IN THE SHORT TERM TO A LOWERED RISK OF ENEMY RECONSTITUTION SINCE THE ENEMY CANNOT FIGHT WITH DESTROYED EQUIPMENT AND MATERIAL. IT ALSO PROVIDES TANGIBLE EVIDENCE THAT THE WAR EFFORT IS 'MAKING PROGRESS.' FINALLY, THE ATTRITION-BASED MODEL PROVIDES AN ELEGANT, ALBEIT SIMPLISTIC, SOLUTION TO ASSESSMENT. THE ASSESSOR MUST ONLY CONFIRM TARGET DESTRUCTION TO VALIDATE

THE STRATEGY. WHILE THESE REASONS APPEAR ATTRACTIVE ON THE SURFACE, THEY ARE NOT ENOUGH TO SUBSTANTIATE ATTRITION-BASED ASSESSMENT.

THE EFFECTS-BASED MODEL IS NOT AS NEARLY AS SIMPLE. THE MERE FACT THAT THERE MAY BE MULTIPLE LINKAGES BETWEEN DIRECT AND INDIRECT EFFECTS MEANS FOLLOWING THE CAUSAL LINKAGES IS NO SIMPLE TASK. UNLIKE THE ATTRITION-BASED MODEL, EBA FREQUENTLY REQUIRES ASSESSORS TO FUSE MULTIPLE ASSESSMENTS IN ORDER TO CONFIRM A DESIRED OUTCOME. OF COURSE, THIS REQUIRES PRECIOUS TIME AND RESOURCES TO ACCOMPLISH. EVEN THEN, IT IS SOMETIMES DIFFICULT TO POSITIVELY ATTRIBUTE ANY GIVEN DIRECT ACTION TO A DESIRED EFFECT. IN SUMMARY, EBA IS MORE COMPLICATED AND TIME CONSUMING WHEN COMPARED TO ATTRITION-BASED ASSESSMENT. HOWEVER, IT IS THE PREFERRED MODEL FOR A VERY SIMPLE REASON.

THE ATTRITION-BASED MODEL DOES NOT POSITIVELY LINK THE ACTIONS TO THE DESIRED EFFECT. THEREFORE, IT CANNOT POSITIVELY VERIFY THAT THE STRATEGY IS SOUND, AND THUS IT CANNOT PROVIDE SAGE RECOMMENDATIONS FOR CHANGING THE STRATEGY IF IT SO REQUIRES. THE EBA MODEL LINKS ACTIONS TO EFFECTS. AS SUCH, IT CAN VERIFY STRATEGY AND GIVE NECESSARY COURSE CORRECTIONS WHEN REQUIRED. THE ASSESSORS THAT MADE UP THE OAT IN MOSELEY'S CAOC DURING OIF UNDERSTOOD THIS POINT WELL. EBA WAS THE CORRECT CONSTRUCT FOR THEM AND REMAINS SO FOR FUTURE WARS.

Summary

THE ATTRITION-BASED AND EFFECTS-BASED MODELS PROVIDE POINTS OF DEPARTURE IN DISCUSSING ASSESSMENT. AIRMEN HAVE MADE MUCH PROGRESS IN THEIR QUEST TO MOVE FROM ATTRITION-BASED ASSESSMENT TO EFFECTS-BASED ASSESSMENT. OIF PROVIDES AN EXCELLENT CASE STUDY WITH WHICH TO MEASURE THIS PROGRESS. SUCCESSFUL OPERATIONAL ASSESSMENT INFORMS THE JFACC WITH ENOUGH FIDELITY TO GUIDE AND STEER THE AIR STRATEGY. DURING OIF, THE CAOC TEAM WITH THIS RESPONSIBILITY WISELY CHOSE TO ACCOMPLISH EBA. HOWEVER, FOR THE MOST PART, EFFECTS-BASED OPERATIONAL ASSESSMENT DID NOT SUCCESSFULLY GUIDE AND STEER THE AIR STRATEGY. CRITICALLY ANALYZING THREE MAJOR

COMPONENTS OF OIF ASSESSMENT—ORGANIZATION, DOCTRINE, AND TECHNOLOGY—
WILL ADVANCE THE UNDERSTANDING OF WHY THIS OCCURRED AND ANSWER WHETHER
EBA CAN EVER SUCCEED IN A WAR SUCH AS OIF.

Chapter 2

Organization

Air Force people must continue breaking down the functional stovepipes and tribal loyalties that stand in the way of translating visions into decisive operational capability.

—General John Jumper
Chief of Staff of the Air Force

BY 21 MARCH 2003, NEARLY 2,000 PEOPLE MANNED THE CAOC AT PRINCE SULTAN AIR BASE.³⁷ ONLY ABOUT TWO DOZEN OF THEM, SPREAD ACROSS SEVERAL DIVISIONS AND TEAMS, CONTRIBUTED DIRECTLY TO OPERATIONAL ASSESSMENT.³⁸ THE TEAM ULTIMATELY RESPONSIBLE WAS THE OPERATIONAL ASSESSMENT TEAM (OAT) IN THE STRATEGY DIVISION. IN EXECUTING THEIR CHALLENGING TASK, THE OAT ATTEMPTED TO USE EBA METHODOLOGY. THE OAT COULD NOT ACCOMPLISH EBA WITHOUT THE SUPPORT OF OTHER AGENCIES, BOTH INSIDE AND OUTSIDE THE CAOC. THIS CHAPTER ANALYZES THIS ORGANIZATION AND EVALUATES WHETHER EBA CAN BE EFFECTIVE WITH THE ORGANIZATIONAL CONSTRUCTS INSIDE AND OUTSIDE THE CAOC.

THIS CHAPTER IS DIVIDED INTO TWO BROAD SECTIONS. THE FIRST SECTION IS DESCRIPTIVE IN NATURE, INTRODUCING AGENCIES THAT THE OAT RELIES ON FOR EBA. THE SECOND SECTION IS ANALYTIC, ASSESSING AND EVALUATING KEY FINDINGS WITH RESPECT TO ORGANIZATIONAL INFLUENCES ON EBA. THE ANALYSIS OF ORGANIZATIONAL INFLUENCES ON EBA INCLUDES PLANNED ORGANIZATIONAL STRUCTURES, MANNING LEVELS, AND COMMAND RELATIONSHIPS. THE CENTRAL FINDING OF THIS CHAPTER IS: STOVE PIPED, HIERARCHICAL STRUCTURES AND INSUFFICIENT MANNING LEVELS INSIDE THE CAOC, ALONG WITH CONFLICTING INTERESTS AND PRIORITIZATIONS OUTSIDE THE CAOC, HAMPERED EBA EFFORTS.

³⁷ *Operation Iraqi Freedom—By the Numbers*, USCENAF Assessment and Analysis Division (Prince Sultan Air Base, Saudi Arabia: USCENAF, April 2003), 3.

³⁸ Maj Stephen Murray, OIF USCENAF Chief, Operational Assessment Team, interviewed by author, 1 March 2005.

Players Inside the CAOC

AT THE START OF OIF, THE AIR FORCE INSTRUCTION (AFI) THAT GOVERNED THE AIR OPERATION CENTER WAS AFI 13-1AOC, VOLUME 3, *OPERATIONAL PROCEDURES—AEROSPACE OPERATIONS CENTER*. THE CAOC AT PRINCE SULTAN AIR BASE (PSAB), SAUDI ARABIA, MAINTAINED THIS FIVE-DIVISION STRUCTURE, BUT INCLUDED DIFFERENT TEAMS WITHIN EACH DIVISION. FIGURE 5, PUBLISHED IN THE DECEMBER 2004 VERSION OF AFOTTP 2-3.2, IS A MORE ACCURATE REPRESENTATIVE OF THE PSAB CAOC ORGANIZATIONAL STRUCTURE AS OF MARCH 2003. OF THE FIVE DIVISIONS IN THE STRUCTURE, THE STRATEGY DIVISION (SD) AND ISR DIVISION (ISRD) WERE DIRECTLY INVOLVED IN OPERATIONAL ASSESSMENT.

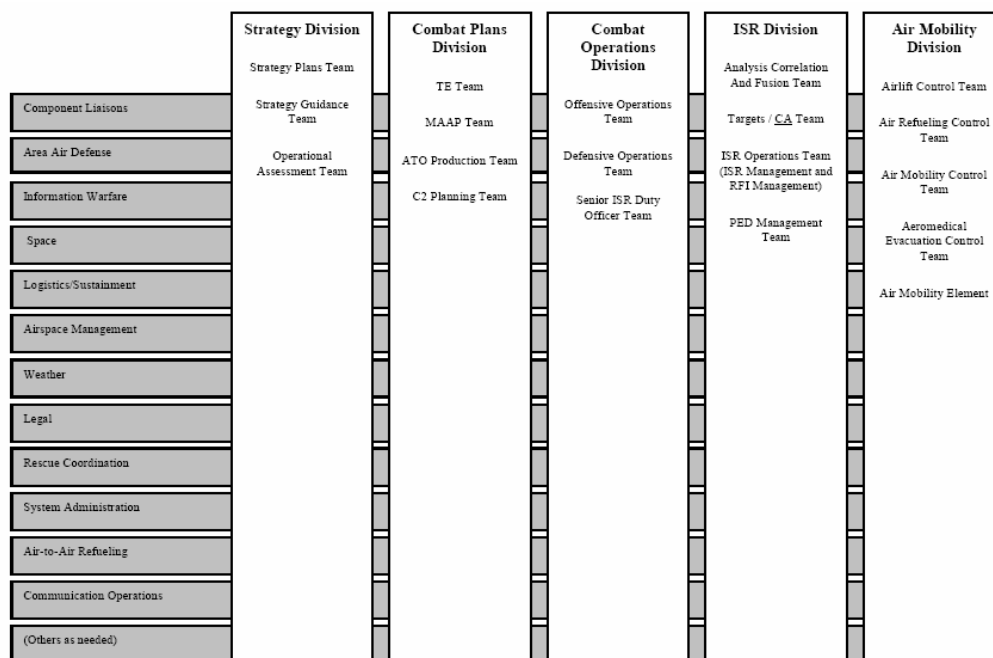


FIGURE 5. BASIC AIR OPERATIONS CENTER ORGANIZATION

SOURCE: AIR FORCE OPERATIONAL TACTICS, TECHNIQUES, AND PROCEDURES (AFOTTP) 2-3.2, *AIR AND SPACE OPERATIONS CENTER*, 13 DECEMBER 2004, 1-4

Strategy Division

ACCORDING TO DOCTRINE, THE STRATEGY DIVISION IS RESPONSIBLE FOR PROVIDING AIR TASKING GUIDANCE TO THE REST OF THE CAOC DIVISIONS AND IS COMPRISED OF THREE MAIN TEAMS. THE STRATEGY PLANS TEAM (SPT) IS FOCUSED ON LONG-TERM OPERATIONS, WHICH ARE DEFINED AS OPERATIONS MORE THAN 72 HOURS AWAY. THE SPT CONCENTRATES ON THE 'BIG PICTURE' AND LEADS THE AOC IN THE JOINT AIR ESTIMATE PROCESS. THE STRATEGY GUIDANCE TEAM (SGT) IS FOCUSED ON NEAR-TERM OPERATIONS, WHICH ARE DEFINED AS OPERATIONS THAT WILL OCCUR WITHIN 72 HOURS.

THE SGT IS FOCUSED MORE NEAR TERM, BRINGING THE JFACC'S GUIDANCE TO LIFE THROUGH THE AIR TASKING ORDER (ATO). FINALLY, THE OPERATIONAL ASSESSMENT TEAM COMBINES PAST AND PRESENT ASSESSMENTS WITH FUTURE PREDICTIONS AND ESTIMATES TO PROVIDE RECOMMENDATIONS FOR CHANGE TO THE JOINT AIR OPERATIONS PROCESS (JAOP). FIGURE 6 OUTLINES THE ROLES AND RESPONSIBILITIES OF EACH TEAM IN THE SD IN MORE DETAIL.

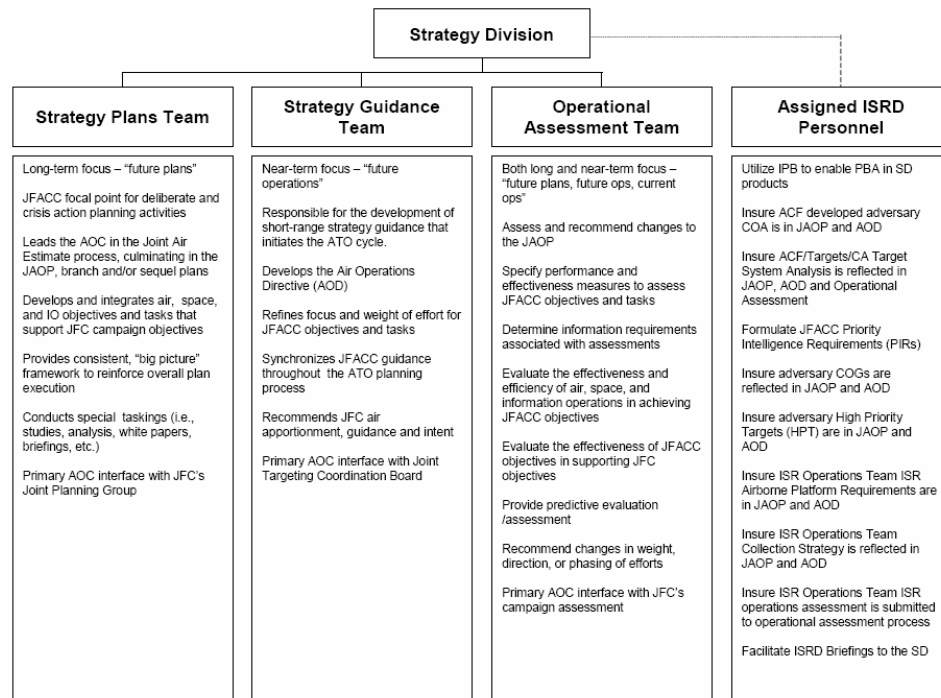


FIGURE 6. CAOC STRATEGY DIVISION

SOURCE: AIR FORCE OPERATIONAL TACTICS, TECHNIQUES, AND PROCEDURES (AFOTTP) 2-3.2, *AIR AND SPACE OPERATIONS CENTER*, 13 DECEMBER 2004, 3.4

Operational Assessment Team

THE OAT IS AN INTEGRAL PART OF THE SD. BROADLY SPEAKING, IT IS THE ENTITY THAT FUSES MANY TACTICAL-LEVEL ASSESSMENTS INTO A SINGLE OPERATIONAL ASSESSMENT FOR THE JFACC. IN ORDER TO MEASURE THE JFACC'S OBJECTIVES AND TASKS, THE OAT SPECIFIES PERFORMANCE INDICATORS AND MEASURES OF EFFECTIVENESS. THE TEAM ALSO DETERMINES WHICH INFORMATION IS REQUIRED TO COMPLETE THE OPERATIONAL ASSESSMENT PIECE. THE OAT IS NOT IN THE BUSINESS OF COLLECTING OR COMPILING INFORMATION. INSTEAD, IT IS EXTREMELY RELIANT ON THE ASSESSMENT INFORMATION THAT OTHER AGENCIES COLLECT. ARMED WITH EXISTING COMPILED INFORMATION, THE OAT FUSES AND ANALYZES DATA FROM THROUGHOUT THE THEATER TO PROVIDE TACTICAL AND STRATEGIC LEVEL RECOMMENDATION, AS WELL AS OVERALL ASSESSMENT OF THE CAMPAIGN STRATEGY.

IF ONE THINKS OF OPERATIONAL ASSESSMENT AS A PUZZLE, THE OAT IS THE ENTITY THAT PUTS THE PIECES TOGETHER INTO A COHERENT OPERATIONAL ASSESSMENT.

ISR Division

DURING OIF, THE OAT INTERACTED WITH SEVERAL KEY ENTITIES WITHIN THE CAOC DURING OIF, INCLUDING THE ISR DIVISION (ISR/D). FOR EXAMPLE, AN OAT REPRESENTATIVE MET WITH THE FUSION TEAM SEVERAL TIMES A DAY TO RECEIVE A 'BROAD UNDERSTANDING OF WHAT EFFECTS WERE HAPPENING ON THE BATTLEFIELD AND ALSO SPECIFIC EXAMPLES.' ADDITIONALLY, THE OAT MET REGULARLY WITH THE COMBAT ASSESSMENT (CA) TEAM. ACCORDING TO PLAN, THE OAT SHOULD DRAW UPON AGGREGATE ASSESSMENTS FROM THE CA TEAM TO BUILD AN ACCURATE PICTURE FOR THE JFACC.³⁹ AS SUCH, THESE TWO ISR/D TEAMS WERE VITAL TO THE EFFECTS-BASED OPERATIONAL ASSESSMENT THE OAT INTENDED TO ACCOMPLISH.

Players Outside the CAOC

THE MAIN OUTSIDE AGENCIES THAT THE OAT INTERACTED WITH DURING OIF WERE CENTRAL COMMAND (CENTCOM) AND THE OTHER COMPONENTS. OF THESE AGENCIES, THE OAT WORKED MORE CLOSELY WITH FORWARD-DEPLOYED CENTCOM ANALYSTS.

CENTCOM

CENTCOM IS LOCATED AT MACDILL AFB, NEAR TAMPA, FLORIDA (ALSO KNOWN AS CENTCOM REAR). IN THE MONTHS LEADING UP TO OIF, GENERAL TOMMY FRANKS AND HIS STAFF MOVED FORWARD TO CAMP AS SAYLIYAH, NEAR DOHA IN QATAR (ALSO KNOWN AS CENTCOM FORWARD) (FIGURE 7). WITHIN THE CENTCOM STRUCTURE, TWO MAIN DIVISIONS WORKED ASSESSMENT: THE INTELLIGENCE DIRECTORATE (J-2) AND THE ASSESSMENT COMPONENT OF THE FORCE STRUCTURE, RESOURCES, AND ASSESSMENT DIRECTORATE (J-8). J-2 FOCUSED MAINLY AT THE TARGET LEVEL AND MAINTAINED CONTROL OF COLLECTION ASSETS. ACCORDINGLY, THE JFACC WAS NOT FREE TO SCHEDULE CRITICAL INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) ASSETS TO HIS CHOOSING. FURTHERMORE, CENTAF ASSESSMENTS MOVED THROUGH J-2 ASSESSMENT CHANNELS FOR HIGHER-LEVEL ANALYSIS. J-8 PROVIDED A SUMMARY OF COMPONENT OPERATIONAL ASSESSMENTS, WHICH COMBINED TO FORM A BROADER CAMPAIGN ASSESSMENT PICTURE VIA THE CAMPAIGN OBJECTIVES ASSESSMENT BOARD (COAB). BOARD PARTICIPANTS INCLUDED REPRESENTATIVES FROM CENTCOM INTELLIGENCE (J-2), PLANS (J-3), LOGISTICS (J-4), AND OPERATIONS (J-5), AS WELL AS

³⁹ Murray interview, 1 March 2005.

COMPONENT LEVEL REPRESENTATIVES. DURING OIF, CENTAF ANALYSTS INTERACTED WITH CENTCOM J-8 ON OPERATIONAL ASSESSMENT MATTERS VIA A DEDICATED OAT REPRESENTATIVE.⁴⁰

ARCENT

THE JFACC APPORTIONED OVER 50% OF HIS AIR ASSETS TO SUPPORT THE COMBINED FORCES LAND COMPONENT COMMANDER (CFLCC).⁴¹ AS THE SUPPORTED COMPONENT, THE CFLCC HAD THE ULTIMATE WORD ON WHETHER AIR POWER WAS EFFECTIVELY SUPPORTING HIS REQUIREMENTS. IN THE CAOC, THE MECHANISM USED TO INTEGRATE ARMY OPERATIONAL REQUIREMENTS INTO THE AIR TASKING CYCLE WAS THE BATTLEFIELD COORDINATION DETACHMENT (BCD). AMONG OTHER DUTIES, THE BCD MONITORS AND INTERPRETS THE LAND BATTLE SITUATION FOR THE JFACC AND PROVIDES THE NECESSARY INTERFACE FOR EXCHANGE OF CURRENT INTELLIGENCE AND OPERATIONAL DATA.⁴² BCD REPRESENTATIVES WORKED WITHIN THE ISR/D AND ATTENDED CAOC STRATEGY PLANNING MEETINGS. THE OAT DIRECTED QUESTIONS CONCERNING GROUND COMPONENT ASSESSMENT TO THE BCD AND THEN BRIEFED THE CFLCC DATA AS IT RELATED TO SPECIFIC OBJECTIVES THAT THE CFACC WAS SUPPORTING.⁴³ FINALLY, ADDITIONAL INTERACTION WITH THE ARMY COMPONENT OCCURRED DURING THE CAMPAIGN OBJECTIVES ASSESSMENT BOARD (COAB) BRIEFING.⁴⁴

⁴⁰ Lt Col David Denhard, OIF CENTCOM Assessments (J-8), interviewed by author, 5 February 2005; Murray interview, 1 March 2005.

⁴¹ *Operation Iraqi Freedom—By the Numbers*, 5.

⁴² SSgt Jerome Baysmore, CENTAF-Forward Public Affairs, "Army BCD Provides Vital Link Between Ground and Air Operations," 23 July 2004, on-line, Internet, 2 February 2005, available from http://www.arcent.army.mil/news/archive/2004_news/july/army_bcd.asp.

⁴³ Maj Stephen Murray, OIF USCENAF Chief, Operational Assessment Team, interviewed by author, 13 April 2005.

⁴⁴ Major David Dietrich, OIF USCENAF Representative to CENTCOM J-8, interviewed by author, 6 February 2005.

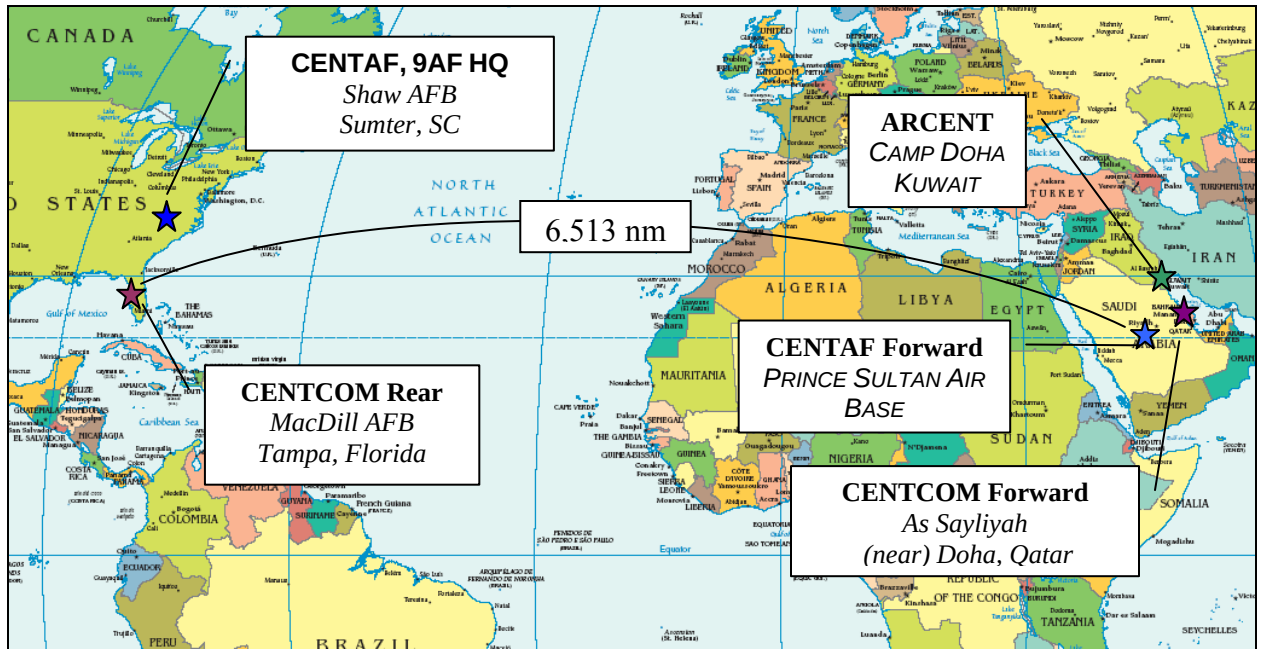


FIGURE 7. ASSESSMENT-RELATED ORGANIZATIONS DURING OIF

Section Summary

THE OAT WAS RESPONSIBLE FOR PROVIDING THE JFACC WITH ACTIONABLE, EFFECTS-BASED OPERATIONAL ASSESSMENT. TO ACCOMPLISH THIS TASK, THE TEAM DREW ON RESOURCES BOTH INSIDE AND OUTSIDE THE CAOC STRUCTURE. THESE RESOURCES MAINLY INCLUDED THE ISR/D AND ARCENT BCD WITHIN THE CAOC, AND THE CENTCOM J-2 AND J-8 DIRECTORATES OUTSIDE THE CAOC. HOWEVER, THE DIVERSE NATURE OF THE RESPECTIVE ORGANIZATIONAL STRUCTURES CREATED A COMPLICATED PATH FOR THE OAT TO NAVIGATE.

Organizational Influence on Operational EBA

THE STRATEGY DIVISION BEGAN OIF EAGER TO ACCOMPLISH EFFECTS-BASED ASSESSMENT, BUT BY THE END OF THE AIR CAMPAIGN, OAT MEMBERS RECOGNIZED THEY COULD NOT EVEN DO ATTRITION-BASED ASSESSMENT WELL. CAOC MANNING AND A STOVE-PIPED HIERARCHICAL STRUCTURE COMBINED TOGETHER WITH A MANDATED RELIANCE ON OUTSIDE ASSESSMENT, RESULTED IN A HAPHAZARD EBA PROCESS. THE FOLLOWING REVEALS THE ORGANIZATIONAL LIMITATIONS TO OIF AND FUTURE EBA EFFORTS.

Manning in the CAOC

ORGANIZATIONAL STRUCTURE INCLUDES MORE THAN SIMPLY HOW DIVISIONS, TEAMS AND CELLS ARE ARRANGED. ANALYSIS OF THE ORGANIZATIONAL INFLUENCE ALSO INCLUDES SOMETIMES OVERLOOKED FACTORS SUCH AS MANNING LEVELS. EVEN THE FINEST PLANS ARE DOOMED FOR FAILURE IF THERE ARE NOT ENOUGH PERSONNEL TO CARRY OUT THE MISSION. DURING OIF, THIS ASPECT OF THE ORGANIZATION CREATED DIFFICULT CHALLENGES THAT CAOC ANALYSTS NEVER COMPLETELY OVERCAME. IN SUM, MANNING LEVELS IN ONE CRITICAL PART OF THE CAOC HAMPERED EBA FOR MOST OF THE CAMPAIGN.

BY EARLY 2003, THE OAT WAS MANNED WITH MEMBERS HAND-PICKED BY THE TEAM CHIEF, MAJOR STEPHEN MURRAY.⁴⁵ THE OAT INITIALLY CONSISTED OF ABOUT FIFTEEN ANALYSTS, TARGETEERS AND REPRESENTATIVES, DEEMED BY MURRAY AS SUFFICIENT TO PROVIDE EFFECTIVE OPERATIONAL ASSESSMENT. UNFORTUNATELY, THIS WAS NOT THE CASE ELSEWHERE IN THE CAOC. THIS IS REFLECTED IN AN EXAMPLE THAT AROSE JUST OVER A WEEK INTO THE WAR.

ROUGHLY TWO DAYS AFTER OIF BEGAN, OAT MEMBERS NOTICED AN ALARMING DEVELOPMENT—A LACK OF TACTICAL ASSESSMENT DATA ON WHICH TO BASE THEIR ANALYSES. ACKNOWLEDGING THIS CRITICAL DEFICIENCY, THE OAT MOVED SEVERAL OF ITS ANALYSTS TO THE OPERATIONS FLOOR TO HELP WITH BASIC DATA COLLECTION. DUTIES INCLUDED RECORDING RADIO IN FLIGHT REPORTS (INFLTREPS) AND COMPILING INCOMING MISSION REPORT (MISREP) INFORMATION. THIS WAS A SHREWD AND NECESSARY ADJUSTMENT THAT UNFORTUNATELY OCCURRED TOO LATE IN THE CAMPAIGN TO MAKE ANY SUBSTANTIAL DIFFERENCE.⁴⁶

THE REASON FOR THIS FAILURE IN GATHERING AND COMPILING TACTICAL ASSESSMENTS IS THREE-FOLD. FIRST, THE PROCESS TO ACCOMPLISH THIS TASK WAS NOT PROPERLY PLANNED AND IMPLEMENTED.⁴⁷ ADDITIONALLY, AIRMEN DID NOT ADEQUATELY LEVERAGE TECHNOLOGY TO ENSURE TACTICAL ASSESSMENTS ENTERED THE CAOC IN A TIMELY AND EFFICIENT MANNER. THESE TWO ISSUES ARE DISCUSSED FURTHER IN LATER CHAPTERS. THE THIRD REASON STEMS FROM AN ORGANIZATIONAL DEFICIENCY. THE LACK OF ENOUGH TRAINED PERSONNEL ON THE CAOC OPERATIONS FLOOR TO ASSIMILATE THESE TACTICAL ASSESSMENT COMPONENTS REFLECTS AN OVERSIGHT IN THE IMPORTANCE OF THIS DATA TO THE EBA PROCESS. AS A RESULT OF THIS OVERSIGHT, THE OAT WAS FORCED TO

⁴⁵ Maj Murray had worked force bed down issues in theater since February 2002. Therefore, Col Allen Wickman moved Major Murray to AFFOR/A-3 for roughly thirty days leading up to the start of OIF to assist in deployment and bed down of CFACC forces. Unfortunately, since the team chief was not readily available to manage his team during this crucial time, the Ops Assessment Team was at a disadvantage as it prepared for the beginning of the air war; Maj Stephen Murray, USCENTAF Chief, Operational Assessment Team, interviewed by author, 15 January 2005.

⁴⁶ Note: During a strategy planning meeting at Shaw AFB (December 2002), Major Murray recommended CENTAF bring thirty data entry specialists to Shaw to familiarize themselves with the software application they intended to use during OIF. Unfortunately, this plan never materialized; Murray interview, 15 January 2005.

⁴⁷ Lt Col David Hathaway, OIF USCENTAF Chief Air Campaign Strategy, interviewed by author, 17 December 2005.

DEDICATE ANALYSTS TO THE OPERATIONS FLOOR IN A GATHER AND COMPILE MODE AND THEREFORE HAD LESS TIME TO ACCOMPLISH THEIR CHARTERED MISSION OF OPERATIONAL EBA.

IF THERE IS ONE CERTAINTY IN WAR, IT IS THAT EACH WAR IS UNIQUE. THEREFORE, IT IS EXTREMELY DIFFICULT, IF NOT IMPOSSIBLE, TO PREDICT THE PERFECT MANNING LEVELS IN WAR FIGHTING CONSTRUCTS SUCH AS THE CAOC. FURTHERMORE, THE MILITARY GENERALLY OPERATES UNDER THE MANTRA OF 'DOING MORE WITH LESS,' WHICH OFTEN INCLUDES PERSONNEL. AS SUCH, COMMANDERS WILL NORMALLY HAVE TO FIGHT WITH LESS TROOPS THAN THEY WOULD HOPE TO HAVE. THIS SAID, CAOC COMMANDERS AND TEAM CHIEFS ARE BEST POSITIONED TO MAKE PERSONNEL REQUESTS AND CHANGES. HAD CAOC LEADERSHIP FORESEEN THE INFORMATION BOTTLENECK THAT DEVELOPED ON THE OPERATIONS ROOM FLOOR, THEY COULD HAVE REMEDIED THE SITUATION EARLIER IN THE WAR BY MAKING PERSONNEL MOVES AND CHANGES.

Hierarchical Structure inside the CAOC

MANNING WAS NOT THE ONLY ISSUE TO PLAGUE OAT EFFORTS AT EBA. THE OAT WAS VERY RELIANT ON TIMELY AND SEAMLESS INFORMATION FLOW BETWEEN IT AND THE OTHER AGENCIES IN AND AROUND THE CAOC. UNFORTUNATELY, NOT ALL OF THESE AGENCIES WERE READY, ABLE, OR WILLING TO CONTRIBUTE TO THIS FLOW. THE VERY NATURE OF THE CAOC ORGANIZATIONAL STRUCTURE HINDERED THESE EFFORTS.

THE CAOC MIRRORS MOST MILITARY ORGANIZATIONAL STRUCTURES IN ITS HIERARCHICAL NATURE. TEAMS AND CELLS FORM DIVISIONS, WHICH ARE LED BY CHIEFS THAT REPORT TO A SINGLE COMMANDER. THIS TRIED AND TRUE ORGANIZATIONAL STRUCTURE IS INGRAINED IN MUCH OF THE MILITARY AND ADMITTEDLY MAINTAINS NOTABLE ADVANTAGES. AT A MINIMUM, PERSONNEL UNDERSTAND THEIR PLACE IN THE CAOC, WHAT THEY ARE RESPONSIBLE FOR AND WHO THEY REPORT TO. ADDITIONALLY, WITHIN TEAMS, CELLS, AND DIVISIONS, THIS STRUCTURE LENDS ITSELF TO EFFICIENT OPERATION. UNFORTUNATELY, NOT EVERY PROCESS REMAINS WITHIN A GIVEN TEAM OR DIVISION. IN FACT, MANY PROCESSES, SUCH AS OPERATIONAL ASSESSMENT, REQUIRE SEVERAL DIFFERENT DIVISIONS TO INTERACT ON A REGULAR BASIS.

IN ORDER TO ACCOMPLISH EBA, THE OAT FUSES A VAST AMOUNT OF DIFFERENT INFORMATION. INPUTS RANGE FROM AIRCRAFT COMBAT DAMAGE AND MUNITIONS EXPENDITURES TO OPEN-SOURCE MEDIA AND IMAGERY INTELLIGENCE. MUCH OF THE ASSESSMENTS THE OAT RELIES ON ORIGINATE IN THE COMBAT ASSESSMENT (CA) CELL WITHIN THE ISR/D. THE OAT MUST INTERACT WITH THIS CELL ON A REGULAR BASIS FOR TACTICAL ASSESSMENTS SUCH AS BATTLE DAMAGE ASSESSMENT (BDA), MUNITIONS EFFECTIVENESS ASSESSMENT (MEA), AND INPUTS TO MISSION ASSESSMENT (MA) TO ASSESS MOEs AND SIS ASSOCIATED WITH TACTICAL TASKS AND OBJECTIVES.⁴⁸ SINCE THIS

⁴⁸ The 2002 version of AFOTTP 2-3.2 was technically the publication that CAOC personnel would follow. However, many of the changes that are reflected in the 2004 AFOTTP 2-3.2 are already evident in the CAOC during OIF. The Targeting and BDA Team is roughly equivalent to the Targets/CA Team; AFOTTP 2-3.2, 13 December 2004, 6-46; AFOTTP 2-3.2, 25 October 2002, 32.

INFORMATION IS TIME CRITICAL AND OFTEN FLEETING, "OPERATIONAL ASSESSMENT RELIES ON A COOPERATIVE, COLLABORATIVE WORKING ENVIRONMENT."⁴⁹ THIS COOPERATIVE, COLLABORATIVE WORKING ENVIRONMENT ASSUMES THAT EACH ACTOR HAS THE SAME GOAL IN MIND, WHICH WAS NOT THE CASE DURING OIF.

ONE PERSPECTIVE MAINTAINS THAT THE CA CELL REMAINED FOCUSED ON A BASE-LEVEL BDA ANALYSIS. AS THE CA CELL PROCESSED THESE ASSESSMENTS, THEY COMPLETED JUST ENOUGH ANALYSIS TO PREPARE THEIR OWN PIECE OF THE PUZZLE—BDA. HOWEVER, CA ANALYSTS DID NOT LINK SPECIFIC TARGETS SETS BACK TO TACTICAL TASKS OR OBJECTIVES THAT COULD SUPPORT MEASUREMENT OF THE AIR COMPONENT'S OBJECTIVES. DUE TO THE OVERWHELMING AMOUNT OF ASSESSMENTS THE CA CELL HAD TO COMPLETE EACH DAY, THEY ESTABLISHED A TIME AT WHICH TO MOVE ON THE NEXT DAY'S BDA DATA.⁵⁰ THIS IMPEDED THE OAT'S ABILITY TO FUSE THE TACTICAL ASSESSMENTS INTO THE LARGER PICTURE OF HOW THE TARGET RESULTS CONTRIBUTED TO THE DESIRED EFFECTS. ACCORDING TO MURRAY, "OTHER FOLKS WERE NOT AWARE OF THE CFACC OBJECTIVES LET ALONE CONCERNED WITH ASSESSING THEM. WE WERE A PAIN IN THE BEHIND [TO SOME, OBSTRUCTING] WHAT FOLKS PERCEIVED AS THEIR REAL JOB."⁵¹ WHEN THE OAT COULD FINALLY COLLECT THE BDA ASSESSMENTS FROM THE CA CELL, THEY SPENT MOST OF THEIR TIME TRYING TO PIECE TOGETHER WHERE THE INFORMATION FIT INTO THE LARGER PICTURE OF WHETHER THE TARGETS STRUCK CONTRIBUTED TO THE DESIRED EFFECT. MANY CELLS REMAINED RUTTED IN ITS COMFORTABLE DIVISIONAL HIERARCHY, NOT RESPONSIVE TO THE INFORMATION DROUGHT ELSEWHERE IN THE CAOC. IN THIS CASE, INEFFICIENCIES IN THE CAOC STRUCTURE RESULTED IN STOVEPIPES OF INFORMATION THAT THE OAT COULD NOT TAP INTO WITHOUT AN INORDINATE AMOUNT OF EFFORT.⁵²

IT DID NOT TAKE LONG FOR THE JFACC TO REALIZE THAT CAOC ASSESSMENT EFFORTS WERE NOT WORKING SMOOTHLY. THE OVERALL PROCESS WAS WELL BEHIND THE PACE OF OPERATIONS, AND THE CAOC WAS NOT ORGANIZED TO MAKE UP FOR THE LAG. THEREFORE, ROUGHLY TWO WEEKS INTO THE WAR, MOSELEY DIRECTED A SIXTH DIVISION TO STAND UP IN THE CAOC—THE ANALYSIS AND ASSESSMENTS DIVISION. THE HEAD OF THE DIVISION, BRIGADIER GENERAL ALLEN PECK, REPORTED DIRECTLY TO MOSELEY. ACCORDING TO PECK, A MAIN PURPOSE OF THIS NEW DIVISION WAS TO FACILITATE AND INTEGRATE EFFORTS THROUGHOUT THE CAOC IN HOPES OF DELIVERING SOME USEABLE ASSESSMENT INFORMATION TO THE JFACC.⁵³ MOST OF THE OAT WAS MOVED TO THE NEW DIVISION, AS WERE SOME ANALYSTS FROM OTHER CAOC DIVISIONS. BY THE TIME THE NEW DIVISION GAINED MOMENTUM, MAJOR HOSTILITIES ENDED.⁵⁴

⁴⁹ Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-1.1, *Air & Space Strategy*, 9 Aug 2002, 40.

⁵⁰ Murray interview, 12 April 2005.

⁵¹ Murray interview, 15 January 2005.

⁵² Ibid.

⁵³ Brig Gen Allen Peck, OIF USCENTAF Chief, Assessment & Analysis Division, email to author, 9 February 05.

⁵⁴ Ibid; Murray interview, 15 January 2005.

AT FIRST GLANCE, CREATING YET ANOTHER HIERARCHICAL DIVISION IN THE CAOC IS THE LAST THING THE JFACC SHOULD HAVE DONE. INTERESTINGLY, IN HIS AFTER ACTION ANALYSIS, MOSELEY REJECTED THE IDEA OF MAKING THE ASSESSMENT DIVISION A PERMANENT PART OF THE CAOC STRUCTURE.⁵⁵ IN HINDSIGHT, THE FACILITATING ROLE THAT THIS PARTICULAR DIVISION PLAYED MAY BE THE EXCEPTION TO THE RULE. MOSELEY, PECK AND THE OAT UNDERSTOOD THE SIGNIFICANCE OF PIERCING DIVISIONAL BARRIERS ENOUGH TO GET INFORMATION FLOWING IN THE CAOC. THIS IDEA WAS THE IMPETUS OF A SIMILAR FACILITATING BODY NOW CODIFIED IN AFOTTP 2-3.2—THE PROCESS ASSESSMENT TEAM (PAT).

IN FUTURE CAMPAIGNS, THE PAT SHOULD HELP OVERCOME INHERENT DEFICIENCIES THAT ARISE WHEN MULTIPLE DIVISIONS IN THE CAOC ARE RESPONSIBLE FOR DIFFERENT COMPONENTS OF THE ASSESSMENT PIECE. COMPRISED OF A SMALL CADRE OF OPERATIONS RESEARCH ANALYSTS, THE PAT MUST BE EMPOWERED WITH ADEQUATE AUTHORITY, KNOWLEDGE, AND EXPERIENCE TO ENHANCE INFORMATION FLOW IN THE CAOC. THE EXPERIENCE AND KNOWLEDGE COMES FROM MANNING THE PAT WITH VETERAN ANALYSTS, WHILE THE AUTHORITY COMES FROM MAKING THE PAT LEADER ANSWER DIRECTLY TO THE CAOC DIRECTOR.⁵⁶ THE PAT BEGINS AFFECTING OPERATIONS EARLY IN THE CAMPAIGN PLAN BY DEVELOPING A PROCESS ASSESSMENT ANNEX TO THE JAOP THAT IDENTIFIES WHERE AND HOW DATA FLOWS THROUGHOUT THE CAOC.⁵⁷ MORE IMPORTANTLY, THIS PRODUCT PRESENTS CLEAR GUIDANCE TO ALL APPROPRIATE DIVISIONS AS TO THEIR RESPECTIVE PLACE IN THE OPERATIONAL ASSESSMENT PROCESS.

VASTLY RESTRUCTURING THE CAOC DUE TO INEFFICIENCIES IN THE OPERATIONAL ASSESSMENT PROCESS IS NOT REALISTIC OR PRACTICAL. HOWEVER, PROVIDING GUIDANCE AND DEFINING REQUIRED INTERACTIONS BETWEEN THE APPROPRIATE DIVISIONS IS REQUIRED. A BARRIER-BREAKING ENTITY SUCH AS THE PAT MAY NOT HAVE TOTALLY ENABLED EBA WITHIN THE CAOC DURING OIF, BUT IT CERTAINLY WOULD HAVE ADVANCED THE EFFORTS OF THE OAT TOWARD THEIR INITIAL GOAL OF PROVIDING EFFECTS-BASED ASSESSMENTS TO THE JFACC.

Command Relationships outside the CAOC

MANNING AND ORGANIZATIONAL STRUCTURE IN THE CAOC ARE INTERNAL TO THE AIR FORCE. HOWEVER, THEY WERE NOT THE ONLY FACTORS TO HAMPER EBA EFFORTS DURING OIF. COMMAND RELATIONSHIPS BETWEEN THE AIR COMPONENT AND THE JOINT FORCES COMMAND ALSO AFFECTED EBA IN THE CAOC. EXAMINING THE ISR PROCESS PROVIDES AN EXCELLENT POINT OF REFERENCE.

⁵⁵ Ibid.

⁵⁶ This particular command relationship may require further analysis. According to the CAOC Director, BG Dan Darnell, once the air campaign began, the director focused mainly on ATO execution and sortie generation. As a result, the JFACC worked directly with his Strategy Division for operational assessment; USAF Brigadier General Dan Darnell and RAF Air Commodore Chris Nickols, OIF USCENTAF CAOC Directors, interviewed by author, 22 January 2005; Hathaway interview, 17 December 2005.

⁵⁷ AFOTTP 2-3.2, December 2004, 3-83.

JFC Intelligence Directorate/J-2

TO ACCOMPLISH EBA, ASSESSORS REQUIRE TIMELY AND ACCURATE INTELLIGENCE. THE PRIMARY MEANS OF COLLECTION IS THROUGH TRADITIONAL ISR PLATFORMS.⁵⁸ DURING OIF, 80 MANNED AND UNMANNED ISR PLATFORMS COLLECTED 42,000 BATTLEFIELD IMAGES DURING 1,000 SORTIES.⁵⁹ ALTHOUGH THESE NUMBERS ARE IMPRESSIVE, THEY DO NOT REFLECT THE DILEMMA COMMANDERS FACED. THEY SIMPLY DID NOT HAVE ENOUGH PLATFORMS TO FEED THE ASSESSMENT PROCESS' VORACIOUS APPETITE FOR IMAGERY AND OTHER FORMS OF ASSESSMENT DATA. THEREFORE, THESE LOW DENSITY/HIGH DEMAND (LD/HD) PLATFORMS HAD TO BE PRIORITIZED.

JOINT PUBLICATION (JP) 3-60, *JOINT DOCTRINE FOR TARGETING*, STATES THAT "THE J-2 HAS THE PRIMARY RESPONSIBILITY FOR PRIORITIZATION OF INTELLIGENCE COLLECTION EFFORTS, ANALYSIS, VALIDATION, AND BDA FOR ALL JOINT OPERATIONS."⁶⁰ SINCE OIF WAS A JOINT CAMPAIGN, THE AIR COMPONENT FELL UNDER FRANK'S COMBINED FORCES. WITHIN THIS TYPE OF COMMAND STRUCTURE, INTERPERSONAL RELATIONSHIPS HOPEFULLY COMPENSATE FOR INHERENT INEFFICIENCIES IN THE ORGANIZATIONAL STRUCTURE. HOWEVER, WHEN RESOURCES BECOME SCARCE, THE SUBORDINATE BODY NORMALLY SUFFERS. THIS WAS INDEED THE CASE WHEN IT CAME TO ISR ASSETS.

IN DISCUSSING MANAGEMENT AND PRIORITIZATION OF ISR ASSETS, THE DOCTRINAL TERMINOLOGY IS COLLECTION MANAGEMENT AUTHORITY (CMA). ACCORDING TO JP 2-01, CMA "CONSTITUTES THE AUTHORITY TO ESTABLISH, PRIORITIZE, AND VALIDATE THEATER COLLECTION REQUIREMENTS, ESTABLISH SENSOR TASKING GUIDANCE, AND DEVELOP THEATER COLLECTION PLANS."⁶¹ JP 2-01 ADDS THAT THE THEATRE J-2 "RETAINS FULL MANAGEMENT AUTHORITY OVER ALL INTELLIGENCE COLLECTION REQUIREMENTS AGAINST TARGETS AND OBJECTIVES WITHIN THE [AREA OF RESPONSIBILITY] AOR, [BUT THAT] THIS AUTHORITY MAY BE DELEGATED TO A SUBORDINATE JFC."⁶² ACCORDING TO AFOTTP 2-3.2, "IN MOST CASES, DELEGATION OF COLLECTION MANAGEMENT AUTHORITY (CMA) WILL BE REQUESTED OF THE JFC/J-2 BY THE JFACC."⁶³

DURING OIF, THE JFC/J2 MAINTAINED CMA.⁶⁴ THE AIR COMPONENT WAS ABLE TO INPUT ISR REQUESTS AT THE DAILY JOINT COLLECTION MANAGEMENT BOARD (JCMB), BUT JFC/J2 ULTIMATELY DETERMINED COLLECTION REQUIREMENT PRIORITIES. DUE TO THE ADDITIONAL LAYER OF COMMAND AND CONTROL, THE COLLECTION PROCESS OFTEN TOOK TOO LONG TO PRODUCE INTELLIGENCE THAT WAS USEFUL FOR OPERATIONAL ASSESSMENT.⁶⁵ WITH CMA AT THE JFC/J2, THE ISR COLLECTION PROCESS

⁵⁸ A non-exhaustive list of traditional ISR platforms employed during OIF includes: Predator and Global Hawk UAV, RC-135 Rivet Joint, E-8 JSTARS, E-3 AWACS, and overhead national assets.

⁵⁹ *Operation Iraqi Freedom—By the Numbers*, 3.

⁶⁰ Joint Publication (JP) 3-60, *Joint Doctrine for Targeting*, 17 January 2002, III-7.

⁶¹ Joint Publication 2-01, *Joint Intelligence Support to Military Operations*, 20 November 96, GL-5.

⁶² *Ibid*, III-15.

⁶³ AFOTTP 2-3.2, 25 October 2002, 166.

⁶⁴ Murray interview.

⁶⁵ Colonel Mason Carpenter, OIF USCENTAF Chief, Strategy Division, interviewed by author, 7 December 2004.

WAS SIMPLY NOT NIMBLE ENOUGH TO MEET THE DEMANDS OF THE OAT, WHICH GREATLY DETRACTED FROM EBA IN THE CAOC.

THE JFC WILL NORMALLY APPOINT A JFACC FROM THE SERVICE THAT HAS THE "PREPONDERANCE OF THE ASSETS AND THE CAPABILITY TO COMMAND THEM."⁶⁶ THE JFC ENTRUSTS THE JFACC TO TARGET IN ORDER TO ACHIEVE COMBINED EFFECTS. AIR FORCE PLANNERS, THROUGH THE JAOP, HAVE DEMONSTRATED THEIR ABILITY TO CARRY OUT THIS CHARGE. IT FOLLOWS, THEN, THAT THE JFC SHOULD ALSO ENTRUST THE JFACC TO COLLECT ON BEHALF OF THE JFC. WITH AUTHORITY OVER HIS OWN ISR PLATFORMS, THE JFACC CAN ENHANCE EBA IN TWO WAYS. FIRST, HE CAN USE THESE RESOURCES TO GET AHEAD OF THE ENEMY BY COLLECTING FOR THE FUTURE. KNOWN AS INTELLIGENCE PREPARATION OF THE BATTLESPACE (IPB), THIS IMPORTANT EBA ENABLER HELPS PLANNERS AND ASSESSORS REFINE THEIR STRATEGY AND MORE PRECISELY FOCUS COLLECTION EFFORTS. THEN, THE JFACC CAN DEDICATE HIS ISR TO COLLECTING HISTORY (POST-STRIKE INTELLIGENCE) IN ORDER TO ASSESS EFFECTS HE IS ATTEMPTING TO ACHIEVE.⁶⁷ IN FUTURE CONFLICTS, TRADITIONAL ISR PLATFORMS WILL LIKELY BE IN HIGHER DEMAND THAN EVER BEFORE. WITHOUT AUTHORITY TO CONTROL THESE ASSETS, THE JFACC'S VISION OF THE BATTLEFIELD IS OBSCURED, A PREDICAMENT NOT CONDUCTIVE TO EBA.⁶⁸

EBA RELIES ON A VARIETY OF ASSETS TO HELP FEED THE ASSESSMENT PICTURE. A FEW ISR RESOURCES THAT WILL REMAIN UNDER THEIR COMPONENTS AUTHORITY ARE USMC F-18 E/F SHARED RECONNAISSANCE PODS (SHARP), US NAVY F-14 AND F-18 TACTICAL AERIAL RECONNAISSANCE PODS (TARPS), AND US ARMY HUMINT. FURTHERMORE, ALL OF COMPONENTS RELY ON NATIONAL SATELLITE ASSETS TO FEED THEIR RESPECTIVE ASSESSMENT PICTURES. TASKING AUTHORITY FOR THESE ASSETS WILL LIKELY REMAIN WITH AGENCIES SUCH AS THE NSA, CIA, NIMA, AND NAIC.⁶⁹ THUS, THE JFACC MUST ACCEPT A GREAT LEVEL OF RESPONSIBILITY WHEN THE JFC GRANTS CMA OVER THEATER ISR. IF THE OTHER THEATER AND NATIONAL COMPONENTS PERCEIVE THAT THE JFACC IS HOARDING ISR SOLELY FOR HIS PURPOSES, THE JFACC WILL LIKELY FIND IT DIFFICULT TO WORK WITH THESE COMPONENTS ON MANY ISSUES. SINCE THE JFACC RELIES ON ISR ASSETS OVER AND ABOVE THOSE UNDER HIS MANAGEMENT AUTHORITY, MISMANAGING THE ASSETS HE DOES CONTROL CAN NEGATIVELY IMPACT HIS OWN EBA EFFORTS.

THE IMPLICATIONS OF THIS PARTICULAR EXAMPLE ARE EVIDENT. EBA REQUIRES COORDINATION AND COOPERATION AMONG AGENCIES OUTSIDE THE CAOC AND EVEN THE COMPONENT. COMMAND

⁶⁶ Air Force Doctrine Document (AFDD) 2, *Organization and Employment of Aerospace Power*, 17 February 2000, 28.

⁶⁷ Michael Short, USAF Senior Mentor, interviewed by author, 4 January 2005.

⁶⁸ Given the inevitable condition of operating with limited ISR assets, a valid question of whether the JFC or, in this case, the JFACC, should have a more clear view of the battlefield. In fact, it is important for them both to have clear view of the battlefield. Scheduling limited ISR assets is a zero-sum venture; there is a constant battle of give and take between various collection requests. The JFC must recognize that the JFACC is best suited and best positioned to command these limited ISR assets. Similarly, the JFACC must also recognize that the JFC will sometimes trump the JFACC's ISR schedule with a priority tasking.

⁶⁹ Major Chance Saltzman, SAASS Student, interviewed by author, 29 March 2005.

RELATIONSHIP WILL CONTINUE TO BE AREAS OF CONTENTION, WHETHER THEY ARE CONDUCTIVE TO EBA OR NOT. AIRMEN MUST CONTINUE PUBLICIZING THE LIMITATIONS THAT CERTAIN COMMAND RELATIONSHIP HAVE ON THE ASSESSMENT PIECE. HOWEVER, IN THE MEAN TIME, AIRMEN MUST WORK HARD TO FOSTER STRONG INTERPERSONAL RELATIONSHIPS BETWEEN THEMSELVES AND THE AGENCIES THEY RELY ON FOR EBA.

Summary

THIS CHAPTER REVEALS SEVERAL KEY POINTS CONCERNING OPERATIONAL ASSESSMENT ORGANIZATIONAL CONSTRUCTS DURING OIF. ALTHOUGH THE RECOMMENDED AOC STRUCTURE AT THE BEGINNING OF OIF INCLUDED APPROPRIATE ASSESSMENT COMPONENTS, MANNING IN CERTAIN CRITICAL AREAS PROVED DETRIMENTAL TO OPERATIONAL ASSESSMENT. WHEN ANALYZING HOW SOME OF THE CAOC COMPONENTS INTERACTED, THE HIERARCHICAL, PARTITIONED CAOC STOVE PIPED STRUCTURE HINDERED INFORMATION FLOW BETWEEN DIVISIONS, TEAMS, AND CELLS. FINALLY, CERTAIN COMMAND RELATIONSHIPS AND AUTHORITIES ACROSS THE COMPONENTS FURTHER HAMPERED EBA IN THE CAOC.

ORGANIZATIONAL STRUCTURES MOST CERTAINLY AFFECT OVERALL PERFORMANCE, BUT THEY ARE NOT THE SOLE CAUSE OF PROCESS INEFFICIENCIES. THE PROCESSES THAT RESIDE WITHIN THESE ORGANIZATIONS MUST BE ABLE TO ADAPT TO CHANGING DYNAMICS, ESPECIALLY IN A HIGH STAKES SITUATION SUCH AS COMBAT. THE FOLLOWING CHAPTER REVEALS SOME OF THE CHALLENGES EFFECTS-BASED ASSESSORS FACED DUE TO PROCESSES DURING OIF.

Chapter 3

Doctrine, Tactics, Techniques, and Procedures

Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.

—Guilio Douhet

Doctrine guides and instructs airmen in their particular mission. According to AFDD 1, *AF Basic Doctrine*, there are three categories of doctrine: basic, operational, and tactical doctrine. Basic doctrine “states the most fundamental and enduring beliefs that describe and guide the proper use, presentation, and organization of air and space forces in military action.”⁷⁰ Operational doctrine “described more detailed organization of air and space forces and applies the principles of basic doctrine to military actions” and is codified in Air Force operational tactics, techniques, and procedures (AFOTTP).⁷¹ Finally, tactical doctrine “describes the proper employment of specific Air Force assets, individually or in concert with other assets, to accomplish detailed objectives” and is codified in Air Force tactics, techniques, and procedures (AFTTP).⁷² Assessors not equipped with doctrine will have greater difficulty accomplishing EBA in an OIF-type war.

This chapter examines five distinct examples to reveal where doctrine was lacking, insufficient, or not conducive in guiding and instructing assessors in the EBA process. First, EBA doctrine associated with the OAT was insufficient in that it described what to do, but fell short of explaining how to do it. Second, doctrine that

⁷⁰ Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, 17 November 2003, 7-8.

⁷¹ Ibid.

⁷² Ibid, 8.

could have closed the rift between the OAT and the ISRD was all but non-existent. The final three examples—ATO tracking, MISREPS and INFLTREPS, and the ISR process illustrate processes that suffered from a lack of doctrinal guidance. The findings in this chapter are significant for determining changes required if EBA is to succeed in future OIF-type wars.

Doctrine & Process in the OAT

WITH RESPECT TO EBA, ANALYSTS IN THE OAT HAD A SOLID GRASP ON WHAT TO DO. IN FACT, THE STRATEGY DIVISION HAD SOME EFFECTS-BASED SUCCESSSES. AN EXCELLENT EXAMPLE OF THIS IS IN THE SEAD/DEAD CAMPAIGN OVER BAGHDAD. IN ORDER TO STRIKE TARGETS IN AND AROUND BAGHDAD, COALITION AIRCRAFT WOULD HAVE TO PENETRATE A ROBUST THREAT ARRAY COMPRISED OF RADAR-GUIDED SURFACE-TO-AIR (SAM) MISSILES AND ANTI-AIRCRAFT ARTILLERY (AAA). MOSELEY RELIED ON F-16 CJ FIGHTERS, EQUIPPED WITH HARM MISSILES, TO NEUTRALIZE THESE THREATS. HOWEVER, MERELY KEEPING ENEMY TRANSMITTERS TURNED OFF WAS NOT ENOUGH. INSTEAD, MOSELEY WANTED THE ASSURANCE THAT THEY COULD NOT TURN ON IN THE FUTURE. THEREFORE, HE OPTED FOR DESTRUCTION OF IRAQI SAM SITES. STRATEGISTS SELECTED SEVERAL DIFFERENT MOES TO HELP THEM MEASURE HOW EFFECTIVE THE STRATEGY WAS. THE FIRST, AND MOST OBVIOUS, WAS TO MEASURE HOW MANY TIMES THE ENEMY RADAR SITES TRANSMITTED AND FIRED. A SECOND INDICATOR WAS THE NUMBER OF HARM MISSILES EMPLOYED AGAINST THESE SITES. A FINAL INDICATOR WAS TO ASSESS INTELLIGENCE SOURCES ON RECENTLY ATTACKED SITES.

TO MINIMIZE RISK, THE F-16 CJS INITIALLY REMAINED SAFELY OUTSIDE THE SAM THREAT. HOWEVER, SEVERAL DAYS INTO THE CAMPAIGN, MOE ANALYSIS REVEALED VERY FEW HARM SHOTS OR SAM KILLS. PREDICTABLY, THE IRAQI OPERATORS WERE REMAINING OFF THE AIR, KNOWING THAT THE HARM REQUIRES A RADAR SIGNAL TO ACCURATELY HOME TO THEIR SITE. IN SUM, THE MEASURES OF EFFECTIVENESS WERE NOT BEING MET. THIS EFFECTS-BASED ASSESSMENT WARRANTED A CHANGE TO THE WAYS AND MEANS TO THE SAME DESIRED OPERATIONAL END STATE OF NEUTRALIZING THE SAM THREAT IN BAGHDAD.

DEDUCING THAT THE IRAQI MISSILE OPERATORS WERE RESTRAINED FROM FIRING UNTIL COALITION AIRCRAFT PIERCED A GIVEN RANGE, CENTAF PLANNERS ADOPTED A DECEPTION PLAN TO LURE THE OPERATORS INTO TURNING THEIR TRANSMITTERS ON. THE BAIT CENTAF SELECTED WERE SEVERAL UNMANNED PREDATOR DRONES THAT HAD REACHED THEIR USEFUL SERVICE LIFE. WITH THE F-16 CJS STILL SAFELY ORBITING OUTSIDE THE THREAT ENVELOPES, PREDATOR OPERATORS FLEW THE DRONES DIRECTLY INTO THE THREAT ARRAY, EFFECTIVELY BAITING THE OPERATORS INTO TURNING ON THEIR TRANSMITTERS. THE F-16S WERE THEN ABLE TO FIRE THEIR HARM MISSILES WITH A MUCH HIGHER PROBABILITY OF SUCCESS. THIS ONE EXAMPLE SHOWS HOW EBA HELPED CENTAF TO ACHIEVE

ONE OF THEIR TOP OBJECTIVES OF GAINING AND MAINTAINING AIR SUPERIORITY IN BAGHDAD.⁷³ IT ALSO SHOWS ONE EXAMPLE WHERE DESPITE A DOCTRINAL DEFICIENCY IN THE AREA OF EBA, STRATEGISTS AND ANALYSTS STILL ENJOYED SOME EFFECTS-BASED SUCCESS. HOWEVER, THE FACT REMAINS THAT SD PLANNERS AND ASSESSORS HAD LIMITED DOCTRINAL GUIDANCE WITH RESPECT TO EBA. A BRIEF LOOK INTO THE DOCTRINAL DOCUMENT THAT IS MEANT TO TRANSLATE GUIDANCE INTO PRACTICE BRINGS THIS POINT TO LIGHT.

DOCTRINE DOCUMENTS DESCRIBE WHAT TO DO AND PROVIDE GUIDANCE ON HOW TO DO IT. IN THE AIR FORCE, THE PROCESSES THAT TRANSLATE DOCTRINE TO ACTION ARE FOUND IN AIRCRAFT SPECIFIC 'DASH 1' TECHNICAL ORDERS (T.O.) AND AIR FORCE TACTICS, TECHNIQUES, AND PROCEDURES (AFTTP) MANUALS. ALTHOUGH SOME DIVISIONS ENJOYED EXTENSIVE DETAIL IN THEIR RESPECTIVE SECTIONS OF THE AOC DASH 1, THE OAT WAS NOT ONE OF THEM. SECTION IV, MISSION CREW DUTIES AND PROCEDURES, OF THE AOC DASH ONE OUTLINES DUTIES AND RESPONSIBILITIES FOR THE SEVEN MAJOR FUNCTIONAL AREAS WITHIN THE OAT, THEREBY PROVIDING A FIRM GRASP ON WHAT TO DO WITH RESPECT TO OA. HOWEVER, THE PROCEDURES TO TRANSLATE THE ROLES AND RESPONSIBILITIES INTO ACTION WERE NOT CODIFIED IN DOCTRINE AT THE TIME OF OIF. INSTEAD, 'ADD THE CHECKLIST' BANNERS STOOD IN PLACE OF THE PROCEDURES SECTION OF EACH OAT FUNCTIONAL AREA, SIGNIFYING A SECTION THAT DESPERATELY AWAITED FURTHER REVISION.⁷⁴ ANY SUCCESS THAT THE OAT HAD AT PROVIDING EFFECTS-BASED OPERATIONAL ASSESSMENT RESULTED FROM PAST EXPERIENCE THEY ACCRUED AND SHEER DETERMINATION.

AIR FORCE LEADERSHIP TAKES GREAT PRIDE IN EQUIPPING AIRMEN SUFFICIENTLY FOR ANY MISSION THEY TACKLE. IT IS ONE REASON THE US RIGHTFULLY CLAIMS THE SINGLE STRONGEST AIR FORCE IN THE WORLD. THE EQUIPMENT AIRMEN CARRY INTO BATTLE IS NOT LIMITED TO THE WEAPONS SYSTEMS THEY EMPLOY. IN FACT, THE DOCTRINE AND PROCESSES THAT ENABLE THE AIRMEN ARE EVERY BIT AS IMPORTANT AS THE JETS, BOMBS, AND BULLETS. UNFORTUNATELY, OIF PROVED THAT NOT EVERY AIRMAN IS ALWAYS EQUIPPED TO ACCOMPLISH THEIR MISSION. EBA REQUIRES THE SUCCESSFUL INTEGRATION OF MANY MOVING PARTS. WITHOUT THE PROCESSES TO GUIDE THEM, OAT ASSESSORS WERE POORLY EQUIPPED TO ACCOMPLISH EBA DURING OIF. THESE PROCESSES MUST BE CODIFIED AND TAUGHT TO AIRMEN IN ORDER TO INCREASE THE CHANCE OF SUCCESS FOR FUTURE ATTEMPTS AT EBA.

ISR Division

ALTHOUGH OAT ASSESSORS DID ENJOY SOME EBO SUCCESSES DURING OIF, CUTTING THEIR EFFECTS-BASED TEETH DURING THIS PARTICULAR CAMPAIGN PROVED TO BE A DAUNTING TASK. AS THE STRATEGY DIVISION REALIZED, THE OPERATIONAL ASSESSMENT PROCESS INCLUDED MANY MORE ENTITIES OUTSIDE THE STRATEGY DIVISION. ONE SUCH ENTITY WAS THE ISR DIVISION (ISR D).

⁷³ Lt Col David Hathaway, OIF USCENAF Chief, Air Campaign Strategy, interviewed by author, 17 December 2005.

⁷⁴ *TO AN/USQ-163-1, Block 10, Version 1-0, Revision 7, 26 November 2002, 4-60 to 4-61.*

FURTHERMORE, EVERYONE INVOLVED MUST WORK TOGETHER IF EBO AND ITS ASSESSMENT COMPONENT ARE TO SUCCEED AT ALL. HOWEVER, WHEN DOCTRINE IS NOT IN PLACE TO GUIDE THE INTERACTIONS BETWEEN DIFFERENT ENTITIES, THE END RESULTS ARE NOT POSITIVE.

ACCORDING TO AFOTTP 2.3.2, ONE OF THE ISR DIVISION'S RESPONSIBILITIES IS TO SYNCHRONIZE ISR ACTIVITIES AND REQUIREMENTS TO ASSIST IN OPERATIONAL ASSESSMENT.⁷⁵ THE OAT RELIED ON THE ASSESSMENT PRODUCTS OF SEVERAL TEAMS WITHIN THE ISRD ON WHICH TO BUILD THE EFFECTS-BASED OA PICTURE. UNFORTUNATELY, THE ISRD AND THE OAT WERE NOT IN SYNC WITH RESPECT TO EBA. ACCORDING TO MURRAY, "THE CA TEAM VIEWED THE OAT AS A CUSTOMER OF THEIR INFORMATION RATHER THAN ANOTHER STEP IN THE CHAIN TAKING THEIR DATA TO THE NEXT LEVEL AND LINKING IT BACK TO THE CFACC'S ULTIMATE STRATEGY. ADDITIONALLY, THE INFORMATION FLOW WAS ALL PULL AND NO PUSH. THE OAT WAS REQUIRED TO SEEK OUT INFORMATION VERSUS THE INFORMATION AUTOMATICALLY FLOWING INTO THE OAT."⁷⁶ IN SUM, THE PROCESSES WERE NOT ESTABLISHED TO INFLUENCE THE VITAL LINK BETWEEN THE ISRD AND THE OAT.

VALID LOWER LEVEL ASSESSMENTS ARE A VITAL COMPONENT OF EBA (SEE COMBAT ASSESSMENT, APPENDIX A). IN THE CAOC, THE ISRD IS LARGELY RESPONSIBLE FOR THESE ASSESSMENTS. HOWEVER, EVEN IF THE ISRD HAD BEEN INTERESTED IN SUPPORTING EFFECTS-BASED OPERATIONAL ASSESSMENT, THEY WOULD HAVE HAD TROUBLE FINDING PROCESSES CODIFIED IN DOCTRINE TO GUIDE THEIR ACTIONS. IN FACT, IT IS DIFFICULT TO FIND ANY REFERENCE TO EBA WITHIN ISRD SECTIONS OF AFOTTP 2-3.2 OR THE AOC DASH 1.⁷⁷ THIS IS NOT TO SAY THAT THE ISRD WAS DEFICIENT IN THEIR RESPONSIBILITY TO COMPLETE CA. HOWEVER, THE DOCTRINAL DIRECTION TO INFLUENCE ENOUGH INTEGRATION WITH THE OAT TO ENABLE EBA WAS DEFINITELY LACKING.

ONCE THE ISRD ACCOMPLISHED CA, THEY STILL HAD TO REPORT THEIR FINDINGS IN A FORMAT THAT ENABLED THE OAT TO ACCOMPLISH EBA. IN REALITY, THIS DID NOT OCCUR. IN ALL FAIRNESS TO THE ISRD, THE RAPIDLY PROGRESSING AIR WAR WREAKED HAVOC ON THEIR ATTEMPTS TO KEEP PACE WITH THE OPERATIONS TEMPO. REGARDLESS, THE OAT SPENT MORE TIME TRYING TO COLLECT, COMPILE, AND CORRELATE ASSESSMENTS FROM THE ISRD THAN THEY DID AT USING THESE ASSESSMENTS TO MEASURE STRATEGIC EFFECTIVENESS. IN THIS EXAMPLE, CLEAR DOCTRINAL GUIDANCE COULD HAVE NARROWED THE RIFT BETWEEN THE OAT AND THE ISRD DESCRIBED IN THE PREVIOUS CHAPTER.

ELSEWHERE IN THE ISRD, OTHER PROCESSES WERE EQUALLY LACKING WITH RESPECT TO EBA. IN DESCRIBING THE BDA PROCESS, THE DEPUTY, CHIEF TARGETS FROM THE CENTAF ISRD HIGHLIGHTS ANOTHER EFFECTS-BASED DOCTRINAL DEFICIENCY. BY DESIGN, AN 'ATO FOLLOWER' WAS

⁷⁵ Air Force Operational Tactics, Techniques and Procedures (AFOTTP) 2-3.2, *Air and Space Operations Center*, 25 October 2002, 4.

⁷⁶ Maj Stephen Murray, OIF USCENAF Chief, Operational Assessment Team, interviewed by author, 1 March 2005.

⁷⁷ It is important to note that the AFOTTP 2-3.2 referred to in this case was in its first edition during OIF. Admittedly, it is not entirely realistic to expect that document would include tried and true procedural guidance.

TO CORRELATE ACTUAL AIRCRAFT SORTIES AGAINST THE RESPECTIVE ATO. THE CAOC BDA TEAM WOULD THEN FORWARD THAT INFORMATION TO THE BDA ASSESSMENT TEAM AT CENTCOM TWICE PER DAY. THE CENTCOM ANALYSTS WOULD TASK AND ASSESS INTELLIGENCE DATA AND REPORT THEIR FINDINGS BACK TO THE CAOC. OF NOTE, THIS NARROWLY SCOPED DESCRIPTION NEVER MENTIONS THE EFFECTS-BASED, OPERATIONAL ASSESSMENT PROCESS THAT RELIES ON THE BDA ASSESSMENTS IT IS PRODUCING. THE BDA TEAM AND CENTCOM WERE MOST CERTAINLY DOING THEIR VERY BEST TO PRODUCE TIMELY, ACCURATE, AND ACTIONABLE TACTICAL ASSESSMENTS. HOWEVER, THE PROCESS THEY SO VIGOROUSLY EXERCISED DID NOT INCLUDE THE ONE CUSTOMER IN THE CAOC THAT NEEDED THEIR PRODUCT TO ENABLE EBA.⁷⁸

IF LOWER LEVEL ASSESSMENTS ARE NOT AVAILABLE, THE EFFECTS-BASED ASSESSOR MAY RESORT TO MORE DEDUCTIVE METHODS. ONE SUCH METHOD INVOLVES TRACKING ATO SCHEDULED SORTIES, AND THEN BROADLY INTERPRETING EFFECTS BY COMPARING REPORTED SORTIES FLOWN TO A PLANNED ALLOCATION OF EFFORT.⁷⁹ FOR EXAMPLE, IF EVERY CLOSE AIR SUPPORT (CAS) SORTIE FLEW ON THE ATO, THE ANALYST CAN DEDUCE WITH SOME LEVEL OF CERTAINTY THAT THE JFACC IS PROVIDING THE REQUIRED AMOUNT OF CAS SUPPORT TO THE JFACC. AS EBA EFFORTS HOPELESSLY UNRAVELED, OIF ASSESSORS FELL BACK TO THIS DEDUCTIVE METHODOLOGY. UNFORTUNATELY, WHEN ASSESSORS ATTEMPTED TO TRACK THE ATO, THEY FOUND VERY LITTLE USEFUL DATA. IN THE NEXT EXAMPLE, THE PROCESS THAT TRANSLATES DOCTRINAL GUIDANCE INTO PRACTICE DID NOT SUPPORT EBA EFFORTS.

ATO Tracking

TO UNDERSTAND ONE REASON WHY THE ATO TRACKING PROCESS WAS SO TAXED DURING OIF, ONE MUST ONLY COMPARE OIF TO TWO MAJOR AIR WARS THAT PRECEDED IT—DESERT STORM AND ALLIED FORCE. RELATIVE TO OIF, DESERT STORM AND ALLIED FORCE WERE PREDOMINATELY FIXED-TARGET WARS. DESERT STORM AND ALLIED FORCE AIRCREW GENERALLY ATTACKED TARGETS THAT HAD BEEN ASSIGNED VIA THE ATO. OIF, HOWEVER, WAS FAR FROM A FIXED-TARGET WAR. WHEN IRAQI FREEDOM BEGAN ON MARCH 19TH, IT PROGRESSED AT A FEVERISH PACE. IN JUST THIRTY-ONE DAYS, COALITION AIRCRAFT FLEW 41,404 SORTIES, AT A DIZZYING AVERAGE RATE OF 1,335 SORTIES PER DAY.⁸⁰ ACCORDING TO ONE F-117 PILOT, HIS SQUADRON RAN OUT OF FIXED TARGETS AFTER ONLY

⁷⁸ Maj Charles Hogan, OIF USCENAF Deputy Chief, Targets, interviewed by author, 15 January 2005.

⁷⁹ Notable voices maintain poor ATO sortie tracking is the root cause of OIF assessment failures and that without an accurate recount of executed sorties, no assessment process can succeed. The author acknowledges this perspective, but wishes to make the following distinctions. ATO tracking is but one component of the tactical assessment that ultimately creates operational assessment. It is an extremely important component, but it is not the single lynchpin of success. Furthermore, the pure effects-based assessor is more interested in the indirect (desired) effect than he is in the direct effect. From this extreme perspective, ATO tracking becomes less important to the overall EBA process.

⁸⁰ *Operation Iraqi Freedom—By the Numbers*, USCENAF Assessment and Analysis Division (Prince Sultan Air Base, Saudi Arabia: USCENAF, April 2003), 7-8.

THREE DAYS OF BOMBING.⁸¹ OF THE NEARLY 20,000 DESIRED MEAN POINTS OF IMPACT (DMPIS) STRUCK, OVER 15,000 (79%) OF THEM WERE ASSOCIATED WITH KILL BOX OPERATIONS OR CLOSE AIR SUPPORT.⁸² SINCE THE ATO DID NOT TIE THESE AIRCRAFT TO A SPECIFIC DMPI OR EVEN TARGET SET, THE CAOC HAD TROUBLE KEEPING TRACK OF WHERE EACH PARTICULAR FLIGHT ACTUALLY ENDED UP. TO FURTHER COMPLICATE THE SITUATION, NEARLY 80% OF ALL SCHEDULED AIRCRAFT RECEIVED THEIR TASKINGS AFTER TAKEOFF. FEW, IF ANY OF THE CAOC ASSESSORS UNDERSTOOD THE MAGNITUDE OF THE TASK BEFORE THEM ON MARCH 19TH, 2003. AS THE OPERATIONS TEMPO ACCELERATED, ANALYSTS STRUGGLED TO CONSOLIDATE A SIMPLE HISTORY OF THE PAST ATO. UNABLE TO COBBLE TOGETHER THIS INFORMATION, CAOC ANALYSTS COULD NOT EVEN REPORT WITH CONFIDENCE HOW MANY SORTIES HAD FLOWN THE PREVIOUS DAY.⁸³ INDEED, THE NATURE OF OIF PLACED GREAT STRAINS ON THE ATO TRACKING PROCESS.

DEDUCING PROGRESS TOWARDS OPERATIONAL OBJECTIVES THROUGH ATO TRACKING RELIES ON SEVERAL ASSUMPTIONS. FIRST, THE INITIAL STRATEGY MUST BE APPROPRIATE FOR THE SITUATION. SECOND, THE STRATEGY MUST BE SUFFICIENTLY EXECUTED. FINALLY, THE ENEMY MUST COOPERATE. SINCE ANY ONE OF THESE ASSUMPTIONS CAN GREATLY AFFECT THE OUTCOME OF THE ASSESSMENT—TO USE ATO TRACKING DATA AS THE PRIMARY MEANS OF ASSESSMENT IS NOT OPTIMAL. HOWEVER, WHEN ANALYSTS CANNOT FIND ANY OTHER USEABLE INTELLIGENCE ON WHICH TO BASE THEIR ASSESSMENTS, THEY MUST FALL BACK TO MORE BASIC MEANS. IN FUTURE WARS, ASSESSORS MAY BE FORCED TO RELY ON THE DEDUCTIVE METHODOLOGY DESCRIBED HEREIN. THEREFORE, A SOLIDIFIED PROCESS THAT ENSURES ACCURATE SORTIE TRACKING IS ESSENTIAL IF EBA IS TO SUCCEED IN THOSE WARS. DURING OIF, THE ATO TRACKING PROCESS WAS NOT CONDUCIVE TO EBA EFFORTS. UNFORTUNATELY, IT WAS NOT THE ONLY PROCESS THAT FIT INTO THIS UNDESIRABLE RUBRIC.

MISREPS and INFLTREPS

THREE MONTHS AFTER OIF, MAJOR GENERAL CHARLES CROOM, THE AIR FORCE DIRECTOR OF C4ISR INFRASTRUCTURE, VOICED A COMMONLY ACCEPTED PERSPECTIVE OF THE USAF IN THE INFORMATION AGE. "THE AIR FORCE IS DROWNING IN INFORMATION AND STARVING FOR KNOWLEDGE."⁸⁴ THIS FAMILIAR QUIP DESCRIBES A SERVICE THAT IS OVERLOADED BY DATA, BUT CANNOT MAKE SENSE OF WHAT THE DATA MEAN. FOR OIF ANALYSTS IN THE CAOC, THIS WAS HARDLY THE CASE.

IN ORDER FOR ANALYSTS TO PROVIDE OPERATIONAL-LEVEL EBA, THEY NEED TIMELY AND ACCURATE TACTICAL ASSESSMENTS ON WHICH TO BUILD THIS ANALYSIS (SEE APPENDIX B).⁸⁵

⁸¹ Major Steve Ankerstar, SAASS Student, interviewed by author, 21 January 2005.

⁸² *Operation Iraqi Freedom—By the Numbers*, 5.

⁸³ Hathaway interview.

⁸⁴ Major General Charles E. Croom Jr., "Warfighting Integrator," *Military Information Technology: Online Edition*, Vol 7, Issue 6, 9 August 2003, on-line, Internet, 28 January 2005, available from http://www.military-information-technology.com/print_article.cfm?DocID=166.

⁸⁵ RAF Air Commodore Chris Nickols, OIF CAOC Director, interviewed by author, 22 January 2005.

INFLTREPS, WEAPON SYSTEM VIDEO (WSV), AND MISREPS ARE TRADITIONAL SOURCES FOR THESE LOWER LEVEL ASSESSMENTS. DUE TO THE PREPONDERANCE OF LAUNCH-AND-FORGET MUNITIONS EMPLOYED DURING OIF, ASSESSORS COULD NOT LEVERAGE WSV FROM THE ATTACKING AIRCRAFT AS THEY DID DURING PREVIOUS WARS.⁸⁶ THEREFORE, INFLTREPS AND MISREPS WOULD HAVE TO TAKE UP THE SLACK.

REPORTS MAY BE DELIVERED WHILE AIRBORNE OR AFTER LANDING, AS INFLTREPS OR MISREPS, RESPECTIVELY. FOR OBVIOUS REASONS, IT IS VITAL TO RECORD THIS INFORMATION WHILE IT IS FRESH IN THE AIRCREWS' MINDS. UNFORTUNATELY, THE CAOC PROCESS WAS NOT ADEQUATE TO COLLECT AND COMPILE ANY OF THIS VALUABLE AND PERISHABLE INFORMATION. IN-FLIGHT REPORTS WERE LACKING FOR SEVERAL REASONS. FIRST, AIRCREW OFTEN FAILED TO PASS ON A REPORT. SOME OF THIS MAY CERTAINLY BE ATTRIBUTED TO THE EXTENSIVE KILL BOX OPERATIONS AIRCREWS EXECUTED. OTHERS JUST FILLED THE SQUARE WITH THE FUTILE PHRASE, "NOTHING TO REPORT." STILL OTHERS WHO DID ATTEMPT TO CALL IN OFTEN FOUND IT DIFFICULT OR IMPOSSIBLE TO FIND AN ASSESSOR ATTENDING THE DEDICATED RADIO FREQUENCY.⁸⁷

IF AIRCREW DID NOT PASS MISSION DETAILS VIA THE INFLTREP, THEY WERE EXPECTED TO DO SO IN THE MISREP. THIS PROCESS ALSO PROVED TO BE A MAJOR FAILURE. AFTER THE FIRST TWENTY-FOUR HOURS, THE CAOC RECEIVED 20% OF THE EXPECTED MISREPS FROM THE FIRST ATO.⁸⁸ WHEN THIS NUMBER FINALLY INCREASED, THE REAL TROUBLE BEGAN. THE ISRD PUBLISHED THE THEATER INTELLIGENCE REPORTING DIRECTIVE (TIRD; AFFECTIONATELY REFERRED TO AS THE 'TURD') AS THE SINGLE SOURCE DOCUMENT TO DIRECT SUBORDINATE UNIT REPORTING. UNFORTUNATELY, IT ALLOWED UNITS TO REPORT IN FREE-TEXT FORMAT, THUS MAKING IT VERY DIFFICULT (IF NOT IMPOSSIBLE) TO AUTOMATICALLY MERGE THESE MISREPS INTO A CENTRAL DATABASE.⁸⁹ BY ONE ACCOUNT, NO LESS THAN FIVE DIFFERENT MISREP FORMATS FLOWED INTO THE CAOC FROM VARIOUS WINGS AND SQUADRONS.⁹⁰ COLLECTION ANALYSTS THEN HAD TO COLLATE THE REPORTS INTO A USABLE PRODUCT, WHICH NORMALLY ENTAILED MANUALLY RETYPING INFORMATION INTO A CENTRAL DATABASE. FINALLY, SOME OF THE MOST VALUABLE MISREPS WERE FROM BOMBER SORTIES THAT HAD DROPPED DOZENS OF

⁸⁶ Of the roughly 30,000 munitions coalition aircraft employed during OIF, over 18,000 of them were either guided 'launch and forget' or unguided weapons. Furthermore, over 6,000 of the nearly 20,000 guided munitions dropped were some version of the Joint Direct Attack Munitions (JDAM). Since these weapons do not require in flight designation refinements, it is not necessary to view the target during the weapon time of flight. Thus, there is no weapons system video (WSV) to use for assessment purposes, effectively eliminating an excellent source of assessment information. Forecasting this challenge, the OAT wisely implemented predictive assessment techniques for weapons like JDAM. Using historical data, assessors applied proven hit rate data to make informed predictions of effects until more reliable information confirmed their forecast. *Operation Iraqi Freedom—By the Numbers*, USCENTAF Assessment and Analysis Division (Prince Sultan Air Base, Saudi Arabia: USCENTAF, April 2003), 11; USAF Brigadier General Dan Darnell, OIF CAOC Director, interviewed by author, 22 January 2005.

⁸⁷ Nickols interview.

⁸⁸ Colonel Mason Carpenter, OIF USCENTAF Chief, Strategy Division, interviewed by author, 7 December 2004.

⁸⁹ This issue is further discussed in Chapter 4, Technology; Murray interview.

⁹⁰ Hogan interview, 15 January 2005.

PRECISION WEAPONS SUCH AS JOINT DIRECT ATTACK MUNITION (JDAM). SINCE MANY OF THESE BOMBERS LANDED BETWEEN 12-20 HOURS AFTER THEIR ATTACK, THE NEXT DAY'S ATO WAS ALREADY IN ITS EXECUTION PHASE. IN MANY CASES, THE BEST THE AIRCREW COULD DO WAS REPORT THAT THE COORDINATES INPUT INTO THE GUIDED WEAPON WERE CORRECT. THIS LACK OF REPORTS LIMITED THE INTELLIGENCE ON WHICH THE OAT COULD BASE OPERATIONAL ASSESSMENTS. IN SUM, A LACK OF PREPAREDNESS IN THE CAOC AND POOR PERFORMANCE BY THE AIRCREW AND WING INTELLIGENCE PERSONNEL GREATLY REDUCED TACTICAL ASSESSMENTS FROM INFLTREPS AND MISREPS.

THERE ARE TWO MAIN WAYS TO ENSURE THE INFLTREPS AND MISREP PROCESSES DO NOT FAIL IN FUTURE WARS: STANDARDIZE AND ENFORCE THE REPORTING PROCEDURES. FIRST, EVERY AIRMAN IN THE PROCESS, FROM THE PILOTS IN THE AIRCRAFT TO THE UNIT INTELLIGENCE OFFICER, MUST USE ONE COMMON REPORTING FORMAT. THIS FORMAT INCLUDES THE TYPE AND ORDER OF INFORMATION THE PILOT REPORTS, TO THE MANNER IN WHICH THE UNIT TRANSMITS IT TO THE CAOC. NEXT, THE REPORTING PROCEDURES MUST BE ENFORCED AT THE UNIT LEVELS. UNITS ARE RESPONSIBLE FOR OBTAINING AND ADHERING TO THE TIRD AND FOR TRANSMITTING THE REQUIRED DATA IN THE PROPER FORMAT. THE CAOC SIMPLY CANNOT SIFT THROUGH HUNDREDS OF DIFFERENTLY FORMATTED MISREPS EVERY DAY. CONSISTENT LACK OF ADHERENCE SHOULD RESULT IN THAT UNIT BEING EXCLUDED FROM A SUBSEQUENT ATO IN ORDER TO PROVIDE ADEQUATE TIME TO BECOME FAMILIAR WITH THE REPORTING PROCEDURES. HOWEVER, AS LONG AS THE DIRECTIVE IS UNDERSTANDABLE AND CLEAR, UNITS WILL AGREEABLY COMPLY.

KEEPING TRACK OF SORTIES FLOWN AND MUNITIONS EXPENDED IS VITALLY IMPORTANT TO THE ASSESSMENT PROCESS. ATO TRACKING, INFLTREPS AND MISREP DATA COMPRISE SOME OF THE MOST BASIC COMPONENTS OF THE INPUTS REQUIRED TO ACCOMPLISH EBA. THE TWO PREVIOUS EXAMPLES ILLUSTRATE WHERE FAULTY PROCESSES WERE NOT CONDUCTIVE TO EBA. IN FUTURE WARS, AIRMEN MUST PAY ADEQUATE ATTENTION TO THESE PROCESSES IF EBA IS TO SUCCEED.

ISR process

EBA DOES NOT OCCUR WITHIN THE VACUUM OF THE OAT. RATHER, THE TEAM MUST RELY ON PROCESSES THAT EXPAND OUTSIDE THE CAOC. THE FINAL EXAMPLE VENTURES OUT OF THE CAOC AND EXAMINES A PROCESS ON A LARGER SCALE. IN THIS CASE, THE DOCTRINE THAT EXISTS DEFINITELY GUIDES THE ISR PROCESS, BUT IS NOT CONDUCTIVE TO EBA.

THE ISR PROCESS FROM AFDD 2-5.2, *ISR OPERATIONS*, PROVIDES A CONVENIENT CONSTRUCT TO FOLLOW THE THEORETICAL FLOW OF INFORMATION WITHIN THE ASSESSMENT PROCESS (FIGURE 8).

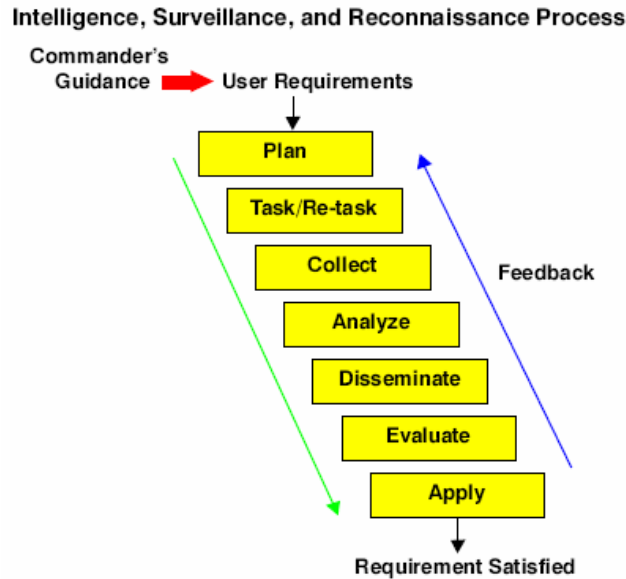


Figure 8. Intelligence, Surveillance, and Reconnaissance Process

SOURCE: Air Force Doctrine Document (AFDD) 2-5.2, *Intelligence, Surveillance, and Reconnaissance Operations*, 21 April 1999, 15.

As the previous EBO description suggested, CENTAF planned to measure progress in achieving operational objectives with predetermined measures of effectiveness and success indicators. The earlier air superiority example illustrates this well. CENTAF airmen planned and tasked some ISR collections through the daily ATO, but only after vetting requests for the LD/HD ISR platforms at the JFC/J2 JCMB. Other collection entities included INFLTREPS and MISREPS, traditional and nontraditional ISR, as well as various ‘INTs’ like human, signals, imagery, and measurement and signature intelligence (HUMINT, SIGINT, IMINT, and MASINT, respectively). Planners directed intelligence reporting via the TIRD. CENTCOM J-2 analyzed the data, and then disseminated their assessments back to the CENTAF OAT, who evaluated it and applied it as appropriate (Figure 9).⁹¹ Although this flow of information appears simple in theory, certain processes were problematic to CAOC EBA in practice. Of note was the ISR management process.

⁹¹ Hogan interview.

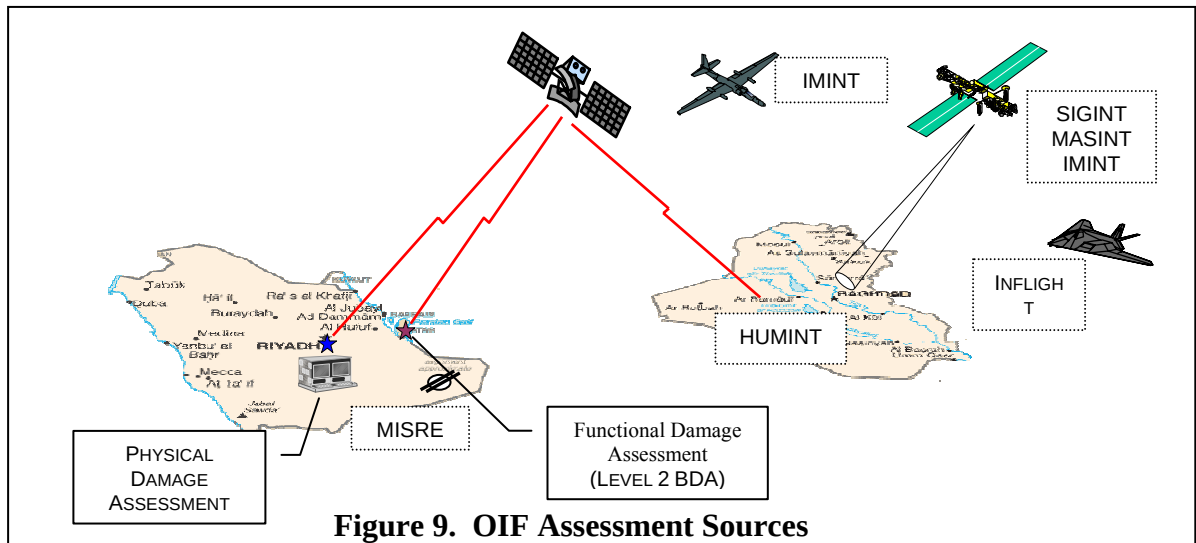


Figure 9. OIF Assessment Sources

TO REVIEW, THE ISR MANAGEMENT PROCESS INCLUDES SEVERAL DIFFERENT AGENCIES. ALTHOUGH THE JFACC CAN REQUEST CMA OVER ISR ASSETS, THE JFC RESERVES THE RIGHT TO MAINTAIN CMA, AS OCCURRED DURING OIF. THE FORMAL VEHICLE FOR THE JFACC TO MAKE ISR REQUESTS WAS AT THE DAILY JCMB. IN GENERAL, THIS PROCESS WAS NOT RESPONSIVE ENOUGH FOR THE JFACC TO REMAIN AHEAD OF THE FAST-MOVING CAMPAIGN.⁹² THE OAT WAS UNABLE TO UTILIZE ISR FOR GATHERING INTELLIGENCE FROM PAST STRIKES OR SURVEYING FUTURE AREAS OF INTEREST. IN SUM, THE EXISTING ISR PROCESS HAMPERED EBA EFFORTS IN THE CAOC.

CENTAF ATTEMPTED TO COMPENSATE FOR THE LACK OF TRADITIONAL ISR BY USING NONTRADITIONAL ISR METHODS SUCH AS TASKING FIGHTER AND BOMBER CREWS TO PROVIDE MISREPS AND WSV ON SIGNIFICANT AREAS OF INTEREST.⁹³ HOWEVER, THIS WISE USE OF RESOURCES WAS ONLY MARGINALLY EFFECTIVE FOR SEVERAL REASONS. FIRST, MANY OF THESE SORTIES WERE ASSIGNED GENERAL AREAS OF OPERATIONS (KILL BOXES) RATHER THAN A SPECIFIC INGRESS-ATTACK-EGRESS ROUTING. THEREFORE, IT WAS DIFFICULT TO PREDICT EXACTLY WHERE THEY WOULD BE FLYING AND THUS BE ABLE TO COLLECT INFORMATION. ALSO, EVEN WHEN THESE NON-TRADITIONAL ISR ASSETS DID COLLECT USEFUL INFORMATION, THE DISMAL REPORTING PROCESS MEANT MANY OF THESE REPORTS REMAINED UNTAPPED. AGAIN, THE ISR PROCESS AS CODIFIED IN DOCTRINE WAS NOT CONDUCTIVE TO THE EFFECTS-BASED ASSESSMENT THE OAT INTENDED TO ACCOMPLISH.

Doctrinal Realities

BEFORE CONCLUDING THIS PORTION OF THE ANALYSIS, IT IS IMPORTANT TO NOTE SOME INHERENT LIMITATIONS IN DOCTRINE. AIR FORCE DOCTRINE DOCUMENT (AFDD 1), *AIR FORCE BASIC*

⁹² Carpenter interview.

⁹³ A non-exhaustive list of non-traditional ISR assets utilized during OIF include: A-10, F-15E, B-52, F16, AV-8B, and EF-18 aircraft.

DOCTRINE, STATES "AIR AND SPACE DOCTRINE IS AN ACCUMULATION OF KNOWLEDGE GAINED PRIMARILY FROM THE STUDY AND ANALYSIS OF EXPERIENCE, WHICH MAY INCLUDE ACTUAL COMBAT OR CONTINGENCY OPERATIONS, AS WELL AS EXPERIMENTS OR EXERCISES."⁹⁴ HOWEVER, THIS ACCUMULATION OF KNOWLEDGE REQUIRES THE VITAL COMPONENT OF TIME TO BOTH ACCUMULATE AND CODIFY RELEVANT EXPERIENCES. IN MARCH 2003, THE EBA CONSTRUCT WAS SHORT ON BOTH. OFTEN TIMES, THIS LACK OF TIME IS BEYOND THE CONTROL OF AIRMEN.

THE STRATEGY DIVISION WAS NOT FORMALLY INTRODUCED INTO DOCTRINE UNTIL 1999.⁹⁵ FURTHERMORE, OIF WAS THE FIRST WAR WHERE A PARTICULAR CAOC CELL WAS SOLELY RESPONSIBLE FOR OA. FROM THIS PERSPECTIVE, THERE WAS RELATIVELY LITTLE TIME TO ACCURATELY CODIFY A CONSTRUCT SUCH AS EBA PRIOR TO OIF. THIS DOES NOT DIMINISH THE IMPORTANCE OF DOCTRINAL GUIDANCE FOR SUCCESSFUL EBA. IT SIMPLY PROVIDES A VALID REASON FOR WHY EBA DOCTRINE WAS SO THIN DURING THIS WAR.

WHEN AIRMEN HAVE ENOUGH RELEVANT EXPERIENCES FROM WHICH TO DETECT TRENDS AND DRAW CONCLUSIONS, THEY MUST THEN CODIFY THEIR FINDINGS. ACTUALLY WRITING DOCTRINE IS AN ITERATIVE AND TIME CONSUMING PROCESS. IT IS INCORRECT TO SUGGEST THAT DOCTRINE DOCUMENTS ARE EVER 'COMPLETE.' HOWEVER, BROAD GUIDELINES SUGGEST CERTAIN TIMEFRAMES IN WHICH DIFFERENT PIECES OF DOCTRINE REACH AN ADEQUATE LEVEL OF USABILITY. MUCH OF THE TACTICAL DOCTRINE IN THE AIR FORCE (T.O.S AND AFTTP) DEVELOPS OVER 18 MONTH CYCLES. THIS AMOUNT OF TIME IS A REASONABLE COMPROMISE BETWEEN THE SPEED OF TECHNOLOGICAL EVOLUTION AND THE ABILITY TO UPDATE THESE DETAILED PUBLICATIONS. OPERATIONAL AND BASIC DOCTRINE GENERALLY UPDATES EVERY TWO TO FIVE YEARS. ADEQUATE EXPERIENCES ON WHICH TO BASE CHANGES AND AVAILABLE DOCTRINE WRITERS DIRECTLY INFLUENCE THESE UPDATES.

AFOTTP 2-3.2 IS THE OPERATIONAL TACTICS, TECHNIQUES, AND PROCEDURES PUBLICATION THAT DESCRIBES THE MANY ORGANIZATIONS AND PROCESSES IN THE CAOC. WHEN OIF BEGAN, THE INK WAS STILL WET IN THE FIRST EDITION OF THIS DOCUMENT.⁹⁶ ADMITTEDLY, PORTIONS OF THIS ANALYSIS HOLD THIS PARTICULAR DOCUMENT TO AN UNREALISTICALLY HIGH STANDARD. HOWEVER, AN IMPORTANT IMPLICATION REMAINS. AIR FORCE DOCTRINE, WHETHER IT IS BASIC, OPERATIONAL, OR TACTICAL, IS MEANT TO GUIDE AIRMEN IN TRANSLATING BROAD, OVER-ARCHING THOUGHTS ON AIRPOWER INTO TACTICAL LEVEL EMPLOYMENT. THE ANALYSIS OF EBA DOCTRINE DURING OIF ILLUSTRATES THE IMPORTANCE OF HAVING USABLE DOCTRINE TO PERFORM THIS ROLE. IT ALSO MAGNIFIES THE IMPORTANCE OF DOCTRINE AND THE NEED TO GET IT RIGHT THE FIRST TIME.

⁹⁴ AFDD 1, 17 November 2003, 3.

⁹⁵ Lt Col Stephen Rothstein, SAASS instructor, interviewed by author, 5 May 2005.

⁹⁶ AFOTTP 2-3.2, 25 October 2002.

Summary

BY NO MEANS DOES THIS THESIS SUGGEST THAT DOCTRINE IS THE PANACEA OF EBA. HOWEVER, DOCTRINE IS THE MEDIUM IN WHICH TO CODIFY PROCESSES. WITH RESPECT TO OIF, DOCTRINE ONLY VAGUELY GUIDED AIRMEN IN WHAT TO DO AND GENERALLY FELL SHORT IN OUTLINING HOW TO DO IT. FURTHERMORE, OTHER CAOC AND CENTCOM DOCTRINE AND PROCESSES OUTRIGHT INHIBITED OPERATIONAL EBA. OUTSIDE THE CAOC, LIMITATIONS FROM THE ISR PROCESS HAMSTRUNG THE JFACC IN HIS ABILITY TO GATHER ADEQUATE INTELLIGENCE TO SUPPORT EBA EFFORTS. INSIDE THE CAOC, ANALYSTS LEARNED THE VALUABLE LESSON OF PAYING ATTENTION TO THE BASICS, AS AN ATROCIOUS TACTICAL ASSESSMENT PROCESS HIJACKED ANY HOPES THEY HAD AT ACCOMPLISHING EBA FOR THE JFACC. BY APPLYING THE EXPERIENCE FROM OIF TO FUTURE DOCTRINE AND PROCESSES, AIRMEN WILL BE BETTER PREPARED TO PRESENT USEFUL, EFFECTS-BASED ASSESSMENTS TO THE JFACC.

Chapter 4

Technology

We will modernize some existing weapons and equipment, a task we have neglected for too long. Our goal is to move beyond marginal improvements to harness new technologies that will support a new strategy.

—President George W. Bush
Speech at Citidel September 23, 1999

Organizational structures and incompatible doctrine and processes inhibited EBA during OIF, but some OIF assessors hoped that superior technology could salvage EBA efforts. At the start of OIF, effects-based analysts envisioned intelligence data seamlessly populating interactive software applications. In fact, the majority of pre-OIF efforts were aimed at these complex information technology (IT) solutions. Granted, most applications were designed with a mission planning and execution mindset, aiding in such tasks as generating target lists and tracking sorties. But some IT applications were designed to automatically correlate completed tactical tasks to their respective operational objectives. Unfortunately, in their haste to implement the complex software applications, airmen overlooked the vital task of populating these programs with data. Without this vital data, EBA efforts suffered greatly. This chapter analyzes the technology side of EBA in the CAOC during OIF, and evaluates whether EBA could have been effective with the technology that was on hand.

The ISR Process model again provides a convenient basis for this study. However, this model requires a slight modification in order to help give this analysis more clarity (Figure 10). In this construct, analysts collect data and then analyze it,

whereby the data makes the transition to information, intelligence, knowledge, and battlespace wisdom. However, in reality, it is extremely difficult to analyze large amounts of data before it is suitably organized. Therefore, a modification to the existing construct adds a vital step to the assessment process—compiling the collected information into a useable format.

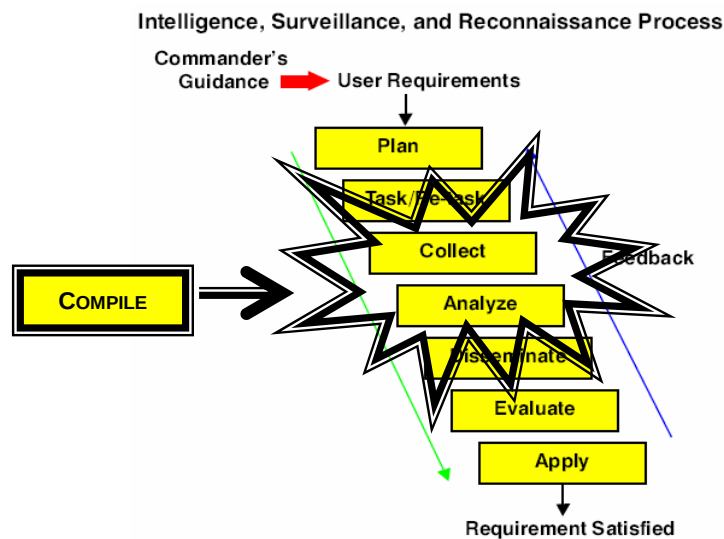


Figure 10. Modified ISR Process

SOURCE: Adopted from Air Force Doctrine Document (AFDD) 2-5.2, *Intelligence, Surveillance, and Reconnaissance Operations*, 21 April 1999, 15

For the purpose of this discussion, collecting refers to the process of getting intelligence data from the source to the CAOC. During OIF, collection occurred via several different methods, to include pilot INFLTREPS and MISREPS, as well as IMINT, SIGINT, MASINT, and HUMINT from traditional and non-traditional ISR assets. The main focus of this analysis is on INFLTREPS and MISREPS, which ties back to similar discussions in the previous chapters. Compiling the data refers to organizing it into a usable format, which is accessible to a user such as an analyst in the

OAT. Finally, in the analysis step, the OAT analyst correlates this intelligence to operational objectives, which ultimately translates to actionable operational assessment.

IN AN INFORMATION-INTENSIVE CONSTRUCT SUCH AS EBA, IT SOLUTIONS ARE EXTREMELY IMPORTANT. AIRMEN USED, OR ATTEMPTED TO USE, SEVERAL DIFFERENT TECHNOLOGIES DURING OIF TO ACCOMPLISH EBA. SOME ASPECTS OF THE IT SOLUTIONS THEY USED WERE CONDUCTIVE TO EFFECTS-BASED ASSESSMENT IN THE CAOC. YET, THESE TECHNOLOGIES COULD STILL NOT KEEP EBA EFFORTS FROM DERAILING. AFTER ILLUSTRATING WHY TECHNOLOGY IS SO VITAL TO EBA, THIS ANALYSIS EVALUATES THE STEPS IN THE MODIFIED ISR PROCESS CONSTRUCT THAT ARE LEAST BROKEN (ANALYSIS), AND CULMINATES WITH THE STEPS THAT MUST CHANGE IF AIRMEN ARE TO ACCOMPLISH EBA IN THE FUTURE (COLLECTING AND COMPILING).

Importance of Technology to EBA

COMPARING THE ATTRITION AND EFFECTS-BASED MODELS ILLUSTRATES THE IMPORTANCE OF TECHNOLOGY IN EBA. ONE OF THE MOST APPEALING ASPECTS OF ATTRITION-BASED OPERATIONS AND ASSESSMENT ARE THEIR RELATIVE SIMPLICITY. STRATEGISTS DETERMINE THE TARGETS THAT ARE MOST VITAL TO THE ENEMY AND PLANNERS DECIDE THE WAYS AND MEANS TO DESTROY THESE TARGETS. ASSESSORS COLLECT POST-STRIKE ASSESSMENTS ON THE TARGETS AND NEATLY CLOSE THE LOOP ON THE TARGETING CYCLE. IN THEORY, WHEN ENOUGH VITAL TARGETS ARE DESTROYED, THE ENEMY CAPITULATES. EFFECTS-BASED OPERATIONS AND ASSESSMENT ARE LESS STRAIGHTFORWARD. DURING OIF, EFFECTS-BASED STRATEGISTS PREPARED NUMEROUS OPERATIONAL OBJECTIVES, EACH WITH SEVERAL ASSOCIATED TACTICAL OBJECTIVES AND TASKS.⁹⁷ PLANNERS CORRELATE TARGET SETS AND INDIVIDUAL DMPIS TO EACH OF THESE TASKS AND OBJECTIVES. THE AGGREGATE OF DIRECT EFFECTS FROM SEVERAL TACTICAL TASKS COMBINE TO ACHIEVE A SPECIFIC OPERATIONAL OBJECTIVE. THUS, FOR EACH GIVEN OPERATIONAL OBJECTIVE, ANALYSTS MUST EVALUATE MULTIPLE DIFFERENT TACTICAL TASKS AND OBJECTIVES. ADDITIONALLY, THE FOCUS OF THE ASSESSMENT FURTHER COMPOUNDS THE ISSUE. IN THE ATTRITION MODEL, ASSESSORS FOCUS ON A GIVEN TARGET TO DEDUCE THE EFFECT OF AN ACTION. IN EBA, ASSESSORS LOOK BOTH AT THE CAUSE AND THE EFFECT. FOR EXAMPLE, IF THREE TACTICAL TASKS SUPPORT AN OBJECTIVE, ASSESSORS MAY HAVE TO GATHER FOUR DIFFERENT PIECES OF INFORMATION: THREE PIECES OF INFORMATION FOR EACH TACTICAL TASK AND ANOTHER PIECE OF INFORMATION FOR THE DESIRED EFFECT. COMPARED TO THE ATTRITION MODEL, THE EBA CONSTRUCT IS GENERALLY MORE DATA INTENSIVE. TECHNOLOGY IS ESSENTIAL FOR THE ANALYST TO COLLECT, COMPILE, AND ANALYZE THE DATA.

⁹⁷ Lt Col Rolando Burnett, OIF USCENTAF, Chief of Strategy Plans, interviewed by author, 31 January 2005.

Analyzing with Information Technology Solutions

IN THE MONTHS LEADING UP TO OIF, ANALYSTS DEDICATED THEIR EFFORTS MAINLY TOWARDS THE DEVELOPMENT OF ANALYZING TECHNOLOGIES. HOWEVER, CENTAF AND CENTCOM PLANNERS DID NOT FOCUS ON ONE, UNIFIED IT ASSESSMENT TOOL. CENTCOM/J2 INITIALLY ENDORSED AND MANDATED USE OF AN APPLICATION CALLED JOINT TARGETING TOOLBOX (JTT) THROUGHOUT THE THEATER.⁹⁸ IN THEORY, THIS APPLICATION SHOULD HAVE BEEN EXTREMELY USEFUL TO BOTH CENTCOM AND CENTAF IN ASSESSING EFFECTS. IN REALITY, IT WAS NOT. JTT WAS SIMPLY NOT ROBUST ENOUGH TO COMPENSATE FOR THE QUANTITY OF TARGETS AND PACE OF OPERATIONS ASSOCIATED WITH THE AIR WAR.

AT THE AIR COMPONENT LEVEL, CENTAF UTILIZED TBMCS, A SOFTWARE SUITE THAT COMBINES “DOZENS OF UNIQUE C2 SYSTEMS TOGETHER TO ALLOW THE STAFF TO PLAN, DIRECT, AND CONTROL THEATER AIR OPERATIONS.”⁹⁹ LEVERAGING THE EXTENSIVE CAPABILITIES OF THE AIR OPERATIONS DATA BASE (AODB) AND MODERNIZED INTEGRATED DATABASE (MIDB), TBMCS PROVIDED THE MEANS TO ACCOMPLISH EBA.¹⁰⁰ ONE SOFTWARE APPLICATION THAT COMPLIMENTED TBMCS WAS ITS.

IN DECEMBER 2003, THE COMMAND AND CONTROL (C2) BATTLE LAB EXERCISED ITS EFFECTIVELY DURING INTERNAL LOOK 2003, A REGIONAL EXERCISE LEADING UP TO OIF THAT FOCUSES ON THEATER COMMAND AND CONTROL IN THE CENTCOM AOR.¹⁰¹ ONE IMPORTANT ASPECT OF THIS EXERCISE WAS FLESHING OUT THE CONCEPT OF OPERATIONS (CONOPS) FOR USING ITS IN AN ASSESSMENT CAPACITY. ALTHOUGH ITS WAS NOT TECHNICALLY PART OF THE TBMCS ARCHITECTURE, IT WAS 100% INTEROPERABLE WITH THE TBMCS STRUCTURE AND POLLED DATA FROM THE TBMCS DATABASES. NOTEWORTHY STRENGTHS INCLUDED ITS ABILITY TO LINK TO IMAGERY, VIDEO, AND OTHER

⁹⁸ Maj Charles Hogan, OIF USCENTAF Deputy Chief, Targets, interviewed by author, 15 January 2005; Developed as a suite of software applications to support operations and targeting requirements at the tactical, campaign, and national level, JTT supports the entire targeting cycle from commander’s objectives, guidance and intent to generating the target list for the Tasking Orders (ATOs) to Combat Assessment (BDA), with the goal of leveraging off of current targeting applications by packaging their functionality into a non-duplicative collection of interoperable targeting tools. Analysts can use JTT to receive, correlate, manipulate, display, and disseminate target intelligence data from multi-discipline sources and apply the resulting information to the battle planning, mission execution and assessment processes. They can also view the Common Operational Picture (COP) of the Joint Operational Area (JOA), examine target imagery, and retrieve and manipulate various products of the Joint Air Operations Planning (JAOP) process, including the ATO, the Master Air Attack Plan (MAAP), and the JIPTL; “JTT Short Description”, April 2001, on-line, Internet, 8 February 2005, available from <http://www.rl.af.mil/tech/programs/jtt/>.

⁹⁹ Mark Hewish, “Out of the CAOC Comes Order,” *Jane’s International Defense Review*, 1 May 2003.

¹⁰⁰ AODB is an Oracle database used for planning and execution of air missions. MIDB is the standard Air Force General Military Intelligence (GMI) database system used extensively throughout the ATO cycle; Tom Gorman, “TBMCS Executive Overviews and Read Ahead Information,” C2TIG/LMMS, Hurlburt Field, FL, 18.

¹⁰¹ Maj Stephen Murray, OIF USCENTAF Chief, Operational Assessment Team, interviewed by author, 1 March 2005.

MULTIMEDIA PRODUCTS, AND IT ABILITY TO OUTPUT TO A VARIETY OF OTHER SOFTWARE APPLICATIONS SUCH AS FALCONVIEW AND MICROSOFT EXCEL. INTEGRATING WITH OTHER WEB-BASED TBMCS APPLICATION, ITS PROVIDED GRAPHIC DEPICTIONS OF STRATEGY-TO-TASK RELATIONS, ON-LINE MISREP TOOLS, AND QUICK LOOK BDA AND OPERATIONAL ASSESSMENT TOOLS.¹⁰² ACCORDING TO THIS CONOPS, ITS PROVIDED A MEANS TO GRAPHICALLY LINK OPERATIONAL OBJECTIVES TO TACTICAL TASKS. THEN, TARGETEERS COULD USE ITS TO CORRELATE SPECIFIC DMPIS TO EACH TACTICAL TASK AND THEIR ASSOCIATED OPERATIONAL OBJECTIVES. AFTER EACH SORTIE, UNITS INPUT MISREP DATA THAT INCLUDES INITIAL BDA ESTIMATES AND TARGET LOCATIONS INTO A SECURE, WEB-BASED ITS INPUT SCREEN. THIS DATA POPULATED THE CAOC ITS DATABASE, WHICH HELPED ANALYSTS MEASURE ACCOMPLISHMENT OF RESPECTIVE TASKS AND ULTIMATELY OF OPERATIONAL OBJECTIVES.¹⁰³ THE OAT COULD REVIEW POST-STRIKE REPORTS OF SPECIFIC TARGET SETS WITH RESPECT TO THEIR ASSOCIATED OPERATIONAL OBJECTIVES. AS A WEB-BASED, INTERACTIVE APPLICATION, ITS ALLOWED COLLABORATIVE PLANNING AND EXECUTION.¹⁰⁴ IN SUMMARY, ITS PROVIDED THE OAT AN ADEQUATE INTERFACE TO THE ASSESSMENT DATABASE TO ACCOMPLISH EBA. HOWEVER, MAKING ITS THE CAOC STANDARD IT SOLUTION FOR OIF DID NOT OCCUR SMOOTHLY.

IN THEIR ATTEMPT TO ACCOMPLISH EBA, CENTAF ANALYSTS RELIED TO ON CENTCOM ASSESSMENTS DURING OIF. THEREFORE, IT FOLLOWS THAT BOTH CENTAF AND CENTCOM WOULD OPERATE THE SAME, OR AT A MINIMUM, COMPATIBLE IT APPLICATIONS. HOWEVER, THIS WAS NOT TO BE. CENTCOM ADHERED TO ITS OWN MANDATE AND USED JTT FOR THE FIRST THREE DAYS OF OIF, BUT QUICKLY REALIZED THAT THE APPLICATION WAS NOT OPERATING UP TO STANDARDS. SOFTWARE GLITCHES AND BASIC DESIGN FLAWS AND LIMITATIONS FORCED ANALYSTS TO REVERT TO SELF-MADE SPREADSHEETS AND DATABASES, SIMILAR TO ONES USED DURING OPERATION ENDURING FREEDOM (OEF) SOME SIXTEEN MONTHS EARLIER.¹⁰⁵ ALTHOUGH THIS QUICK FIX RECTIFIED PROBLEMS AT THE JOINT LEVEL, IT ALSO NEGATED ANY HOPES OF CENTCOM AND CENTAF OPERATING SIMILAR ASSESSMENT APPLICATIONS. EFFECTS-BASED ASSESSORS IN THE CAOC COULD NOT RELY ON AUTOMATED COLLABORATION BETWEEN THE AIR COMPONENT AND THE JOINT STAFF IN THE AREA OF ASSESSMENT.

THE START OF OIF MARKED TECHNOLOGY-RELATED PROBLEMS IN THE CAOC, AS WELL. PRIOR TO THE START OF OIF, AF/XOI DICTATED THAT CENTAF USE JTT.¹⁰⁶ HOWEVER, MOST CENTAF ANALYSTS KNEW THAT JTT COULD NEITHER HANDLE THE GREATER NUMBER TARGETS ASSOCIATED WITH

¹⁰² *Air & Space Operations Center Weapons System Block 10+ Systems Guide*, AFC2ISRC, Langley AFB, Va., 3 Dec 2002, 40.

¹⁰³ Murray interview, 1 March 2005.

¹⁰⁴ "Products: ITS" Intelligent Software Solutions, Inc. 30 March 2005, on-line, Internet, 14 March 2005, available from <http://www.issinc.com/products/its/shtml>.

¹⁰⁵ Hogan interview.

¹⁰⁶ Murray interview, 1 March 2005.

THE AIR STRATEGY, NOR WAS IT ROBUST ENOUGH TO KEEP UP WITH THE RAPIDLY CHANGING ATO.¹⁰⁷ BESIDES, CENTAF ANALYSTS WERE MORE FAMILIAR AND COMFORTABLE WITH ITS. THEREFORE, CENTAF PLANNED TO USE THE IT SOLUTION THEY HAD TRAINED WITH DURING INTERNAL LOOK 2003—ITS. AT THIS POINT, CENTAF HAD AT LEAST ADOPTED A SOLUTION THAT COULD ENHANCE EBA IN THE CAOC. HOWEVER, ADOPTING ITS WAS NOT SUFFICIENT. ITS ALSO REQUIRED LAST MINUTE UPDATES AND CHANGES. UNFORTUNATELY, THIS CRUCIAL MAINTENANCE WAS DELAYED SINCE SOFTWARE DEVELOPERS WERE NOT IN THEATER TO ACCOMPLISH THE NEEDED WORK.¹⁰⁸ IN RETROSPECT, ITS WAS THE CORRECT CHOICE TO MAKE FOR THE CAOC, BUT DUE TO FAULTY GUIDANCE FROM AF/XOI AND POOR TECHNICAL SUPPORT IN THEATER, OPERATIONAL ASSESSORS COULD NOT LEVERAGE THE FULL CAPABILITY THIS APPLICATION HAD TO OFFER.

SINCE ITS WAS NOT FULLY INTEGRATED ACROSS THE CAOC, SOME TEAMS USED OTHER APPLICATIONS. FOR EXAMPLE, LONG RANGE PLANNERS IN THE STRATEGY DIVISION CREATED A MICROSOFT EXCEL TOOL TO CORRELATE TACTICAL TASKS TO SPECIFIC DMPIS AND OPERATIONAL OBJECTIVES. UNFORTUNATELY, THEY HAD DIFFICULTY IN OBTAINING AND INPUTTING REQUIRED DATA INTO THIS APPLICATION.¹⁰⁹ ANOTHER MOTIVATED OPS ANALYST CREATED A DATABASE THAT SEQUENCED MISREP DATA FOR EACH DAY. HOWEVER, POPULATING THE DATABASE WITH USEFUL INTELLIGENCE PROVED DAUNTING. AT THE HEIGHT OF THE WAR, THIS ONE ANALYST AUTOMATED MOST MISREP ENTRIES INTO A DATABASE AND MANUALLY INPUT APPROXIMATELY TWO HUNDRED MISREPS INTO THIS PRODUCT PER DAY.¹¹⁰ IN THE END, ANALYSTS NEVER BENEFITED FROM THE PLANNED AUTOMATED FUNCTIONALITY OF ITS. INSTEAD, THEY RELIED MAINLY ON SELF-MADE SPREADSHEETS AND DATABASES, MOST OF WHICH WERE NOT INTERACTIVE AND ALL OF WHICH REQUIRED MANUAL DATA ENTRY.

ITS WAS A WELL DESIGNED IT SOLUTION THAT COULD HAVE GREATLY INCREASED THE OAT'S ABILITY TO ACCOMPLISH EBA DURING OIF. UNFORTUNATELY, CONFLICTING GUIDANCE AS TO WHICH IT SOLUTION TO USE—JTT OR ITS—CAUSED CONSTERNATION IN THE CAOC. FURTHERMORE, A LACK OF TECHNICAL SUPPORT FOR THE SOFTWARE ALSO PLAGUED ITS IMPLEMENTATION. AS A RESULT, MANY CAOC AIRMEN REVERTED TO MORE BRUTE-FORCE METHODS, LIKE MANUALLY INPUTTING DATA INTO SELF-MADE SPREADSHEETS AND DATABASE INTERFACES. THIS PARTICULAR EXAMPLE REVEALS THREE THINGS. FIRST, AIRMEN MUST INTEGRATE IT SOLUTIONS THAT ARE CONDUCIVE TO THE EBA CONSTRUCT INTO THE CAOC WELL BEFORE THE WAR BEGINS. THIS ALLOWS CAOC ANALYSTS TO BECOME FAMILIAR WITH THE IT APPLICATION. SECOND, TRAINED SOFTWARE TECHNICIANS MUST ACCOMPANY THEIR RESPECTIVE SOFTWARE SUITES INTO THE THEATER. NO MATTER HOW WELL DESIGNED AND INTEGRATED THE SUITES ARE, THEY WILL INEVITABLY REQUIRE ATTENTION IN THE HEAT OF BATTLE. THE FINAL IMPLICATION CONSIDERS WHERE IN THE ASSESSMENT PROCESS TECHNOLOGY SHOULD BE REFOCUSSED.

¹⁰⁷ T.B. Williams, Contractor, 505 TRS, Hurlburt Field, FL, interviewed by author, 30 March 2005; Stephen Murray, OIF USCENAF Chief, Operational Assessment Team, interviewed by author, 15 January 2005.

¹⁰⁸ Hogan interview.

¹⁰⁹ Murray interview.

¹¹⁰ Ibid..

AS CAOC ANALYSTS QUICKLY DISCOVERED, EXTENSIVE IT SOLUTIONS ARE OF LITTLE USE UNLESS THEY ARE POPULATED WITH USEFUL INTELLIGENCE INFORMATION. THIS REQUIRES THE CRITICAL STEPS OF COLLECTING AND COMPILING THE DATA BE ACCOMPLISHED. DURING OIF, THE AIR COMPONENT FAILED MISERABLY AT THESE TWO TASKS.

Feeding the Database: Collecting and Compiling

EBA REQUIRES A FIRM FOUNDATION OF TACTICAL ASSESSMENTS ON WHICH TO BASE HIGHER LEVEL ANALYSIS. DURING OIF, ANALYSTS USED A VARIETY OF METHODS TO COLLECT THIS INFORMATION. THEY COLLECTED SOME DATA WHILE THE COLLECTION PLATFORM WAS AIRBORNE, AND THE REST AFTER IT HAD LANDED. AT THE MOST BASIC LEVEL, PILOTS VERBALLY PASSED INFLTREPS AS SOON AS PRACTICAL AFTER A GIVEN STRIKE. AS PREVIOUSLY ESTABLISHED, THIS METHOD OF TRANSMISSION WAS CUMBERSOME AND UNRELIABLE. OTHER PILOTS UTILIZED DATA-BURST TECHNOLOGY FOR THIS TASK, SUCH AS IN THE B-2 STEALTH BOMBER. ALTHOUGH MORE EFFICIENT IN TRANSMITTING THE DATA, THESE SYSTEMS WERE STILL NOT CAPABLE OF AUTOMATICALLY COLLABORATING WITH IT TECHNOLOGIES IN THE CAOC.¹¹¹ ON THE WHOLE, VOICE AND DATA INFLTREPS DID NOT SUBSTANTIALLY ADD TO THE FOUNDATION OF DATA IN A TIMELY OR USEFUL MANNER.

IF PILOTS WERE UNABLE TO PASS INFLTREPS, THEY WERE EXPECTED TO COMPLETE A POST-FLIGHT MISREPS WITH A UNIT INTELLIGENCE REPRESENTATIVE. THIS PROCESS, TOO, WAS TIME-CONSUMING AND CUMBERSOME. UNITS GENERALLY DID NOT FOLLOW THE PLANNED CONOPS FOR ENTERING MISREPS INTO THE ITS DATABASE, OPTING INSTEAD TO TRANSMIT VIA EMAIL, TELEPHONE, OR HARD COPY.¹¹² THIS PROBLEM COMPOUNDED DUE TO AN AMBIGUOUS TIRD, WHICH ALLOWED UNITS TO TRANSMIT MISREP DATA IN FREE-TEXT FORMAT. THE RESULTING EFFECT WAS THAT THE RECEIVER AT THE CAOC HAD TO MANUALLY INPUT THE DATA INTO ITS. THE NUMBERS OF INFLTREPS AND MISREPS STEADILY INCREASED AS OIF PROGRESSED. IN FACT, THE OAT DEDICATED SEVERAL ANALYSTS TO COLLECTING THESE REPORTS. HOWEVER, THE REPORTS HAD LITTLE UTILITY FOR EBA UNTIL THEY COULD BE CORRELATED WITH TARGET SETS, SORTIES, AND ULTIMATELY OPERATIONAL OBJECTIVES. MACHINE-TO-MACHINE INTERFACES BETWEEN AIRCRAFT, UNIT REPORTING SYSTEMS, AND THE CAOC COULD HAVE GREATLY IMPROVED THE COLLECTING AND COMPILING OF TIME CRITICAL ASSESSMENT INFORMATION.

A NOTIONAL F-15E KILL BOX MISSION ILLUSTRATES THE PRACTICAL REALITY OF WHY INFLTREPS AND MISREPS WERE SO WEAK. IN THIS EXAMPLE, FOUR AIRCRAFT ARE TASKED TO SERVICE A KILL BOX WHERE SUSPECTED ENEMY FORCES ARE LOCATED. EACH AIRCRAFT IS LOADED WITH EIGHT LASER GUIDED BOMBS, WHICH MEANS THE FOUR-SHIP CAN TARGET UP TO THIRTY-TWO DIFFERENT

¹¹¹ By linking a basic laptop computer and handheld radio transmitter through the existing aircraft satellite communications (SATCOM) antenna, pilots could transmit and receive emails and attachments while airborne. F-117 and B-52 aircraft used similar systems to receive and transmit in-flight taskings and post-strike intelligence; Major Kenneth Johnson, SAASS Student, interviewed by author, 9 February 05.

¹¹² Hogan interview.

DESIRED MEAN POINTS OF IMPACT (DMPIS). SINCE THESE ARE MOBILE TARGETS, THE CAOC DOES NOT HAVE PREVIOUSLY BUILT TARGET FOLDERS. THEREFORE, ASSESSORS ARE VIRTUALLY STARTING FROM SCRATCH WHEN THE ATTACK OCCURS. ASSUMING THE AIRPLANES SUCCESSFULLY DESTROY 75% OF THE TARGETS THEY ENGAGE, THEY HAVE TWENTY-FOUR DIFFERENT DMPIS TO REPORT TO THE CAOC. ALTHOUGH THE F-15E IS EQUIPPED WITH LINK-16 DATA LINK TECHNOLOGY, IT IS CURRENTLY UNABLE TO PASS DETAILED POST-STRIKE MISSION RESULTS BY MEANS OTHER THAN VOICE COMMUNICATIONS. AN ABBREVIATED INFLTREP INCLUDES AIRCRAFT CALL SIGN, TARGET TYPE, TARGET COORDINATES, WEAPON EMPLOYED, AND TIME OF ENGAGEMENT. FOR THESE TWENTY-FOUR TARGETS, THIS ONE FOUR-SHIP COULD PASS UP OVER 100 LINES OF INFORMATION. THE ODDS OF ALL OF THIS INFORMATION REACHING THE CAOC, MUCH LESS FINDING ITS WAY INTO THE CAOC DATABASE ARE ASTRONOMICAL. FOR EBA TO STAND A CHANCE, AIRCRAFT SYSTEMS MUST LEVERAGE MACHINE-TO-MACHINE TECHNOLOGIES THAT SIMPLY DID NOT EXIST DURING OIF.

THE PREVIOUS KILL BOX MISSION PROVIDES A USEFUL SCENARIO TO EXPLAIN THIS CONCEPT. EACH TIME THE F-15E EMPLOYS A WEAPON, RELEASE PARAMETERS ARE STORED IN THE AIRCRAFT CENTRAL COMPUTER. THIS INFORMATION MAY BE DOWNLOADED VIA A DATA TRANSFER MODULE (DTM) AND REVIEWED ON A DEDICATED MISSION PLANNING SYSTEM. WITH A BASIC SOFTWARE INTERFACE, PROGRAMMERS COULD LINK THIS MISSION PLANNING SYSTEM TO THE WEB-BASED ITS SYSTEM. THEN, UNIT LEVEL PERSONNEL CAN EFFICIENTLY AND ACCURATELY DOWNLOAD POST-FLIGHT MISSION DATA DIRECTLY INTO THE ITS DATABASE. THIS ELIMINATES SEVERAL TIME CONSUMING AND CUMBERSOME STEPS IN THE PROCESS THAT AIRCREW AND INTELLIGENCE PERSONNEL FOLLOWED DURING OIF. ALTHOUGH THIS SOLUTION IS A STEP ABOVE THE EXISTING METHODOLOGY OF OIF, TECHNOLOGIES CAN FURTHER ADVANCE THE PROCESS.

AN EVEN BETTER ALTERNATIVE WOULD LEVERAGE AUTOMATED MACHINE-TO-MACHINE INTERACTION. EACH TIME THE F-15E EMPLOYS A WEAPON, THE RELEASE PARAMETERS AND TARGET COORDINATES ARE TRANSMITTED VIA DATA LINK TO THE CAOC.¹¹³ ADDITIONALLY, TARGETING POD VIDEO OF THE ATTACKS COULD ACCOMPANY THESE PARAMETERS. ONCE RECEIVED BY THE CAOC, THE PARAMETERS AND WSV AUTOMATICALLY POPULATE THE ITS DATABASE. IF ITS CAN CORRELATE THE TARGET COORDINATES TO AN EXISTING TARGET, IT DOES SO. OTHERWISE, IT CREATES A NEW TARGET NUMBER ASSOCIATED WITH THIS MISSION. INTERFACING EXISTING TECHNOLOGIES CAN PROCESS THIS INFORMATION FURTHER.

ONCE WEAPONS TYPE, RELEASE PARAMETERS, AND TARGET MAKEUP ARE KNOWN, ITS CAN TAP INTO WEAPONERING PROGRAMS SUCH AS THE ELECTRONIC JOINT MUNITIONS EFFECTIVENESS MANUAL (JMEM) TO MAKE PRELIMINARY WEAPONS EFFECTS PREDICTIONS. TRAINED ANALYSTS CAN ALSO ASSESS ACTUAL HIT CRITERIA TO A RELATIVELY HIGH LEVEL OF FIDELITY. IN THEORY, ASSESSMENT OF

¹¹³ Data Link Automated Reporting System (DLARS) is a Command and Control Battlelab initiative that provides this capability; "DLARS", C2 Battlelab, on-line, Internet, 10 April 2005, available at <http://www.c2b.hurlburt.af.mil/dlars.htm>.

THE TACTICAL TASK IN THE EBO CONSTRUCT COULD BE COMPLETED BEFORE THE F-15E EVER RETURNS TO BASE.

THIS CONCEPT MIGHT SEEMS FAR-FETCHED, BUT IT IS NOT. GRANTED, THERE ARE CHALLENGES IN THE AREAS OF ONBOARD SYSTEMS AS WELL AS DATA LINK AND COMPUTER ARCHITECTURES. HOWEVER, THE FACT REMAINS THAT THESE TYPES OF TECHNOLOGIES DO EXIST. THEY MUST SIMPLY BE DEVELOPED AND INTEGRATED. THE KEY LESSON FROM OIF IS THAT THE COLLECTION AND COMPILING PHASES REQUIRE MORE ATTENTION THAN THEY GOT DURING THE WAR. TECHNOLOGIES MUST BE FURTHER DEVELOPED AND INTEGRATED TO ACCOUNT OF THE DAUNTING TASK OF COLLECTING THE LARGE AMOUNTS OF DATA REQUIRED IN AN EFFECTS-BASED OPERATION. WITHOUT MACHINE-TO-MACHINE INTERFACES, THE FUTURE OF EBA IS DESTINED TO REPEAT ITS OIF DÉBUT.

Summary

Airmen often look to technology to enhance processes. Initiatives such as software system development and implementation are expensive and certain to keep US defense and information technology contractors gainfully employed for years to come. During OIF, CAOC airmen hoped to use such collaborative, automated software systems to analyze information. As they quickly recognized, these elaborate applications are of no utility unless valid data populates their data fields in a timely manner. A basic lack of focus on collecting and compiling this data was a major reason why technology did not help EBA efforts in the CAOC. Air Force analysts will undoubtedly remain keen on technical solutions to assessment; it is inherent in the culture. However, they must realize that the systems are only as good as the data that feeds them.

Conclusion

Our initial assessment is that they will all die.

—Mohammed Saeed al-Sahaf
(aka: Baghdad Bob)
Iraqi Information Minister, March 2003

Effective operational assessment provides the JFACC the means to guide and alter his strategy. During OIF, the selected model for operational assessment, EBA, did

not support the JFACC in this regard. Considering the above quote by the now-infamous ‘Baghdad Bob,’ the US is fortunate that the Iraqis had assessment problems of their own. Regardless of the success of US airpower during OIF, the harsh reality is that the next enemy may not be quite as misinformed or inept as the Iraqis were.

The research in the thesis suggests that in a fast, dynamic, short war like OIF, where the JFACC is a supporting commander, the EBA construct is difficult, if not impossible, to achieve with OIF-era doctrine, organizational structure, and technology. The obvious next step is to determine what changes are necessary in order to make EBA rhetoric into reality.

This final chapter presents findings, implications, and recommendations for making EBA a reality. Then it offers several considerations for the road ahead. First, the adjustments required to improve the assessment process and make EBA a reality require a cultural change in the Air Force. Second, realistic training must buttress these changes before the next war begins. Finally, a brief examination of the nature of OIF suggests a noticeable trend in the future of modern warfare. This examination magnifies the importance of developing and adapting constructs that are feasible in these types of wars.

Findings, Implications, & Recommendations

Airmen must be organized, trained, and equipped to accomplish a given mission. In evaluating EBA, organizational factors include manning, command relations, and actual organizational structures. Airmen must also be equipped and trained with adequate doctrine and technology for EBA to become reality. Organization clarifies roles and missions, doctrine guides actions and processes, and technology enables. Organizational, doctrinal, and technological constraints certainly plagued EBA in the CAOC during OIF. One analyst summed up the OIF assessment effort this way: “Issues with BDA in Iraqi Freedom—nearly identical to findings identified in after-action reports of operations over the last 13 years—include inadequate tracking of mission execution; lack of a common BDA database; lack of BDA education and training; problems created

by modern warfare's unprecedented speed, scope, and scale; and the low priority of BDA collection."¹¹⁴ This quote succinctly summarizes many of the following findings.

Organization

EBA CANNOT SUCCEED UNDER THE CURRENT ORGANIZATIONAL CONSTRUCT BOTH INSIDE AND OUTSIDE THE CAOC. INSIDE THE CAOC, MANNING LEVELS ARE VITAL TO THE SUCCESS OF EBA. DURING OIF, THERE WERE NOT ENOUGH ANALYSTS TO GATHER AND COMPILE THE TACTICAL ASSESSMENTS THAT FLOWED INTO THE CAOC. BY THE TIME THE OAT DEDICATED ITS OWN PERSONNEL TO THIS OVERLOOKED, BUT IMPORTANT TASK, THE CAOC ASSESSMENT PROCESS WAS ALREADY HOPELESSLY BEHIND. IT IS NOT PRACTICAL TO RECOMMEND DETAILED MANNING LEVELS ACROSS THE CAOC ASSESSMENT COMMUNITY. HOWEVER, THE FOLLOWING GUIDELINES HELP SHAPE THE SOLUTION. FIRST, THE NUMBER OF REQUIRED PERSONNEL RELATES DIRECTLY TO ASSESSMENT-SUPPORTING IT SOLUTIONS, THE SIZE AND NATURE OF THE CAMPAIGN, AND THE PROFICIENCY OF PERSONNEL. ALTHOUGH MANNING CONTINUES TO BE A CONSIDERABLE CHALLENGE FOR COMMANDERS, INCREASED EMPHASIS ON THE IMPORTANCE OF MANNING CAOC ASSESSMENT-RELATED BILLETS CAN HELP OVERCOME THIS CHALLENGE. HOWEVER, EVEN IF DIVISIONS, CELLS, AND TEAMS ARE ADEQUATELY MANNED, THE PROBLEMS ARISING FROM A PREDOMINATELY HIERARCHICAL, STOVE PIPED CAOC STRUCTURE REMAIN.

THE HIERARCHICAL AND DIVISIONAL STRUCTURE IN THE CAOC IS NOT CONDUCIVE TO EBA, INSTEAD FOSTERING COMPARTMENTALIZATION OF INFORMATION FOR USE IN RIGID, FRAGMENTED, SERIAL ASSESSMENT PROCESSES.¹¹⁵ CONSIDERING THAT THIS HIERARCHICAL, DIVISIONAL ARRANGEMENT PERMEATES THE AIR FORCE AND THE REST OF THE MILITARY, IT IS DIFFICULT TO ENVISION AN ABRUPT DEPARTURE FROM THIS STRUCTURE. HOWEVER, CERTAIN ENHANCEMENTS ARE APPROPRIATE FOR THE CAOC. THE FIRST CONCERNS THE FLOW OF INFORMATION, WHICH MUST BE STREAMLINED WITHIN THE CAOC IF EBA IS TO SUCCEED. A 'HUB AND SPOKE' MODEL FOR THE OAT IS ONE WAY TO PROMOTE INFORMATION SHARING ACROSS ESTABLISHED CAOC DIVISIONS. THE HUB OF THE MODEL SHOULD BE AN EXPERIENCED ANALYST, EMPOWERED WITH ENOUGH AUTHORITY TO SOLICIT PARTICIPATION IN THE EBA PROCESS. THE SPOKES ARE ADEPT ANALYSTS WHO REGULARLY INTERACT WITH ANALYSTS IN OTHER CAOC DIVISIONS. FOR EXAMPLE, A SPOKE THAT EXTENDS EITHER PERMANENTLY OR FREQUENTLY FROM THE SD INTO THE ISRD CAN SIGNIFICANTLY IMPROVE THE INFORMATION FLOW THAT WAS SO LACKING DURING OIF.¹¹⁶

¹¹⁴ Lt Col Hugh Curry, USAF, "The Current Battle Damage Assessment Paradigm is Obsolete," *Air & Space Power Journal*, Winter 2004, 13-17.

¹¹⁵ "Effects-based Assessment: Closing the Loop," (CAF White Paper, ACC, Langley AFB, Va.: March 2004), 5.

¹¹⁶ For more information, see Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-3.2, *Air and Space Operations Center*, 13 December 2004.

ANOTHER ORGANIZATIONAL CHANGE IS TO ADD A PROCESS ACTION TEAM (PAT) IN THE CAOC. THE PAT FOCUSES ON PROCESSES DEDICATED TO INFORMATION FLOW TO, FROM, AND WITHIN THE CAOC. PAT MEMBERS ARE SIMILAR TO CAOC EXPEDITORS, CAPABLE OF CRITICALLY EVALUATING COMPONENTS FROM A BROAD PERSPECTIVE.

IN DISCUSSING EBA WITH RESPECT TO CAOC ORGANIZATION, THE OAT IS THE TEAM TO ACCOMPLISH IT. SINCE ASSESSMENT IS THE GUIDING LIGHT OF STRATEGY, IT IS VITAL TO KEEP THE OAT IN THE STRATEGY DIVISION. FURTHERMORE, THE OAT SHOULD BE PHYSICALLY LOCATED WITH THE STRATEGY GUIDANCE AND STRATEGY PLANS TEAMS. THE TEAMS WITHIN THE SD MUST FREQUENTLY INTERACT WITH ONE ANOTHER, RATHER THAN WAITING FOR SCHEDULED MEETINGS OR BRIEFINGS. PHYSICALLY LOCATING THEM TOGETHER WILL FOSTER THIS TYPE OF INTERACTION AND ENABLE EBA TO DO ITS JOB—GUIDE AND IF REQUIRED, ADJUST STRATEGY.

FINALLY, ENHANCING EBA THROUGH THE ORGANIZATIONAL PERSPECTIVE REQUIRES A LOOK AT COMMAND AUTHORITIES BETWEEN THE JFACC AND THE JFC. SPECIFICALLY, IT INVOLVES GRANTING THE JFACC ADEQUATE AUTHORITY OVER LD/HD ISR ASSETS AND THE ABILITY TO EFFECTIVELY REACH BACK TO NATIONALLY CONTROLLED INTELLIGENCE ASSETS. THE JFC WILL NORMALLY APPOINT A JFACC FROM THE SERVICE THAT HAS THE “PREPONDERANCE OF THE ASSETS AND THE CAPABILITY TO COMMAND THEM.”¹¹⁷ FURTHERMORE, THE JFC WILL ASSIGN MISSION TASKINGS TO THE “UNIT SELECTED TO BE RESPONSIBLE FOR THE ACCOMPLISHMENT OF THE COLLECTION OPERATION. THE SELECTED UNIT MAKES THE FINAL CHOICE OF SPECIFIC PLATFORMS, EQUIPMENT, AND PERSONNEL BASED ON SUCH OPERATIONAL CONSIDERATIONS AS MAINTENANCE SCHEDULES, TRAINING, AND EXPERIENCE.”¹¹⁸ IT SEEMS CLEAR THAT THE JFC SHOULD DELEGATE CMA TO THE JFACC ON THE BASIS OF BOTH DOCTRINE AND COMMON SENSE. HOWEVER, ASSUMING THE JFC DOES NOT AGREE, THE JFACC HAS ALTERNATIVES THAT STEM FROM OTHER JFACC ROLES.

THE FIRST ALTERNATIVE CONCERNS THE JFACC’S ROLE AS THE AREA AIR DEFENSE COMMANDER (AADC), THE ISR COORDINATOR, AND THE AIRSPACE CONTROL AUTHORITY (ACA). AFDD 2 SUGGESTS THE JFACC WILL NORMALLY CLAIM THESE RESPONSIBILITIES, SINCE THEY INCLUDE “FUNCTIONS THAT DEMAND INTEGRATION TO ENSURE UNITY OF COMMAND AND EFFORT.”¹¹⁹ ASSUMING THE JFC MAINTAINS ISR CMA, THE JOINT STAFF STILL PRIORITIZES ISR. HOWEVER, THE JFACC MANAGES MANY OF THE ASSETS. ADDITIONALLY, AS THE ACA, THE JFACC MAINTAINS FINAL AUTHORITY OF WHERE AND WHEN ISR ASSETS FLY. AS LONG AS THE JFACC MEETS JFC PRIORITIES, HIS ROLE AS THE ACA ALLOWS HIM TO EMPLOY ISR ASSETS ANY WAY HE SEES FIT.

THE SECOND ALTERNATIVE HAS TO DO WITH A COMPONENT OF ISR CMA, KNOWN AS COLLECTION OPERATIONS MANAGEMENT (COM). THE COM PROCESS “ORGANIZES, DIRECTS, AND

¹¹⁷ Air Force Doctrine Document (AFDD) 2, *Organization and Employment of Aerospace Power*, 17 February 2000, 28.

¹¹⁸ Joint Publication (JP) 2-01.1, *Joint Tactics, Techniques, and Procedures for Intelligence Support to Targeting*, 9 January 2003, III-24 to III-25.

¹¹⁹ AFDD 2, 72.

MONITORS THE EQUIPMENT AND PERSONNEL THAT ACTUALLY COLLECT THE DATA TO SATISFY REQUIREMENTS.”¹²⁰ IF THE JFACC DOES NOT RECEIVE CMA, HE NORMALLY IS GRANTED COM. ALTHOUGH THE JFACC IS NOT MANAGING THE LD/HD ISR ASSETS, HE IS OPERATING THEM. THIS MAY BE SUFFICIENT TO ACCOMPLISH THE TASKINGS REQUIRED FOR EBA.

THE SINGLE MOST INFLUENTIAL FACTOR OF ISR PRIORITIZATION AND MANAGEMENT IS AVAILABILITY. SHOULD THE DAY COME WHEN THE JFC AND HIS COMPONENT COMMANDERS HAVE MORE EXTENSIVE ISR COVERAGE, THESE COMMAND RELATIONSHIP DEBATES WILL FALL BY THE WAYSIDE. HOWEVER, UNTIL THEN, THE JFACC NEEDS ENOUGH CONTROL OVER VITAL ISR ASSETS TO SUPPORT HIS STRUGGLING EBA PROCESS. AFTER ALL, IF THE JFC HAS ENOUGH TRUST IN THE JFACC TO TARGET IN ORDER TO ACHIEVE COMBINED EFFECTS, THEN THE JFACC SHOULD ALSO BE ABLE TO COLLECT ON BEHALF OF THE JFC.¹²¹

FROM AN ORGANIZATIONAL PERSPECTIVE, ADJUSTMENTS IN THESE AREAS WOULD HAVE ENABLED EBA TO PRODUCE BETTER RESULTS DURING OIF. WITHOUT THESE CHANGES, EBA WILL LIKELY CONTINUE TO STRUGGLE IN FUTURE OIF-TYPE WARS.

Doctrine, Tactics, Techniques & Procedures

DOCTRINE PROVIDES THE GUIDANCE FOR COMMANDERS TO FOLLOW IN WAR. THEY USE PROCESSES TO TRANSLATE THEIR DOCTRINAL GUIDANCE INTO USEFUL PRACTICE. DURING OIF, KEY DOCTRINE WAS NONEXISTENT, INCOMPLETE, OR NOT CONDUCTIVE TO EBA. IF EBA IS TO SUCCEED IN FUTURE WARS, AIRMEN MUST DEVELOP, EVALUATE, ADOPT, AND SPREAD APPROPRIATE DOCTRINE AND PROCESSES THROUGHOUT THE CAOC, THE AIR FORCE, AND THE JOINT SERVICES.

FIRST AND FOREMOST, EXPERIENCED AIRMEN MUST VIGOROUSLY CONTINUE TO DEVELOP EBA DOCTRINE. AIRMEN ASSOCIATED WITH THE AIR FORCE ASSESSMENT TASK FORCE (AFATF) SHOULD WORK IN CONCERT WITH SUCH AGENCIES AS THE C2ISR CENTER, C2 BATTLELAB, THE 505TH COMMAND AND CONTROL WING AT HURLBURT FIELD, AND THE AF DOCTRINE CENTER (AFDC).¹²² THEIR THOUGHTS AND EXPERIENCES MUST CONTINUE TO BE CAPTURED IN DOCTRINE DOCUMENTS, TTPs, WHITE PAPERS AND ARTICLES. IN THIS AREA, ONE INITIATIVE CURRENTLY IN THE WORKS IS THE NEWEST VERSION OF AFDD 2-1.9, *TARGETING*. THE CURRENT DRAFT OF THIS DOCUMENT INCLUDES AN EXCELLENT SECTION ON EBO, INCLUDING PRINCIPLES OF EFFECTS-BASED OPERATIONS. ADDITIONALLY, IT DEDICATES AN ENTIRE CHAPTER TO ASSESSMENT. HERE, IT CODIFIES THE ASSESSMENT LEXICON PRESENTED IN APPENDIX B OF THIS THESIS AND INCLUDES A COMPREHENSIVE LIST OF KEY ENABLERS FOR THE EBA CONSTRUCT.

¹²⁰ JP 2-01.1, III-23.

¹²¹ Michael Short, USAF Senior Mentor, interviewed by author, 4 January 2005.

¹²² Following OIF, OIF lessons learned prompted USAF/XO to task USAF/XOI to establish an Air Force Assessment Task Force (AFATF) to make recommendations for improving the assessment process. Agenda items for this group include assessment terminology, non-traditional ISR, ATO mission execution tracking, and training.

NEXT, AIRMEN MUST EVALUATE THE DOCTRINE AND PROCESSES THEY CREATE. MORE IMPORTANTLY, THEY MUST DO SO BEFORE THE NEXT WAR BREAKS OUT. DESPITE INCREASED OPERATIONS TEMPO OVER THE LAST SEVERAL YEARS, THE AIR FORCE STILL MAINTAINS A CREDIBLE EXERCISE SCHEDULE. AIRMEN MUST TAKE ADVANTAGE OF THESE OPPORTUNITIES TO TEST FLY EBA DOCTRINE. IF AIRMEN HOPE TO BENEFIT FROM EBA IN THE NEXT WAR, THEY MUST ENSURE ACCOMPANYING DOCTRINE IS PROPERLY VETTED IN AN ENVIRONMENT THAT MOST CLOSELY REFLECTS COMBAT OPERATIONS.

AFTER EVALUATING DOCTRINE AND PROCESSES, THE NEXT STEP IS TO ENSURE THE NEW PROCEDURES ARE INTEGRATED THROUGHOUT THE CAOC. AIRMEN THAT ENTER THE CAOC MUST BE AWARE OF THE GUIDANCE. THOSE WHO ARE PART OF THE EBA PROCESS MUST HAVE A LEVEL OF KNOWLEDGE GREATER THAN MERE FAMILIARITY. IN ADOPTING THESE NEW PROCESSES, THE AFOREMENTIONED PROCESS ASSESSMENT TEAM (PAT) WILL BE BENEFICIAL.

AS THE NEW GUIDANCE PERMEATES THE CAOC, AIRMEN MUST ALSO INFUSE IT INTO JOINT DOCTRINE. SINCE SERVICE DOCTRINE IS THE SOURCE OF JOINT DOCTRINE, THIS TASK IS NOT DIFFICULT IN THEORY. UNFORTUNATELY, THE REALITY OF THE SITUATION IS MUCH DIFFERENT. SINCE AIRPOWER ENABLES ASSESSMENT OVER THE LARGEST PORTION OF THE BATTLEFIELD, THE AIR FORCE IS IN THE BEST POSITION TO TAKE THE LEAD IN THE JOINT ASSESSMENT COMMUNITY. AS THE AIR FORCE TARGETING CYCLE IS A MAJOR FOCAL POINT OF THE JOINT TARGETING PROCESS, SO TOO SHOULD THE AIR FORCE EBA MODEL.

FINALLY, AIRMEN MUST CONTINUE TO ANALYZE THE ACTUAL CONTENT OF THE DOCTRINE AND PROCESSES THEY CODIFY TO ENHANCE EBA. ONE SMALL EXAMPLE OF THIS IS REFLECTED IN AN EXPERIMENTAL PROCESS KNOWN AS ESTIMATED DAMAGE ANALYSIS (EDA). WITH EDA, ANALYSTS EFFECTIVELY SHORTEN THE TIME IT TAKES TO MOVE FROM INITIAL BDA TO FUNCTIONAL DAMAGE AND TARGET SYSTEM ASSESSMENT (SEE APPENDIX A). BY MERGING EMPIRICAL DATA SUCH AS WEAPONS RELEASE PARAMETERS AND HISTORICAL PERFORMANCE DATA WITH KNOWN STRUCTURAL AND FUNCTIONAL FEATURES OF SELECTED, MODELED TARGETS, ANALYSTS CAN GAIN AN INITIAL ESTIMATE OF PHYSICAL DAMAGE TO THE TARGET. AFTER AN ATTACK, IF EDA CRITERIA ARE MET, THE ASSESSMENT PROCEEDS WITH A HIGH MEASURE OF CERTAINTY TO FUNCTIONAL DAMAGE ASSESSMENT. THIS IS BUT ONE EXAMPLE OF HOW PROCESSES, AS OUTLINED IN DOCTRINE, CAN FURTHER ENHANCE EBA IN THE CAOC.

CERTAIN REALITIES OF DOCTRINE WILL CONTINUE TO CREATE CHALLENGES IN THIS IMPORTANT AREA. FIRST, DOCTRINE TAKES TIME TO DEVELOP. PEACETIME EFFORTS SUCH AS CONFERENCES, MEETINGS, EXERCISES, 'THINK TANKS,' AND TASK FORCES PROVIDE VALUABLE INPUTS TO DOCTRINE. HOWEVER, NOTHING REPLACES LESSONS LEARNED FROM ACTUAL COMBAT. THEREFORE, THE EVOLUTION OF SOME DOCTRINE DOCUMENTS HINGES ON THE EXPERIENCES GAINED DURING THE NEXT WAR. THE REALITY OF CODIFYING THESE THOUGHTS AND LESSONS IS CHALLENGING AS WELL.

LIMITATIONS INHERENT IN THE DOCTRINE WRITING PROCESS INFLUENCE THE FINAL PRODUCT. A BRIEF LOOK AT THE PROCESS HIGHLIGHTS SOME OF THESE ISSUES. A CENTRAL ORGANIZATION, SUCH AS THE AFDC OR THE JOINT AIR AND SPACE TACTICS CENTER (J-ASTC), SELECTS A QUALIFIED ACTION OFFICER TO LEAD A WRITING CONFERENCE, AND THEN TRANSMITS A CONFERENCE ANNOUNCEMENT MESSAGE TO APPROPRIATE AGENCIES. IN A PERFECT WORLD, EVERY EXPERT IN A GIVEN FIELD GATHERS AT THESE WRITING CONFERENCES. IN REALITY, THIS SELDOM OCCURS. REAL-WORLD DEPLOYMENT REQUIREMENTS, MONETARY CONSTRAINTS, OR OTHER PERSONNEL AVAILABILITY NORMALLY LIMITS CONFERENCE ATTENDANCE. IN THE ONE TO THREE WEEKS THAT THE TEAM MEETS, THEY GENERATE EITHER AN ENTIRELY NEW DOCUMENT OR UPDATE AN EXISTING ONE. A TYPICAL AFDD CAN TAKE UP TO ONE YEAR FROM THE WRITING CONFERENCE TO ACTUAL PUBLISHING.¹²³ THE PRODUCTS THAT THESE CONFERENCES GENERATE IMPROVE WITH EACH DRAFT. HOWEVER, UNDERSTANDING THE EXTERNAL CONSTRAINTS ON THE ENTIRE DOCTRINE PROCESS ILLUMINATES INHERENT WEAK SPOTS IN DOCTRINE, OVERALL.

DOCTRINE IS THE MEANS TO SHARE THOUGHTS AND EXPERIENCES, AS WELL AS PROVIDE GUIDANCE AND RECOMMENDATIONS IN THE FORM OF TACTICS, TECHNIQUES, AND PROCEDURES. WITH THIS IN MIND, THERE ARE SEVERAL WAYS TO MINIMIZE THE AFOREMENTIONED LIMITATIONS ON DOCTRINE. FIRST AND FOREMOST, AIRMEN MUST RECOGNIZE THE IMPORTANCE OF DOCTRINE, WHETHER IT IS BASIC, OPERATIONAL, OR TACTICAL. THIS IN ITSELF WILL GENERATE INCREASED INVOLVEMENT IN THE DOCTRINAL DEVELOPMENT PROCESS. NEXT, SUBJECT AREA EXPERTS SHOULD NOT WAIT UNTIL DOCTRINE CONFERENCES TO BEGIN COMPILING THEIR THOUGHTS, EXPERIENCES, AND LESSONS LEARNED. INSTEAD, THEY SHOULD MAINTAIN A WORKING DOCUMENT AND BRIEFINGS THAT WILL ACCOMPANY THEM TO THE DOCTRINE CONFERENCE. WHEN THE CONFERENCE IS SCHEDULED, SUBJECT EXPERTS MUST DO EVERYTHING IN THEIR POWER TO ATTEND. THE CONFERENCE CAN ELIMINATE ONE EXTERNAL LIMITATION BY PROVIDING FULL FUNDING FOR SELECTED AREA EXPERTS TO ATTEND. NEXT, THE CONFERENCE MUST INCLUDE THE CORRECT SUBJECT EXPERTS. IN THE CASE OF EBA, WRITERS SHOULD INCLUDE STRATEGISTS, ANALYSTS, AND OPERATORS FROM INTELLIGENCE AND OPERATIONS COMMUNITIES. THIS WILL ENSURE THE PRODUCT INCLUDE A WIDER CONSENSUS RATHER THAN A NARROW, FOCUSED PERSPECTIVE. FINALLY, DOCTRINE IS NOT THE ONLY WAY INFORMATION IS SHARED. BETWEEN DOCTRINE CONFERENCES, AIRMEN MUST CONTINUE PUBLISHING AND PRESENTING RESEARCH PAPERS AND WHITE PAPERS AT REGULAR MEETINGS, WORKING GROUPS, AND CONFERENCES. ADDITIONALLY, THEY CAN USE INTERNET BULLETIN BOARDS AND CHAT SITES TO ENSURE THE WIDEST DISSEMINATION OF RELEVANT EXPERIENCES, THOUGHTS, AND LESSONS LEARNED. FOLLOWING THESE RECOMMENDATIONS, MOTIVATED AIRMEN CAN OVERCOME THE INHERENT LIMITATIONS OF DOCTRINE TO HELP ADVANCE PROCESSES SUCH AS EBA.

¹²³ Air University Catalog, on-line, Internet, 5 May 05, available from http://www.maxwell.af.mil/au/au_catalog_1999_2000/catalog2000_60_doctrine.html.

Technology

IT IS NO SURPRISE THAT TECHNOLOGICAL SOLUTIONS DOMINATE THE EVOLUTION OF THE CAOC. SINCE EBA RESIDES IN THE CAOC, TECHNOLOGY IS A MAJOR PART OF THE PROCESS. HOWEVER, IT IS IMPORTANT TO FOCUS TECHNOLOGY ON THE ENTIRE PROCESS VICE PARTS OF IT. IN ORDER FOR EBA TO SUCCEED, DATA MUST BE COLLECTED, COMPILED, AND ANALYZED. UNFORTUNATELY, MAJOR INFORMATION TECHNOLOGY (IT) SOLUTIONS DURING OIF FOCUSED TOO MUCH ON THE LAST ELEMENT AND NOT THE FIRST TWO. THE IT SOLUTIONS THAT FOSTER COMPILING AND ANALYZING INFORMATION ARE NOTHING SHORT OF INCREDIBLE. HOWEVER, WITHOUT DATA TO FEED THEM, THEY ARE WORTHLESS TO EBA. SEVERAL EXAMPLES PRESENTED IN THIS THESIS STRESS THE IMPORTANCE OF GETTING TIMELY, ACCURATE, FOUNDATIONAL ASSESSMENTS BACK TO THE CAOC IN A USEABLE FORMAT.

THE AIR FORCE MUST PAY SUFFICIENT ATTENTION TO THE COLLECTING AND COMPILING PHASES OF ASSESSMENT. THIS INCLUDES GATHERING FROM AIRBORNE COCKPITS AND GROUND-BASED UNITS. DATA LINK TECHNOLOGY WILL ENABLE AIRBORNE PLATFORMS TO QUICKLY AND ACCURATELY TRANSMIT INITIAL ATTACK PARAMETERS AND ASSESSMENT ESTIMATES BACK TO THE CAOC. FURTHERMORE, INITIATIVES SUCH AS THE AUTOMATED MISPREP TOOL (AMT) WILL ENABLE UNITS TO PUSH MISREP DATA FORWARD TO A UNIFIED DATABASE. THESE ARE BUT A FEW OF THE TECHNOLOGICAL SOLUTIONS THAT SPEAK DIRECTLY TO THESE INITIAL PHASES OF ASSESSMENT.

ONLY TIME AND ANOTHER WAR WILL TELL IF THESE ORGANIZATION, DOCTRINAL, AND TECHNOLOGICAL RECOMMENDATIONS WILL BRING EBA UP TO A LEVEL OF OPERATIONAL UTILITY. IN THE MEAN TIME, INITIATING THESE CHANGES WILL CERTAINLY ADVANCE THE EBA CONSTRUCT AND IMPROVE THE ODDS OF EBA SUCCEEDING IN A FUTURE WAR. WITH THESE CHANGES IN MIND, SEVERAL ADDITIONAL CONSIDERATIONS HELP PAVE THE ROAD AHEAD. FIRST, IN ORDER TO FULLY EXPLOIT THE POWER OF THE EBA CONSTRUCT, A CULTURAL CHANGE IN THE AIR FORCE IS REQUIRED THAT SOLIDIFIES THE IMPORTANCE OF ASSESSMENT IN OUR ABILITY TO WAGE WAR. SECOND, THE AFOREMENTIONED CHANGES TO ORGANIZATION, DOCTRINE, AND TECHNOLOGY CAN ONLY TAKE ROOT THROUGH REALISTIC TRAINING AND EXERCISING. FINALLY, USING OIF AS A CASE STUDY, A BROAD LOOK AT THE NATURE OF FUTURE WARFARE OFFERS SEVERAL IMPORTANT TOPICS FOR FUTURE RESEARCH.

Culture

EBA REQUIRES MORE THAN JUST A FEW ANALYSTS. IN FACT, IT REQUIRES A CONCERTED EFFORT OF ANALYSTS AND OPERATORS ALIKE. THE AIR FORCE ASSESSMENT COMMUNITY IS WELL AWARE OF THE CHALLENGES EBA MET DURING OIF. UNFORTUNATELY, THE ASSESSMENT COMMUNITY IS A RELATIVELY SMALL PORTION OF THE AIR FORCE. HISTORY REFLECTS AN AIR FORCE THAT DOES NOT GIVE ASSESSMENT THE CREDENCE IT DESERVES, AS A VITAL COMPONENT OF A COHERENT, EFFICIENT, AND EFFECTIVE AIR CAMPAIGN STRATEGY. PILOTS ARE RAISED TO BELIEVE THAT THEIR JOB IS TO BLOW STUFF UP. THEN, WHEN THE DUST SETTLES, INTELLIGENCE PERSONNEL MOVE IN TO ASSESS THE DAMAGE. THIS IS A CULTURAL DEFICIENCY THAT MUST BE OVERCOME IF EBA IS TO SUCCEED.

SOME ORGANIZATIONAL CHANGES THAT SHOULD PROMOTE CULTURAL CHANGES WITH RESPECT TO THE ASSESSMENT COMMUNITY HAVE ALREADY OCCURRED OR SOON WILL OCCUR. THE FIRST WAS RELOCATING THE DIRECTORATE OF INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (XOI) UNDERNEATH THE DIRECTOR OF AIR AND SPACE OPERATIONS (XO).¹²⁴ WITH THIS STRUCTURE, THE STAFF DIRECTORATES OF BOTH THE INTELLIGENCE AND OPERATIONS COMMUNITIES REPORT TO ONE COMMANDER. THE CHALLENGE OF BREAKING DOWN INHERENT STOVEPIPES IN THIS TYPE OF DIVISIONAL STRUCTURE WILL PERSIST. HOWEVER, PLACING BOTH DIRECTORATES UNDER A UNIFIED ORGANIZATIONAL STRUCTURE IS A MOVE IN THE CORRECT DIRECTION. THE SECOND FORCE STRUCTURE INITIATIVE THAT IS SOON TO TAKE EFFECT IS THE CREATION OF THE STANDING WAR FIGHTING HEADQUARTERS (WFHQ). THE OVERALL CONCEPT OF CREATING THE WFHQ WITH A STANDING AOC IS TO PLAN, EXECUTE, AND ASSESS WAR FIGHTING OPERATIONS FULL TIME.¹²⁵ MEANWHILE, ESTABLISHING A DEDICATED DIVISION UNDER THE COMMANDER, AIR FORCE FORCES (COMAFFOR), THE A-9 ANALYSIS, ASSESSMENTS, AND LESSONS LEARNED DIVISION, REFLECTS AN OVERALL RECOGNITION THAT ASSESSMENT IS A VITAL COMPONENT OF THE AIR STRATEGY. CARE MUST BE TAKEN TO AVOID THE SAME TYPE OF STOVE PIPING DESCRIBED IN THIS THESIS. FOR THE SAME REASON WHY THE OAT WILL BE MOST EFFECTIVE BY REMAINING WITHIN THE SD, THE A-9 DIRECTORATE MUST REMAIN FULLY ENGAGED WITH THE DAILY ACTIVITIES OF THE CAOC.

THE OVERALL GOAL OF THESE PARTICULAR EXAMPLES IS TO ENHANCE INTEGRATION BETWEEN COMPONENTS AND PROVIDE THE WAR FIGHTER THE RESOURCES REQUIRED TO ACCOMPLISH HIS OBJECTIVES. HOWEVER, A CONVENIENT BYPRODUCT OF BOTH ORGANIZATIONAL CHANGES IS THAT THE ASSESSMENT PIECE OF AIR STRATEGY MOVES FURTHER TOWARDS THE FOREFRONT OF THE OPERATIONAL AIR FORCE. THE AUTHOR IS NOT SO NAÏVE TO BELIEVE THAT EBA-ENHANCING ORGANIZATIONAL, DOCTRINAL, AND TECHNOLOGICAL CHANGES WILL OCCUR OVER NIGHT. HOWEVER, CREATING A CULTURE THAT ACKNOWLEDGES THE IMPORTANCE OF ASSESSMENT TO THE OVERALL SUCCESS OF THE AIR CAMPAIGN IS A VITAL FIRST STEP TO ENSURING EBA SUCCEEDS IN FUTURE WARS.

Training

THE FIRST STEPS TO FIXING A PROBLEM ARE RECOGNIZING AND ENSURING AWARENESS OF THE PROBLEM. THE NEXT STEP IS TO DEVELOP AN ACHIEVABLE SOLUTION TO THE PROBLEM. THE FINAL STEP IS IMPLEMENTING THE SOLUTION. THE FINAL STEP IS ARGUABLY EVERY BIT AS IMPORTANT AS THE PRECEDING ONES. JUST AS AIRMEN CAN PERFECTLY EXECUTE A FLAWED STRATEGY, THEY CAN ALSO POORLY EXECUTE A PERFECT ONE.

IF EBA IS TO SUCCEED IN FUTURE WARS, ALL REQUIRED PERSONNEL MUST BE KNOWLEDGEABLE AND EXPERIENCED IN EFFECTS-BASED DOCTRINES AND PROCESSES, OR AT A MINIMUM, BE FAMILIAR WITH THEM. FURTHERMORE, COMBAT IS NOT THE PLACE TO IMPLEMENT NEW CHANGES. RATHER, THE AIR

¹²⁴ USAF Brigadier General Dan Darnell, OIF USCENTAF CAOC Director, interviewed by author, 22 January 2005.

¹²⁵ ““Effects-based Assessment: Closing the Loop,” 9.

FORCE MUST TRAIN PERSONNEL BEFORE DEPLOYMENTS AND TAKE FULL ADVANTAGE OF THE MULTIPLE TRAINING OPPORTUNITIES IT HAS TO ENSURE CAOC PERSONNEL GET SUFFICIENT EXPERIENCE IN APPLYING THEIR TRAINING. THE C2 WAR FIGHTERS COURSE AT HURLBURT FIELD IS THE CENTRAL SCHOOLHOUSE FOR AOC TRAINING. EXERCISES SUCH AS BLUE FLAG ARE DEDICATED TO EXERCISING THE COMMAND AND CONTROL PIECE. FURTHERMORE, RED FLAG IS EVOLVING FROM A SOLELY TACTICAL-LEVEL EXERCISE TO ONE THAT RECOGNIZES THE OPERATIONAL LEVEL OF WAR. REGIONAL EXERCISES SUCH AS INTERNAL LOOK 2003 AND THE ANNUAL ULCHI-FOCUS LENS (UFL) IN KOREA ARE PERFECT OPPORTUNITIES TO FURTHER VET AND REINFORCE CONCEPTS SUCH AS EBA. HOWEVER, THESE EXERCISES SHARE ONE COMMON WEAKNESS WHEN IT COMES TO EBA—DURATION.

EBA REQUIRES TIME IN ORDER FOR ANALYSTS TO RECOGNIZE ENOUGH TRENDS TO MAKE ANALYTICALLY SOUND STRATEGIC RECOMMENDATIONS TO THE JFACC. UNFORTUNATELY, MOST EXERCISES DO NOT LAST LONG ENOUGH FOR THESE TRENDS TO DEVELOP SUFFICIENTLY. THE UFL TEAM IN KOREA ATTEMPTS TO CIRCUMVENT THIS ISSUE BY SKIPPING THE VIRTUAL CALENDAR AHEAD BY UP TO FIFTY DAYS, THEREBY FITTING SEVERAL MONTHS OF EXERCISE DAYS INTO THE ALLOTTED FIVE TO TEN DAYS OF ACTUAL EXERCISING. ALTHOUGH THIS IS NOT THE OPTIMAL SOLUTION, IT ACKNOWLEDGES THE DEMANDS OF REAL WORLD RESPONSIBILITIES AND RESULTING TIME LIMITATIONS ON THE EXERCISE PARTICIPANTS. IF ASSESSMENT IS TO IMPROVE, ADMINISTRATORS MUST AVOID THE TEMPTATION OF SPRINKLING 'EXERCISE FAIRY DUST' ACROSS THE ASSESSMENT PIECE. ASSESSMENT MUST BECOME AN INTEGRAL PART OF EACH TRAINING EXERCISE. COMMANDERS MUST NOT SHORT ASSESSMENT BECAUSE OF THE PERCEIVED NOTION THAT IT TAKES FROM THE OPERATIONAL PART OF THE EXERCISE. INSTEAD, THEY MUST RECOGNIZE THAT ASSESSMENT IS ACTUALLY AN INTEGRAL PART OF THE OPERATIONAL COMPONENT.

AS FIGURE 11 SUGGESTS, TRAINING IS THE CORD THAT LASHES TOGETHER ORGANIZATIONAL, DOCTRINAL, AND TECHNOLOGICAL FIXES TO EBA. THERE ARE DEFINITE CHALLENGES TO HOW TRAINING SHOULD BEST BE USED. HOWEVER, RECOGNIZING THE IMPORTANCE OF TRAINING AND THE LIMITATIONS INHERENT IN ANY EXERCISE WILL ENABLE THE AIR FORCE TO MAXIMIZE EVERY TRAINING AND EXERCISE OPPORTUNITY. MORE IMPORTANTLY, COMMANDERS MUST CONSTRUCT THEIR EXERCISES TO ACCOUNT FOR THE TYPES OF WARS THEY ARE MOST LIKELY TO FIGHT IN THE FUTURE.

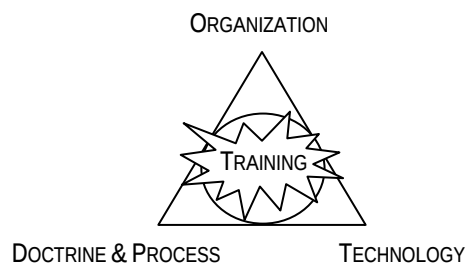


Figure 11. Organization, Doctrine, and Technology Triad

Nature of War

OIF WAS A FAST PACED, SHORT, DYNAMIC WAR.¹²⁶ IN THIS WAY, IT WAS NOT UNLIKE DESERT STORM AND ALLIED FORCE, WHICH LASTED 42 AND 78 DAYS, RESPECTIVELY. THIS TREND SUGGESTS THAT OIF IS INDEED A MODEL FOR FUTURE WARS IN WHICH AIRPOWER WILL BE INVOLVED. TECHNOLOGY WILL ENSURE THESE WARS ARE FAST PACED AND SHORT. ADVERSARIES THAT RELY ON ASYMMETRIC WARFARE AS THEIR ONLY MEANS TO SURVIVE WILL ENSURE THAT FUTURE WARS ARE DYNAMIC. EXAMINING THE EBA CONSTRUCT AGAINST THESE TYPES OF WARS REVEALS RELEVANT CONSIDERATIONS FOR THIS AND OTHER CONSTRUCTS THAT THE AIR FORCE ADOPTS.

EBA REQUIRES TIME. FIRST, ASSESSORS REQUIRE ENOUGH TIME TO COLLECT AND COMPILE ASSESSMENT INFORMATION. NEXT, EFFECTS TAKE TIME TO DEVELOP AND THUS TO ASSESS. THROUGH IMPROVED ORGANIZATION, DOCTRINALLY GUIDED PROCESSES, AND TECHNOLOGY, AIRMEN CAN DECREASE THE AMOUNT OF TIME IT TAKES TO COLLECT AND COMPILE INFORMATION. HOWEVER, THEY CANNOT CONTROL THE AMOUNT OF TIME IT TAKE FOR AN EFFECT TO DEVELOP. RECOGNIZING THIS LIMITATION, THE EBA PROCESS INCLUDES A PREDICTIVE ELEMENT MEANT TO MITIGATE SOME OF THIS PROBLEM. HOWEVER, THIS ASPECT OF ASSESSMENT IS LARGELY OUT OF THEIR CONTROL. DURING THE THIRTY-ONE DAYS OF OIF, COALITION AIRCRAFT AVERAGED OVER 1,300 SORTIES PER DAY.¹²⁷ SITUATIONS DEVELOPED IN HOURS AND DAYS RATHER THAN WEEKS AND MONTHS. BEFORE MOST OPERATIONAL AND STRATEGIC EFFECTS BECAME EVIDENT, THE AIR CAMPAIGN ENDED. ONE WRITER MAINTAINS, "THE EFFECTS OF MANY AIR STRIKES IN THIS WAR WERE IMPOSSIBLE TO ASSESS UNTIL COALITION FORCES ACTUALLY PUT THEIR BOOTS ON THE GROUND, AND EVEN THEN THE OUTCOME COULD REMAIN UNCERTAIN. ONLY AFTER THE CONFLICT IS OVER—AND SOMETIMES LONG AFTER—CAN THE HISTORIAN, WITH ACCESS TO THE DOCUMENTS ON BOTH SIDES, UNTANGLE THE REAL EFFECTS THAT BOMBING AND MISSILE ATTACKS HAVE HAD ON AN ENEMY."¹²⁸ DUE TO THE SHORT DURATION AND FAST PACE OF OIF, ASSESSORS DID NOT HAVE ENOUGH TIME TO ASSESS MANY OPERATIONAL EFFECTS. THIS EVIDENCE SUGGESTS THAT A SHORT, FAST-PACED CAMPAIGN WILL STRESS AN UNDER-DEVELOPED EBA PROCESS.

¹²⁶ Yet another critical aspect of OIF concerned the efficiency of precision-guided munitions and the capacity of modern aircraft to employ them. The majority of OIF strike aircraft employed multiple precision-guided munitions per sortie. Considering an astonishing 3:2 munitions dropped per DMPs struck, CAOC assessors had hundreds of DMPs to evaluate for each ATO; *Operation Iraqi Freedom—By the Numbers*, USCENAF Assessment and Analysis Division (Prince Sultan Air Base, Saudi Arabia: USCENAF, April 2003), 11.

¹²⁷ *Operation Iraqi Freedom—By the Numbers*, 7-8.

¹²⁸ Williamson Murray and Major General Robert H. Scales, Jr., *The Iraq War: A Military History* (Cambridge, Mass.: The Belknap Press of Harvard University Press, 2003), 156-157.

PACE AND DURATION ARE NOT THE ONLY FACTORS TO INFLUENCE EBA. EBA FAVORS A FIXED TARGET BATTLESPACE WHERE COMPONENTS NOMINATE TARGETS FOR INCLUSION ON THE JOINT INTEGRATED PRIORITY TARGETS LIST (JIPTL). AFTER AIR ASSETS ATTACK THESE TARGETS, TRADITIONAL AND NON-TRADITIONAL ISR ASSETS COLLECT ASSESSMENT INFORMATION ON THEM. ANALYSTS CORRELATE KNOWN STRIKES AGAINST TARGET SETS AND EXAMINE PREDETERMINED MEASURES OF EFFECTIVENESS IN ORDER TO ASSESS DESIRED EFFECTS. HOWEVER, RECALLING THE LARGE PERCENTAGE OF AIRBORNE TASKINGS DURING OIF, THIS WAS FAR FROM A FIXED-TARGET WAR.

IN ORDER FOR EBA TO SUCCEED, STRATEGISTS MUST CORRELATE TACTICAL TASKS TO OPERATIONAL OBJECTIVES. FOR THIS TO OCCUR, THEY MUST BE ABLE TO ASSESS THE TASKS THAT WERE PLANNED FOR A RESPECTIVE OBJECTIVE. SIMPLY STATED, THE THREAD THAT CONNECTS THE STRATEGY TO THE ACTION MUST REMAIN INTACT. WHEN THIS THREAD IS NOT IN PLACE, EBA WILL NOT SUCCEED. IN THE EBO CONSTRUCT, DMPIS CORRESPOND TO SPECIFIC TACTICAL TASKS, WHICH IN TURN SUPPORT TACTICAL AND OPERATIONAL OBJECTIVES. THEREFORE, EFFECTS-BASED ASSESSMENTS HINGE ON PLANNED ACTIONS. THE DYNAMIC NATURE OF OIF RESULTED IN AIRMEN EXECUTING MISSIONS THAT WERE NOT IN ACCORDANCE WITH THE STRATEGY THAT INITIALLY ALLOCATED THEM. ACCORDING TO CAOC DIRECTOR BG DAN DARNELL, PLANNERS PUSHED NEARLY A DOZEN CHANGES TO EACH DAILY ATO.¹²⁹ STRESSING AN UNDER-DEVELOPED ASSESSMENT PROCESS, THE DYNAMIC NATURE OF OIF CREATED HAVOC THROUGHOUT THE CAOC. JUST AS TIME AFFECTS EBA, RAPIDLY CHANGING OPERATIONS AFFECT IT AS WELL. LIKE OIF, FUTURE WARS WILL ALSO BE DYNAMIC. EVIDENCE FROM OIF SUGGESTS THAT DYNAMIC WARS WILL STRESS AN UNDER-DEVELOPED EBA PROCESS.

US MILITARY COMMANDERS, POLITICAL LEADERS, AND THE AMERICAN PUBLIC GENERALLY WELCOME FAST-PACED, SHORT WARS. MOST MILITARY COMMANDERS ALSO REALIZE THAT WAR IS UNPREDICTABLE. ACCEPTING THESE FACTORS AS REALITY, THE ONE FINAL ASSET THE COMMANDER CAN MAINTAIN IS CONTROL OVER HIS PROCESSES. CONTROL IS IMPORTANT BECAUSE IT ALLOWS THE COMMANDER TO PROACTIVELY EXECUTE THE PLANNED ASSESSMENT PROCESS. HOWEVER, DURING OIF, THE JFACC STRUGGLED TO DO THIS, ALTHOUGH THIS WAS NO FAULT OF HIS OWN. IN ADDITION TO BEING A SUBORDINATE COMPONENT OF THE JFC, THE AIR COMPONENT ACTED MAINLY IN A SUPPORTING ROLE, REFLECTED IN THE CFACC APPORTIONING ROUGHLY 66% OF HIS AIR ASSETS TO SUPPORT THE CFLCC AND CFMCC.¹³⁰ AS A SUBORDINATE AND SUPPORTING COMPONENT, THE JFACC SPENT MORE TIME REACTING TO EXTERNAL INPUTS THAN ASSESSING PLANNED EXECUTION WITH RESPECT TO STRATEGY.

MANY ATO CHANGES CAME FROM CENTCOM OR FRANKS HIMSELF, AND WERE OFTEN NOT ON THE JIPTL.¹³¹ DARNELL NOTES, "CENTCOM FORWARD DROVE THE TRAIN. WHEN THEY DISAGREED WITH A CENTAF ASSESSMENT, THEY WOULD CALL FOR A RESTRIKE, AND SINCE IT WAS A HIGH PRIORITY TARGET FOR THEM, IT WOULD NORMALLY GO ON THE TIME SENSITIVE TARGET (TST) LIST. IT ALSO MADE

¹²⁹ *Operation Iraqi Freedom—By the Numbers*, 6.

¹³⁰ *Ibid*, 5.

¹³¹ Byron E. Hukee, 32 AOS/AOXS Chief, Operational Assessment, interviewed by author, 11 April 2005.

IT VERY DIFFICULT TO BE PROACTIVE WITH ASSESSMENT OR THE ATO PROCESS IN GENERAL.”¹³² AS FIGURE 12 SUGGESTS, TOO MANY EXTERNAL INPUTS JUST PRIOR TO OR DURING THE EXECUTION PHASE CAN DERAIL THE ENTIRE EBO PROCESS.

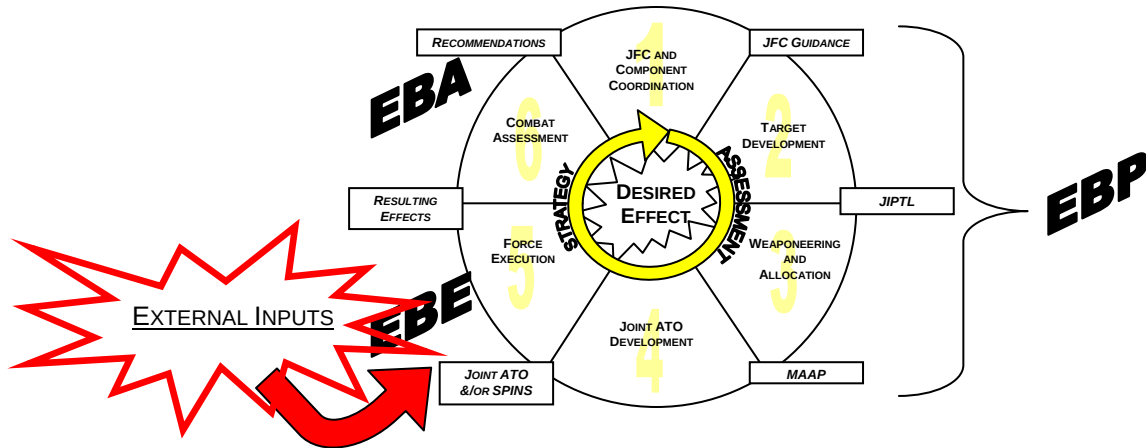


Figure 12. External Inputs to Air Tasking Cycle

SINCE AIRPOWER RESOURCES ARE FINITE, THE DAILY ATO IS A ZERO SUM GAME. FOR EVERY DMPI ADDED TO THE ATO, ANOTHER MUST BE ELIMINATED. AFTER REPRIORITIZING HIS LIMITED RESOURCES, THE CAOC DIRECTOR ACCEPTED THAT SOME PLANNED ATO TARGETS WOULD GO UNCOVERED. IN EFFECT, THE THREAD THAT TIES TACTICAL TASKS TO OPERATIONAL OBJECTIVES UNRAVELED, THEREBY LEAVING EBA WITH LITTLE TO ASSESS. ONE CAN ONLY ASSUME THAT THE JFC HAD HIS OWN SET OF OPERATIONAL OBJECTIVES IN MIND WHEN HE PUSHED LATE NOTICE CHANGES DOWN TO THE CAOC. HOWEVER, IF THESE DMPI CHANGES DO NOT CARRY WITH THEM THE SAME EFFECTS-BASED METHODOLOGY AS THE EFFECTS-BASED PLANNED ATO DMPIs THAT THEY REPLACED, THEN ANALYSTS CAN DO LITTLE WITH EBA. AT BEST, THEY CAN REPORT SORTIE FLOWN, WEAPONS EXPENDED, AND HOPEFULLY TACTICAL LEVEL ASSESSMENTS. BY PULLING THE EFFECTS-BASED THREAD FROM THE CAOC, ANALYSTS ARE RELEGATED TO ATTRITION-BASED ASSESSMENT AT BEST.

PREVIOUS CHAPTERS ILLUSTRATE HOW THE JFACC MUST HAVE A SUFFICIENT LEVEL OF AUTHORITY OVER ISR ASSETS TO ENABLE EBA COLLECTION AND PREDICTION. I WILL NOT REITERATE THIS POINT HERE. SUFFICE TO SAY, THESE COMBINED POINTS SUGGEST THAT INADEQUATE OPERATIONAL CONTROL AND AUTHORITY WILL STRESS AN UNDER-DEVELOPED EBA PROCESS.

THE AGGREGATE OF THE PRECEDING FINDINGS SUGGESTS THAT FAST, DYNAMIC, SHORT WARS WHERE THE JFACC IS THE SUPPORTING COMMANDER WILL STRESS AN UNDER-DEVELOPED EBA CONSTRUCT. SINCE AIRMEN WILL LIKELY FIGHT THESE TYPES OF WARS IN THE FUTURE, ANY

¹³² Darnell interview, 22 January 2005.

OPERATIONAL CONSTRUCT THEY ADOPT MUST ACCOUNT FOR THE SITUATION FOR WHICH IT IS DEVELOPED. IT IS EASY TO BLAME THE WAR FOR EBA FAILURES, BUT EBA DID NOT FAIL BECAUSE OF THE NATURE OF THE WAR. AFTER ALL, THE EBA CONSTRUCT MUST CONFORM TO THE WAR, NOT VICE VERSA. EBA FAILED BECAUSE THE ORGANIZATIONAL, DOCTRINAL, AND TECHNOLOGICAL SUPPORT IT REQUIRES WERE NOT SUFFICIENTLY DEVELOPMENT WHEN THE WAR BEGAN. IN SUM, THE EBA PROCESS DID NOT CONFORM TO THE NATURE OF THE OIF. THESE FEATURES MUST BE ACKNOWLEDGED AND PREDICTED FOR FUTURE WARS, BUT MUST NOT BECOME EXCUSES FOR FUTURE FAILURES. RATHER, THEY MUST BE CHALLENGES THAT ORGANIZATION, DOCTRINE, AND TECHNOLOGY FOCUS ON TO ENSURE THE EBA PROCESS IS READY THE NEXT TIME.

Spectrum of Effectiveness

THE EVIDENCE PRESENTED HEREIN STRONGLY SUPPORTS THE THESIS THAT AN UNDERDEVELOPED EBA CONSTRUCT WILL NOT PROSPER IN AN OIF-TYPE WAR WITH CURRENT ORGANIZATIONAL, DOCTRINAL, AND TECHNOLOGICAL LIMITATIONS. HOWEVER, THE INITIAL RESEARCH QUESTION REMAINS: CAN EBA BE OPERATIONALIZED FOR THE TYPES OF WAR THE US WILL LIKELY FIGHT IN THE FUTURE. IN OTHER WORDS, CAN EBA REACH A POINT OF ACCEPTABLE UTILITY? THE LOGIC USED IN ANSWERING THIS QUESTION MAY BE APPLIED TO ADDITIONAL CONSTRUCTS THE AIR FORCE AND US MILITARY ESTABLISHMENT ADOPTS.

ESTABLISHING A REASONABLE DEFINITION OF WHAT IT MEANS TO BE OPERATIONAL PROVIDES THE NECESSARY FOUNDATION FOR ANSWERING WHETHER EBA CAN ACHIEVE THIS STATUS IN A FUTURE WAR. PERHAPS THE BEST WAY TO BEGIN IS TO STATE WHAT OPERATIONAL IS NOT. OPERATIONALIZING EBA DOES NOT MEAN THAT THE CONSTRUCT PROVIDES THE JFACC A FLAWLESS VIEW OF THE PAST AND A PERFECT GLIMPSE INTO THE FUTURE. THIS STANDARD IS, OF COURSE, IMPOSSIBLE TO ACHIEVE. AS IT RELATES TO EBA, OPERATIONAL MEANS THE CONSTRUCT IS USEFUL TO THE JFACC, WHERE THE BENEFITS GAINED FROM ACCOMPLISHING EBA REMAIN GREATER THAN OR EQUAL TO THE OVERALL EXPENDITURE OF EFFORT, RESOURCES, OR HUMAN LIFE. DEFINING THE SUCCESS OF A CONSTRUCT IN PRACTICAL AND REALISTIC TERMS IS PARAMOUNT IN ASSESSING ITS OVERALL UTILITY.

THERE IS A SPECTRUM OF UTILITY FOR ANY THEORETICAL CONSTRUCT, BOUNDED ON EITHER END BY ZERO AND PERFECT EFFECTIVENESS. SOMEWHERE ALONG THIS SPECTRUM IS A WINDOW OF PRACTICAL UTILITY, WHERE AN OPERATIONAL CONSTRUCT RESIDES (FIGURE 13). THE LEFT EDGE OF THIS WINDOW IS THE PLACE WHERE THE CONSTRUCT IS OF NO VALUE TO THE USER. THIS IS THE POINT WHERE THE BENEFITS OF THE CONSTRUCT DO NOT OUTWEIGH THE COSTS OF IMPLEMENTING IT. THE RIGHT EDGE REPRESENTS THE REALISTIC LOCATION WHERE THE CONSTRUCT CAN SIMPLY NOT IMPROVE ANY MORE.

AIRMEN MANIPULATE THE LEVERS OF INTERNAL FACTORS SUCH AS ORGANIZATION, DOCTRINE, AND TECHNOLOGY TO KEEP THE CONSTRUCT WITHIN THE WINDOW OF PRACTICAL UTILITY. CONSTRUCTS LACKING IN ANY OF THESE AREAS MAY FALL OUTSIDE THIS WINDOW. ADDITIONALLY, EXTERNAL FACTORS

SUCH AS THE NATURE OF WARFARE CAUSE THE WINDOW OF PRACTICAL UTILITY TO MOVE UP AND DOWN THE SPECTRUM. FOR EXAMPLE, IN A LIMITED WAR AGAINST AN OUTCLASSED ENEMY, A CONSTRUCTS' WINDOW OF UTILITY MOVES FURTHER TO THE LEFT. THE WINDOW SLIDES TO THE RIGHT DURING A WAR AGAINST A MORE CREDIBLE THREAT.

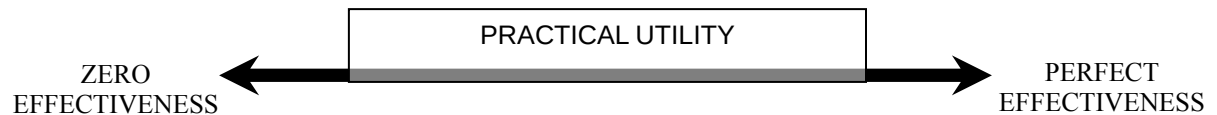


FIGURE 13. SPECTRUM OF UTILITY

DURING OIF, THE EBA CONSTRUCT FELL OUTSIDE ITS WINDOW OF PRACTICAL UTILITY. FIRST, EXTERNAL FACTORS LIKE PACE, DURATION, AND DYNAMIC NATURE OF THE WAR CAUSED THE WINDOW OF UTILITY TO MOVE TO THE RIGHT. THIS REQUIRED THE EBA CONSTRUCT TO BE CLOSER TO MAXIMUM EFFECTIVENESS IN ORDER TO ENTER THE WINDOW OF UTILITY. HOWEVER, INEFFICIENCIES IN THE INTERNAL FACTORS KEPT THE CONSTRUCT FROM ENTERING THE WINDOW. THE END RESULT WAS THAT THE EBA CONSTRUCT WAS NOT PARTICULARLY USEFUL IN ITS PURPOSE.

AN OPERATIONAL CONSTRUCT IS ONE THAT FALLS WITHIN ITS WINDOW OF UTILITY. THE NATURE OF FUTURE WARS MEANS THIS WINDOW WILL CONTINUE TO FAVOR THE RIGHT SIDE OF THE SPECTRUM. IN THIS REGARD, IT IS MORE DIFFICULT TO GET A CONSTRUCT INTO ITS WINDOW OF UTILITY. IN THESE TYPES OF WARS, A CONSTRUCT MUST NOT ONLY BE EFFECTIVE, BUT ALSO EFFICIENT. FORTUNATELY, THE POINT OF PRACTICAL UTILITY IS NOT A SINGLE POINT ON THE SPECTRUM—THE WINDOW HAS WIDTH. THEREFORE, THE CONSTRUCT MUST MERELY GET SOMEWHERE INTO THIS THEORETICAL WINDOW TO BE CLASSIFIED AS OPERATIONALIZED. THIS DOES NOT IMPLY THAT STRATEGISTS SHOULD AIM SHORT OF THE GOAL OF MAXIMUM UTILITY FOR A GIVEN CONSTRUCT. IT SIMPLY ACKNOWLEDGES THAT A CONSTRUCT IS CONSIDERED USEFUL WHEN IT LIES IN ITS WINDOW OF UTILITY, SOMEPLACE SHY OF THE THEORETICALLY UNACHIEVABLE MARK OF PERFECT EFFECTIVENESS. THE RECOMMENDATIONS FOR CHANGES TO INTERNAL FACTORS ARE TANGIBLE WAYS STRATEGISTS CAN PUSH THE EBA CONSTRUCT INTO ITS WINDOW.

VALID COMPLAINTS OF EBA ARE THAT THE CONSTRUCT IS TOO COMPLEX, TOO TIME CONSUMING, AND TOO DEPENDENT ON INTANGIBLE ASSESSMENT INPUTS TO ADAPT TO A WAR LIKE OIF. CONCEDED—AT LEAST IN PART—SOME OR ALL OF THESE ALLEGATIONS, A LOOK AT THE EBA PRODUCT ITSELF HELPS TO ANSWER WHETHER THE EBA CONSTRUCT IS WORTH PURSUING AT ALL. THE EBA CONSTRUCT CAN NEVER PAINT THE ENTIRE OPERATIONAL ASSESSMENT PICTURE. THE CHALLENGE IS DETERMINING WHEN *ENOUGH* OF THE OPERATION PICTURE IS IN PLACE TO FUEL INFORMED, STRATEGIC DECISIONS. WHEN THE EBA ENABLES THE JFACC TO MAKE INFORMED, STRATEGIC DECISIONS, THE CONSTRUCT IS IN ITS

WINDOW OF UTILITY. WE CAN EXTRAPOLATE THIS LOGIC AGAINST THE BACKDROP OF PREDICTED, OIF-TYPE FUTURE WARS TO DETERMINE THE UTILITY OR FUTILITY OF PURSUING OTHER CONSTRUCTS.

Future Research

ANY WORTHWHILE RESEARCH PROJECT CREATES AS MANY QUESTIONS AS IT ANSWERS. CONSIDERING THE CONCLUSIONS PRESENTED IN THIS CHAPTER, THERE ARE THREE AREAS THAT ARE FERTILE FOR ADDITIONAL RESEARCH. THEY EXPAND ON CULTURE, TRAINING, AND THE NATURE OF FUTURE WAR. A CULTURAL REVOLUTION IS REQUIRED BEFORE ASSESSMENT CAN TAKE ITS RIGHTFUL PLACE IN STRATEGY DEVELOPMENT AND EMPLOYMENT. THE MEANS BY WHICH TO FOSTER THIS CULTURAL CHANGE—EITHER TOP-DOWN OR GRASS ROOTS—IS THE SUBJECT IN QUESTION. AN ADVANTAGE OF A GRASS-ROOTS APPROACH IS THAT THE CULTURAL CHANGE SPREADS WIDELY ACROSS THE AIR FORCE, THEREBY BUILDING A STRONG FOUNDATION. A DISADVANTAGE OF THIS APPROACH IS THAT IT TAKES A RELATIVELY LONG TIME TO SPREAD. THE CRITICAL NEED TO CHANGE THE WAY AIRMEN THINK ABOUT ASSESSMENT SUGGEST A TOP-DOWN APPROACH IS REQUIRED. DETERMINING THE BEST WAY TO FOSTER THIS CULTURAL CHANGE IS GROUNDS FOR FURTHER RESEARCH. NEXT, THE CHANGES REQUIRED TO ENABLE EBA AND THIS ASSESSMENT-MINDED CULTURAL CHANGE MUST BE IMPLEMENTED THROUGH REALISTIC TRAINING. THIS THESIS BRIEFLY DISCUSSED SEVERAL LIMITATIONS IN THIS AREA. FURTHER RESEARCH IS REQUIRED TO BEST DETERMINE HOW TO IMPROVE EBA AND INTEGRATE THIS PROCESS INTO THE OPERATIONAL AIR FORCE. FINALLY, STUDYING EBA DURING OIF OFFERS VALUABLE INSIGHT INTO OTHER PROCESSES AND CONSTRUCTS FOR FUTURE OIF-STYLE WARS. AIRMEN MUST REALISTICALLY DETERMINE WHETHER THE PROCESSES AND CONSTRUCTS THEY ARE DEVELOPING CAN ACTUALLY BECOME OPERATIONALLY USEFUL IN A WAR AS FAST, SHORT, AND DYNAMIC AS OIF. IF THEIR ANSWER IS NO, THEN THE CONSTRUCT MUST BE MODIFIED OR JETTISONED. THESE THREE RESEARCH TOPICS WILL HELP MAKE THE EBA CONSTRUCT USEFUL TO THE JFACC IN FUTURE WARS, AS WELL AS OTHER CONSTRUCTS THAT AIRMEN CONTINUE TO GRAPPLE WITH ON A DAILY BASIS.

Summary

IN *THE LOGIC OF WAR AND PEACE*, EDWARD LUTTWAK PERCEPTIVELY NOTES THAT "...VICTORY MISLEADS, [BUT] DEFEAT EDUCATES."¹³³ IT IS WORTH STATING THAT WHEN GENERAL FRANKS TESTIFIED TO CONGRESS IN JULY 2003, HE NEVER MENTIONED ASSESSMENT PROBLEMS.¹³⁴ AIRMEN SHOULD TAKE HEART IN KNOWING THEY SUPPORTED THEIR COMMANDER. REGARDLESS, THIS THESIS REVEALS AREAS THAT WERE IN NEED OF IMPROVEMENT. IF AIRMEN LOOK AT THEIR OVERALL EFFORT DURING OIF AS A

¹³³ Edward N. Luttwak, *Strategy: The Logic of War and Peace* (Cambridge, Mass.: The Belknap Press of Harvard University, 2001), 16.

¹³⁴ "Statement by General Tommy Franks US Army Before the House Armed Services Committee US House of Representatives," July 10, 2003, on-line, Internet, 14 February 2005, available from <http://www.iwar.org.uk/news-archive/iraq/03-07-10franks.htm>.

VICTORY, THEN THEY ARE MISLED. HOWEVER, IF THEY ACCEPT THE FAILURES IN AREAS SUCH AS EBA, THEN THEY ARE OPEN TO LEARNING FROM THEIR MISTAKES. LET US NOT BE MISLED BY THE SUCCESSES WE ENJOYED DURING OIF, BUT EDUCATED BY THE FAILURES WE RECOGNIZED.

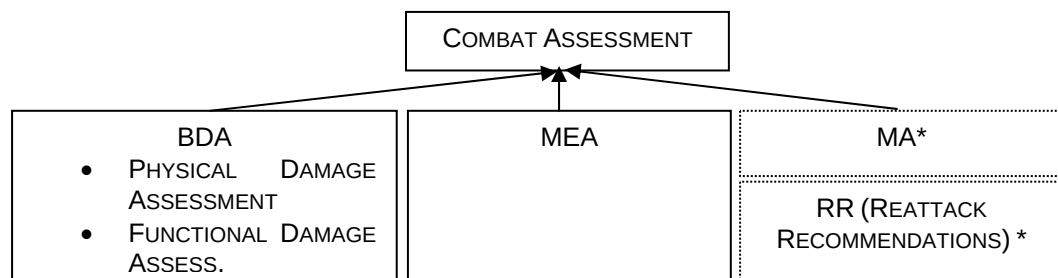
Airmen can perfectly execute a flawed strategy. If analysts assess nothing but physical effects, it is impossible to determine if the execution or the strategy is flawed. Assessing the effectiveness of actions is the only sure way to gauge the strategy. This is the essence of EBA. Former commander of ACC, General Hal Hornburg speaks for many likeminded airmen when he says, “We must transcend the kinetic- and attrition-based process of the past and adopt an effects-based methodology.”¹³⁵ But notable obstacles stand in the way of this effects-based methodology from fulfilling its true potential in future wars. OIF was the first opportunity for airmen to flesh out the assessment piece of EBO. The performance of EBA during this war proves that we still have work to do.

¹³⁵ “Effects-based Assessment: Closing the Loop”, Forward, 2.

Appendix A – Existing Assessment Lexicon

THE FOLLOWING TERMINOLOGY IS TAKEN FROM DOCTRINE THAT WAS CURRENT PRIOR TO AND DURING OIF. SOURCES OF REFERENCE ARE JOINT DOCTRINE, AIR FORCE DOCTRINE DOCUMENTS (AFDD), AND AIR FORCE OPERATIONS TACTICS, TECHNIQUES, AND PROCEDURES (AFOTTP).

ALTHOUGH SERVICE DOCTRINE IS MEANT TO BE THE SOURCE OF JOINT DOCTRINE, THE AFOTTP 2-3.2 THAT WAS CURRENT DURING OIF BORROWS EXTENSIVELY FROM JOINT DOCTRINE IN DEFINING ASSESSMENT TERMINOLOGY. ODDLY, THERE IS LITTLE REFERENCE TO OPERATIONAL ASSESSMENT IN ANY OF THE SOURCES CITED BELOW. INSTEAD, AFOTTP DESCRIBES THE OUTPUT OF THE OPERATIONAL ASSESSMENT TEAM MAINLY BY DEFINING COMBAT ASSESSMENT. WITHIN THE CAOC DURING OIF, THE GENERALLY ACCEPTED ASSESSMENT CONSTRUCT WAS:



* There is conflict between Joint and Air Force doctrine regarding whether reattack recommendations are a component of CA or a result of CA. The author agrees with the latter definition, as presented in AFDD 2-5.2, which defines the components of CA as BDA, MEA, and MA.

Figure 14. Combat Assessment Construct, Pre-OIF

COMBAT ASSESSMENT (CA)

JP 1-02 DEFINES CA AS “THE DETERMINATION OF THE OVERALL EFFECTIVENESS OF FORCE EMPLOYMENT DURING MILITARY OPERATIONS. COMBAT ASSESSMENT IS COMPOSED OF THREE MAJOR COMPONENTS: (A) BATTLE DAMAGE ASSESSMENT; (B) MUNITIONS EFFECTIVENESS ASSESSMENT; AND (C) REATTACK RECOMMENDATION.”¹³⁶

AFOTTP 2-3.2 BORROWS FROM THE JP 1-02 DEFINITION OF CA, AND ADDS “THE OBJECTIVE OF COMBAT ASSESSMENT IS TO IDENTIFY RECOMMENDATIONS FOR THE COURSE OF MILITARY OPERATIONS. THE J-3 IS NORMALLY THE SINGLE POINT OF CONTACT FOR COMBAT ASSESSMENT AT THE JOINT FORCE LEVEL, ASSISTED BY THE JOINT FORCE J-2.”¹³⁷

AFDD 2-5.2 PROVIDES A SLIGHT VARIATION WITH, “COMBAT ASSESSMENT (CA) EVALUATES COMBAT OPERATIONS EFFECTIVENESS IN ACHIEVING COMMAND OBJECTIVES. CA INCLUDES BDA, MUNITIONS EFFECTIVENESS ASSESSMENT (MEA), AND MISSION ASSESSMENTS (MA). TOGETHER, THESE

¹³⁶ Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (As Amended Through 5 June 2003), 96.

¹³⁷ Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-3.2, *Air and Space Operations Center*, 25 October 2002, 317.

THREE ASSESSMENTS PROVIDE INFORMATION ON THE SUCCESS OR FAILURE OF MILITARY OPERATION AND DETERMINE THE NEED FOR ADDITIONAL OPERATIONS OR MODIFICATIONS IN PLANNING.”¹³⁸

BATTLE DAMAGE ASSESSMENT (BDA)

AFOTTP 2-3.2, *AIR AND SPACE OPERATIONS CENTER*, ADOPTS THE DEFINITION OF BDA FROM JP 1-02, *DoD DICTIONARY OF MILITARY AND ASSOCIATED TERMS*. BOTH DOCUMENTS DEFINE BDA AS “THE TIMELY AND ACCURATE ESTIMATE OF DAMAGE RESULTING FROM THE APPLICATION OF MILITARY FORCE, EITHER LETHAL OR NON-LETHAL, AGAINST A PREDETERMINED OBJECTIVE. BATTLE DAMAGE ASSESSMENT CAN BE APPLIED TO THE EMPLOYMENT OF ALL TYPES OF WEAPON SYSTEMS (AIR, GROUND, NAVAL, AND SPECIAL FORCES WEAPON SYSTEMS) THROUGHOUT THE RANGE OF MILITARY OPERATIONS.” BATTLE DAMAGE ASSESSMENT IS PRIMARILY AN INTELLIGENCE RESPONSIBILITY WITH REQUIRED INPUTS AND COORDINATION FROM THE OPERATORS. BATTLE DAMAGE ASSESSMENT IS COMPOSED OF PHYSICAL DAMAGE ASSESSMENT, FUNCTIONAL DAMAGE ASSESSMENT, AND TARGET SYSTEM ASSESSMENT.”¹³⁹

AFDD 2-5.2 ADDS THAT “BDA IS A TIMELY AND ACCURATE ESTIMATE OF DAMAGE OR EFFECT RESULTING FROM THE APPLICATION OF MILITARY FORCE AGAINST A PREDETERMINED OBJECTIVE. (HOW MUCH DAMAGE DID THE BOMB DO?)”¹⁴⁰

- **PHYSICAL DAMAGE ASSESSMENT (PHASE I BDA)**

- o JP 1-02 DEFINES PHYSICAL DAMAGE ASSESSMENT AS “THE ESTIMATE OF THE QUANTITATIVE EXTENT OF PHYSICAL DAMAGE (THROUGH MUNITION BLAST, FRAGMENTATION, AND/OR FIRE DAMAGE EFFECTS) TO A TARGET RESULTING FROM THE APPLICATION OF MILITARY FORCE. THIS ASSESSMENT IS BASED USUALLY UPON SINGLE SOURCE DATA.”¹⁴¹
- o SOME REPRESENTATIVE SOURCES FOR DATA NECESSARY TO MAKE A PHYSICAL DAMAGE ASSESSMENT INCLUDE THE AIR TASKING ORDER (ATO) OR MASTER AIR ATTACK PLAN, MISREPS, AIRCRAFT COCKPIT VIDEO (ACV), WEAPON SYSTEM VIDEO (WSV), VISUAL/VERBAL REPORTS FROM GROUND SPOTTERS OR COMBAT TROOPS, CONTROLLERS AND OBSERVERS, ARTILLERY TARGET SURVEILLANCE REPORTS, SIGINT, HUMINT, IMINT, MASINT, AND OPEN-SOURCE INTELLIGENCE(OSINT).¹⁴²
- o PHASE I BDA REPORTING TIMELINE IS 1-2 HOURS AFTER RECEIPT OF INFORMATION.¹⁴³

- **FUNCTIONAL DAMAGE ASSESSMENT (PHASE II BDA)**

- o JP 1-02 DEFINES FUNCTIONAL DAMAGE ASSESSMENT AS “THE ESTIMATE OF THE EFFECT OF MILITARY FORCE TO DEGRADE OR DESTROY THE FUNCTIONAL OR OPERATIONAL CAPABILITY OF THE TARGET TO PERFORM ITS INTENDED MISSION AND ON THE LEVEL OF SUCCESS IN ACHIEVING OPERATIONAL OBJECTIVES ESTABLISHED AGAINST THE TARGET. THIS ASSESSMENT IS BASED UPON ALL-SOURCE INFORMATION, AND INCLUDES AN ESTIMATION OF THE TIME REQUIRED FOR RECUPERATION OR REPLACEMENT OF THE TARGET FUNCTION.”¹⁴⁴
- o PHASE II BDA REPORTING TIMELINE IS 4-6 HOURS AFTER RECEIPT OF INFORMATION.¹⁴⁵

- **TARGET SYSTEM ASSESSMENT (PHASE III BDA)**

- o JP 1-02 DEFINES TARGET SYSTEM ASSESSMENT AS “THE BROAD ASSESSMENT OF THE OVERALL IMPACT AND EFFECTIVENESS OF THE FULL SPECTRUM OF MILITARY FORCE APPLIED AGAINST THE OPERATION OF AN ENEMY TARGET SYSTEM OR TOTAL COMBAT

¹³⁸ Air Force Doctrine Document (AFDD) 2-5.2, *ISR Operations*, 21 April 99, 44-45.

¹³⁹ JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (As Amended Through 5 June 2003), 63; AFOTTP 2-3.2, *Air and Space Operations Center*, 25 October 2002, 317.

¹⁴⁰ AFDD 2-5.2, 21 April 99, 44-45.

¹⁴¹ JP 1-02, , 407.

¹⁴² Joint Publication (JP) 2-01.1, *Joint Tactics, Techniques, and Procedures for Intelligence Support to Targeting*, 9 January 2003, VI-2 to VI-3.

¹⁴³ JP 2-01.1, VI-3.

¹⁴⁴ JP 1-02, 216.

¹⁴⁵ JP 2-01.1, VI-3.

- EFFECTIVENESS (INCLUDING SIGNIFICANT SUBDIVISIONS OF THE SYSTEM) RELATIVE TO THE OPERATIONAL OBJECTIVES ESTABLISHED.”¹⁴⁶
- o PHASE III BDA REPORTING TIMELINE IS DAILY.”¹⁴⁷

MUNITIONS EFFECTIVENESS ASSESSMENT (MEA)

JP 1-02 DEFINES MUNITIONS EFFECTIVENESS ASSESSMENT: MEA IS “CONDUCTED CONCURRENTLY AND INTERACTIVELY WITH BATTLE DAMAGE ASSESSMENT, THE ASSESSMENT OF THE MILITARY FORCE APPLIED IN TERMS OF THE WEAPON SYSTEM AND MUNITIONS EFFECTIVENESS TO DETERMINE AND RECOMMEND ANY REQUIRED CHANGES TO THE METHODOLOGY, TACTICS, WEAPON SYSTEM, MUNITIONS, FUSING, AND/OR WEAPON DELIVERY PARAMETERS TO INCREASE FORCE EFFECTIVENESS. MUNITIONS EFFECTS ASSESSMENT IS PRIMARILY THE RESPONSIBILITY OF OPERATIONS WITH REQUIRED INPUTS AND COORDINATION FROM THE INTELLIGENCE COMMUNITY.”¹⁴⁸

AFDD 2-5.2 ADDS THAT “MEA ANALYZES THE EFFECTIVENESS OF THE MUNITION’S DAMAGE MECHANISMS AND DELIVERY PARAMETERS. (DID THE BOMB DO WHAT IT WAS SUPPOSED TO DO?) PLANNERS USE THIS INFORMATION TO DETERMINE THE RIGHT MUNITION FOR THE RIGHT TARGET.”¹⁴⁹

MISSION ASSESSMENT (MA)

AFDD 2-5.2 MAKES BRIEF REFERENCE TO MA WITH, “MA EVALUATES THE EFFECTIVENESS OF A TASKED OR APPORTIONED MISSION ON THE ADVERSARY’S WARFIGHTING AND SUSTAINING CAPABILITIES. (DID THIS MISSION ACHIEVE THE EFFECT WE WANTED IT TO ACHIEVE?)”¹⁵⁰

¹⁴⁶ JP 1-02, 525-526.

¹⁴⁷ JP 2-01.1, VI-3.

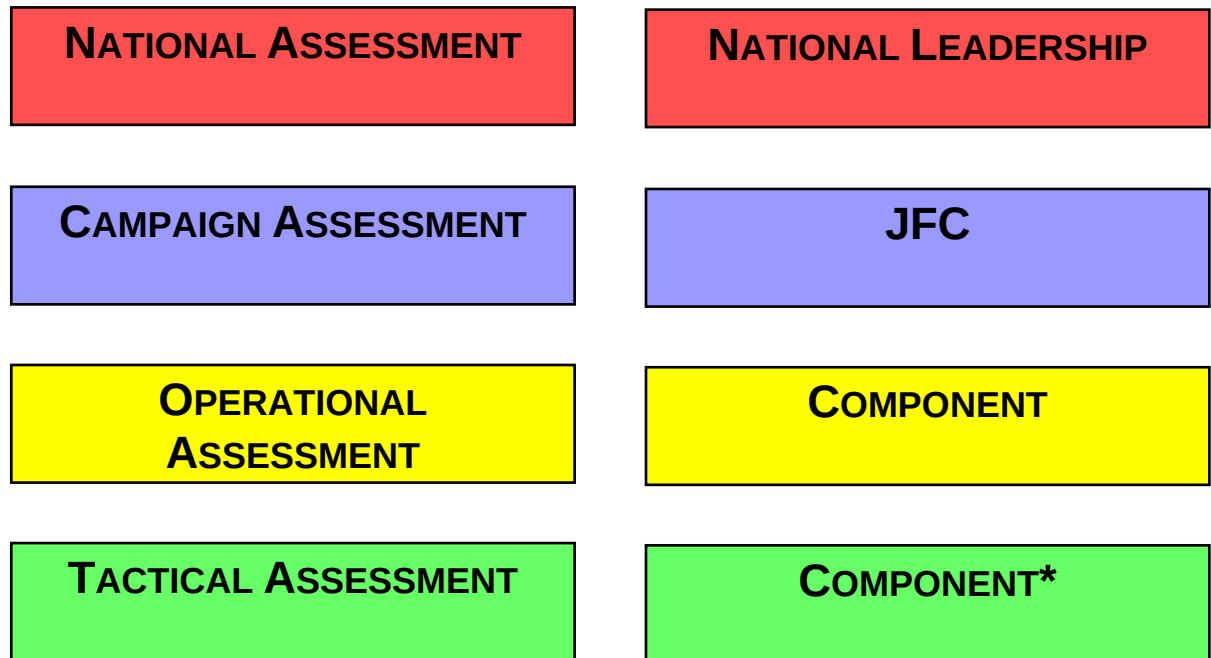
¹⁴⁸ JP 1-02, 352.

¹⁴⁹ AFDD 2-5.2, 44-45.

¹⁵⁰ AFDD 2-5.2, 21 April 99, 44-45.

Appendix B – Proposed Assessment Lexicon

SINCE THE END OF OIF, SEVERAL AIR FORCE INITIATIVES HAVE ADVANCED THE ASSESSMENT LEXICON THAT ACCOMPANIED ASSESSORS DURING OIF. IN MARCH 2004, ACC PUBLISHED “EFFECTS-BASED ASSESSMENT: CLOSING THE LOOP.” IN OCTOBER 2004, THE AIR FORCE ASSESSMENT TASK FORCE MET AT NELLIS AFB, NV TO FURTHER DISCUSS ASSESSMENT LEXICON. LATER THAT MONTH, COL MASON CARPENTER, CENTAF CHIEF OF STRATEGY DURING OIF, BRIEFED THE RESULTS OF THE AFATF EFFORT AT THE AIR FORCE DOCTRINE SUMMIT. IN DECEMBER 2004, THE SECOND VERSION OF AFOTTP 2-3.2 RESCINDED THE FIRST VERSION. THIS DOCUMENT CLEARLY DEFINES RELEVANT ASSESSMENT TERMINOLOGY, ADDING EFFECTS-BASED TERMINOLOGY TO MANY OF THE TERMS. ALTHOUGH MANY OF THESE DEFINITIONS ARE NOT YET CODIFIED IN OFFICIAL AIR FORCE DOCTRINE, THIS APPENDIX PROVIDES AN OVERVIEW OF THESE THREE MAIN INITIATIVES. IT IS A LIKELY BLUEPRINT FOR THE LEXICON THAT WILL DESCRIBE FUTURE EBA. THESE DEFINITIONS WILL BE CODIFIED IN THE NEXT VERSION OF AFDD 2-1.9, *TARGETING*.



** UNITS CAN PERFORM TACTICAL ASSESSMENT IF*

Figure 15. Proposed Assessment Construct¹

NATIONAL ASSESSMENT

NATIONAL ASSESSMENT IS A “BROAD REVIEW OF THE EFFECTIVENESS OF NATIONAL SECURITY STRATEGY OR IF NATIONAL LEADERSHIP CRISIS OBJECTIVES ARE BEING ACHIEVED.”²

¹ Col Mason Carpenter, “New Assessment Construct Proposal,” briefing, Air Force Doctrine Summit, Maxwell AFB, AL, October 2004.

² Ibid.

CAMPAIGN ASSESSMENT

CAMPAIGN ASSESSMENT IS "THE BROAD QUALITATIVE AND ANALYTICAL DETERMINATION OF THE OVERALL EFFECTIVENESS OF MILITARY OPERATIONS. INTEGRATES COMPONENT OPERATIONAL ASSESSMENTS INTO AN EVALUATION OF PROGRESS TOWARDS JFC OBJECTIVES AND RECOMMENDS FUTURE ACTIONS AND IS EFFECTS-BASED."³

AFOTTP 2-3.2 DEFINES CAMPAIGN ASSESSMENT AS "THE PROCESS USED AT THE JFC LEVEL TO DETERMINE IF MILITARY FORCES ARE ACHIEVING THE DESIRED END STATES OF THE CAMPAIGN OR OPERATIONS PLAN, ALONG WITH MAKING RECOMMENDATIONS FOR THE COURSE OF MILITARY OPERATIONS."⁴

*COMPONENT ASSESSMENT: COMPONENT EFFECTS ASSESSMENT PROVIDES AN EVALUATION OF EFFECTS GENERATED BY TACTICAL ACTIONS AND OTHER BATTLESPACE INFLUENCES TOWARDS ACHIEVING COMPONENT-ASSIGNED OPERATIONAL OBJECTIVES WITH A RECOMMENDATION FOR FUTURE ACTIONS. INPUTS INCLUDE AGGREGATE TAs AND PBA TO INCLUDE TARGET SYSTEM ASSESSMENTS (PREVIOUSLY KNOWN AS PHASE III BDA).*⁵

OPERATIONAL ASSESSMENT (OA)

OA IS THE "EVALUATION OF EFFECTS GENERATED BY TACTICAL ACTIONS AND OTHER BATTLE SPACE INFLUENCES TOWARDS ACHIEVING COMPONENT-ASSIGNED OPERATIONAL OBJECTIVES AND A RECOMMENDATION OF FUTURE ACTION AND IS EFFECTS-BASED."⁶

AFOTTP 2-3.2 PROVIDES A SOUND WORKING DEFINITION FOR OA. "OPERATIONAL ASSESSMENT IS THE PROCESS USED AT THE COMPONENT LEVEL TO DETERMINE IF MILITARY OPERATIONS ARE PRODUCING DESIRED EFFECTS LEADING TO ACHIEVEMENT OF OPERATIONAL OBJECTIVES AND TO MAKE RECOMMENDATIONS FOR THE FUTURE COURSE OF COMPONENT LEVEL OPERATIONS. THE OPERATIONAL ASSESSMENT PERFORMED AT THE COMPONENT LEVEL FLOWS INTO THE CAMPAIGN ASSESSMENT PERFORMED BY THE JFC."⁷

THE ACC EBA WHITE PAPER ADDS A SLIGHT VARIATION TO OA WITH OPERATIONAL EFFECTS ASSESSMENT (OEA), STATING THAT OEA "PROVIDES A BROAD, QUALITATIVE AND ANALYTICAL DETERMINATION OF THE OVERALL EFFECTIVENESS OF MILITARY OPERATIONS TOWARDS ACHIEVING A COMMANDER'S OBJECTIVES WITH A RECOMMENDATION FOR FUTURE ACTIONS."⁸

TACTICAL ASSESSMENT

The ACC EBA White Paper states that tactical assessment "Determines the effectiveness of kinetic and non-kinetic tactical military operations on targets or entities through empirical and objective methods. Inputs include physical damage assessment (previously known as Phase I BDA), functional assessment (previously known as functional damage assessment or Phase II BDA), munitions effectiveness assessment, military operations other than war (MOOTW) assessments, weather effects; and logistics status."⁹ Furthermore, tactical assessment is performance-based.¹⁰

³ Ibid.

⁴ Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-3.2, *Air and Space Operations Center*, 13 December 2004, 3-58.

⁵ "Effects-based Assessment: Closing the Loop," (CAF White Paper, ACC, Langley AFB, Va.: March 2004), 10-11.

⁶ Carpenter briefing.

⁷ AFOTTP 2-3.2, 3-58.

⁸ "Effects-based Assessment: Closing the Loop," 12.

⁹ Ibid, 9.

¹⁰ Carpenter brief, October 2004.

COMBAT ASSESSMENT (CA)

AFOTTP 2-3.2 NO LONGER INCLUDES RR AS A COMPONENT OF CA. INSTEAD, IT STATES “CA, AS IT RELATES TO OA, IS THE PROCESS USED TO DETERMINE IF TACTICAL LEVEL MISSIONS HAVE PRODUCED DESIRED EFFECTS BASED ON ASSIGNED TACTICAL TASKS. THE OAT USES CA INPUTS TO MEASURE EFFECTS AT THE OPERATIONAL LEVEL. COMBAT ASSESSMENT, AS DEFINED BY THE ISRD, INCLUDES BATTLE DAMAGE ASSESSMENT, MUNITIONS EFFECTIVENESS ASSESSMENT, AND INPUTS TO MISSION ASSESSMENT (MA). THESE ELEMENTS FEED BOTH THE OA AND CAMPAIGN ASSESSMENT. IN THE JAOC, CA FEEDS THE OA PROCESS BY PROVIDING FEEDBACK ON WHETHER THE OBJECTIVES ARE BEING MET AND IF ATO MISSIONS ARE ACHIEVING THE DESIRED MEASURES OF EFFECTIVENESS FOR TACTICAL TASKS. AT THE COMBATANT COMMAND, INPUTS FROM CA ARE USED TO CONDUCT DETAILED TARGET SYSTEM ANALYSIS, WHICH SHOULD ALSO BE INCLUDED AS INPUTS TO OA PROCESSES. THIS DATA IS USED BY THE OAT TO CONDUCT MISSION ASSESSMENT.”¹¹

BATTLE DAMAGE ASSESSMENT (BDA)

AFOTTP 2-3.2 MAINTAINS THE DEFINITION OF BDA FROM JP 1-02 (AND THE FORMER VERSION OF AFOTTP 2-3.2). IT ADDS THAT “THESE ASSESSMENTS ARE USED TO EVALUATE THE AMOUNT OF FUNCTIONAL DAMAGE AN ENEMY’S TARGET SYSTEMS HAS SUSTAINED. IN CONJUNCTION WITH ACF ANALYSTS AND TARGET STRATEGISTS, THE OAT USES THESE ASSESSMENTS TO DETERMINE IF THE JFACC’S OBJECTIVES WERE MET, AND IF DESIRED EFFECTS ON THE ENEMY’S OPERATIONAL AND STRATEGIC COGS ACHIEVED.” FURTHERMORE, “THE NEW FOCUS OF ANALYSIS MUST BE ON EFFECTS. A SEPARATE CELL WITHIN THE TARGETS/COMBAT ASSESSMENT TEAM SHOULD BE ESTABLISHED TO DEVELOP AND ANALYZE CAUSAL LINKAGES OR MECHANISMS. EXAMPLE: WE ARE TARGETING POWER GENERATION FACILITIES. WHAT WILL BE THE INDIRECT EFFECTS OF SUCH TARGETING? FOCUS ON SEWAGE TREATMENT PLANTS, HOSPITAL OPERATIONS, AND WATER SUPPLY.”¹²

MUNITIONS EFFECTIVENESS ASSESSMENT (MEA)

AFOTTP STATES “MUNITIONS EFFECTIVENESS ASSESSMENT (MEA) IS THE ASSESSMENT OF MILITARY FORCE APPLIED IN TERMS OF THE WEAPON SYSTEM AND MUNITIONS EFFECTIVENESS TO DETERMINE AND RECOMMEND ANY REQUIRED CHANGES TO THE METHODOLOGY, TACTICS, WEAPON SYSTEMS, MUNITIONS, FUZING, AND/OR WEAPONS DELIVERY PARAMETERS TO INCREASE FORCE EFFECTIVENESS. THE PURPOSE OF MEA IS TO COMPARE THE ACTUAL EFFECTIVENESS OF WEAPONS SYSTEMS AND THEIR MUNITIONS TO THEIR ANTICIPATED EFFECTIVENESS. MEA IS CONDUCTED CONCURRENTLY AND INTERACTIVELY WITH BDA. MEA IS FEDERATED, BUT THE JAOC CAN SUPPORT NEAR/SHORT TERM MEA PROJECTS. FOR EXAMPLE, IF THE JAOC NEEDS AN EXPLANATION FOR WHY SPECIFIC MUNITIONS DROPPED ON A SERIES OF TARGETS CONSISTENTLY FELL LONG, THE OAT AND CA CELL SHOULD BE ABLE TO CONDUCT AN INVESTIGATION IN THE JAOC. HOWEVER, FIXES AND FURTHER INVESTIGATION OF THE PROBLEM WOULD BE FEDERATED. THE CA CELL AND COMBAT OPERATIONS DIVISION WILL PROVIDE DATA REQUIRED TO CONDUCT MEA.”¹³

MISSION ASSESSMENT (MA)

AFOTTP 2-3.2 STATES, “MISSION ASSESSMENT (MA) ADDRESSES THE EFFECTIVENESS OF A PARTICULAR MISSION (E.G. OFFENSIVE COUNTERAIR [OCA], INTERDICTION [AI], STRATEGIC ATTACK [SA]). MA PROVIDES BROAD PERSPECTIVE OF THE IMPACT AND EFFECTIVENESS OF MILITARY OPERATIONS WAGED AGAINST AN ADVERSARY. WHILE BDA AND MEA ADDRESS LETHAL FORCE EMPLOYMENT AGAINST INDIVIDUAL TARGET SYSTEMS AND WEAPONS, MA EVALUATES THE IMPACT OF ASSIGNED MISSIONS SUCH AS INTERDICTION, COUNTERAIR, OR STRATEGIC ATTACK. IT DIRECTLY IMPACTS THE JFACC’S APPORTIONMENT NOMINATIONS AND THE RESULTANT JFC’S DECISION. MISSION ASSESSMENTS ARE MADE

¹¹ AFOTTP 2-3.2, 3-58.

¹² Ibid, 3-59.

¹³ Ibid, 3-59 to 3-60.

BY THE SUPPORTED COMMANDER, AND THE OAT CAN GARNER THESE INPUTS FROM THE SERVICE LNOs ASSIGNED TO THE JAOC.”¹⁴

REATTACK RECOMMENDATIONS (RR)

AFOTTP 2-3.2 CLARIFIES THE CONFUSION WITH REATTACK RECOMMENDATIONS. “REATTACK RECOMMENDATIONS VERSUS MA. THE TERM “REATTACK RECOMMENDATION” IS SOMETIMES USED INTERCHANGEABLY WITH THE TERM “MISSION ASSESSMENT.” THE TWO TERMS ARE NOT SYNONYMOUS WITHIN THE JAOC. REATTACK RECOMMENDATION (RR) DOES NOT ADDRESS THE NEED TO ASSESS A MISSION GIVEN TO A SUPPORTED COMMANDER. MA ADDRESSES THIS NEED. RRS COME FROM MULTIPLE SOURCES, NOT JUST CA, AND REPRESENTS A CONCLUSION RATHER THAN AN ASSESSMENT. RRS WILL ENTER THE STANDARD TARGETING PROCESSES (I.E., NOMINATION PROCESS, COD RE-ROLLS, ETC.) AND WILL BE HANDLED BY THE APPROPRIATE JAOC DIVISION AS REQUIRED.”¹⁵

¹⁴ Ibid, 3-60.

¹⁵ Ibid, 6-86.

Glossary

AADC	Area Air Defense Commander
ACA	Airspace Control Authority
AFDC	Air Force Doctrine Center
AFDD	Air Force Doctrine Document
AFI	Air Force Instruction
AFOTTP	Air Force Operational Tactics, Techniques, and Procedures
AFPAM	Air Force Pamphlet
AGM	Air to Ground Missile
AMT	Automated MISREP Tool
AODB	Air Operations Data Base
ATO	Air Tasking Order
ATP	Advanced Targeting Pod
AWOS	Air War Over Serbia
BCD	Battlefield Coordination Detachment
BDA	Battle Damage Assessment
C2	Command and Control
C4ISR	Command, Control, Communication, Computers, Intelligence, Surveillance, Reconnaissance
CA	Combat Assessment
CAOC	Combined Air Operations Center
CAS	Close Air Support
CENTAF	US Central Command Air Forces
CENTCOM	US Central Command
CFACC	Combined Forces Air Component Commander
CFLCC	Combined Forces Land Component Commander
CFMCC	Combined Forces Maritime Component Commander
CISR	Chief of ISR
CMA	Collection Management Authority
COAB	Campaign Objectives Assessment Board
COM	Collection Operations Management
CONOPS	Concept of Operations
CROP	Common Relevant Operational Picture
CWDS	Combat Weapons Delivery Software
CSAF	Chief of Staff of the Air Force
DEAD	Destruction of Enemy Air Defenses
DMPI	Desired Mean Point of Impact
DOD	Department of Defense
DTM	Data Transfer Module

DS	Operation DESERT STORM
DSAWA	Desert Storm Air War Analyst
EBA	Effects-based Assessment
EBO	Effects-based Operations
EBP	Effects-based Planning
EO	Electro Optical
F2T2EA	Find, Fix, Track, Target, Engage, Assess
FBCB2	Force XXI Battle Command Brigade and Below
FDL	Fighter Data Link
FEAF	Far East Air Forces
GBU	Guided Bomb Unit
GPS	Global Positioning System
GUI	Graphic User Interface
HARM	High Speed Anti-Radiation Missile
HUMINT	Human Intelligence
INFLTREP	Inflight Report
IMEA	Integrated Munitions Effects Assessment
IMINT	Imagery Intelligence
IPB	Intelligence Preparation of the Battlespace
IR	Infrared
ISR	Intelligence, Surveillance, and Reconnaissance
ISRD	Intelligence, Surveillance, and Reconnaissance Division
IT	Information Technology
ITS	Interim Targeting Solution
JAOP	Joint Air Operations Process
JBDA	Joint Battle Damage Assessment
JCMB	Joint Collection Management Board
JDAM	Joint Direct Attack Munition
JFACC	Joint Forces Air Component Commander
JFC	Joint Force Commander
JIB	Joint Integration Board
JIC	Joint Intelligence Center
JIPTL	Joint Integrated Prioritized Target List
JMEM	Joint Munitions Effectiveness Manual
JP	Joint Publication
JTCB	Joint Targeting Coordination Board
JTT	Joint Targeting Toolbox
JWAC	Joint Warfare Analysis Center
LANTIRN	Low Altitude Navigation and Targeting Infrared for Night

LD/HD	Low Density/High Demand
LGB	Laser Guided Bomb
MA	Mission Assessment
MAAP	Master Air Attack Plan
MASINT	Measuring and Signaling Intelligence
MATTS	Mission Analysis Tracking and Tabulation System
MEA	Munitions Effectiveness Assessment
MIDB	Modernized Integrated Database
MISREP	Mission Report
MOE	Measure of Effectiveness
MTF	Master Target Folder
OA	Operational Assessment
OAF	Operation Allied Force
OAT	Operational Assessment Team
ODF	Operation Deliberate Force
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OODA	Observe-Orient-Decide-Act
OSD	Office of the Secretary of Defense
PAT	Process Assessment Team
PBA	Predictive Battlespace Awareness
PED	Processing, Exploitation, and Dissemination
PGM	Precision Guided Munition
PSAB	Prince Sultan Air Base
RAF	Royal Air Force
RR	Reattack Recommendation
SA	Situational Awareness
SAASS	School of Advanced Air and Space Studies
SADL	Situational Awareness Data Link
SAM	Surface-to-Air Missile
SATCOM	Satellite Communications
SCAR	Strike Control and Reconnaissance
SD	Strategy Division
SEAD	Suppression of Enemy Air Defenses
SGT	Strategy Guidance Team
SI	Success Indicator
SIGINT	Signals Intelligence
SOF	Special Operations Forces
SPT	Strategy Plans Team
SR	Special Reconnaissance

TACLAN	Tactical Local Area Network
TBMCS	Theater Battle Management Core Systems
T-BONE	Theater Battle Operations Net-Centric Environment
TET	Targeting Effects Team
TO	Technical Order
TRS	Tactical Radio System
TST	Time Sensitive Targeting (formerly TCT)
UAV	Unmanned Aerial Vehicle
UFL	Ulchi-Focus Lens
USSBS	US Strategic Bombing Survey
WFHQ	War Fighting Headquarters
WSV	Weapon System Video

Bibliography

ACC. "Effects-based Assessment: Closing the Loop." CAF White Paper. Langley AFB, Va.: March 2004.

Air & Space Operations Center Weapons System Block 10+ Systems Guide. Langley AFB, Va.: AFC2ISRC, 3 December 2002.

Air Force Doctrine Document (AFDD) 1. *Air Force Basic Doctrine*, 17 November 2003.

Air Force Doctrine Document (AFDD) 2. *Organization and Employment of Aerospace Power*, 17 February 2000.

Air Force Doctrine Document (AFDD) 2-5.2. *Intelligence, Surveillance, and Reconnaissance Operations*, 21 April 1999.

Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-1.1. *Air & Space Strategy*, 9 Aug 2002.

Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-3.2. *Air and Space Operations Center*, 25 October 2002.

Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-3.2. *Air and Space Operations Center*, 13 December 2004.

Air University Catalog. On-line, Internet, 5 May 05. Available from http://www.maxwell.af.mil/au/au_catalog_1999_2000/catalog2000_60_doctrine.html.

"American Deaths in Iraq." *Boston Globe*, 12 January 2005. n.p. On-line. Internet, 12 January 2005. Available from https://www.boston.com/news/world/middleeast/articles/2005/01/12/american_deaths_in_iraq/

Baysmore, SSgt Jerome. "Army BCD Provides Vital Link Between Ground and Air Operations." 23 July 2004. On-line. Internet, 2 February 2005. Available from http://www.arcent.army.mil/news/archive/2004_news/july/army_bcd.asp.

"Casualties." 7 August 2002. Taken from Michael Clodfelter. *Warfare and Armed Conflicts: A Statistical Reference to Casualty and Other Figures, 1618-1991*. London: McFarland & Company, 1992, 2 vols. On-line. Internet, 15 February 2005. Available from <http://www.nv.cc.va.us/home/cevans/Versailles/greatwar/casualties>.

- Carpenter, Col Mason. "New Assessment Construct Proposal." Briefing. Air Force Doctrine Summit, Maxwell AFB, Al., October 2004.
- Crane, Conrad C. *American Airpower Strategy in Korea: 1950-1953*. Lawrence, Ks.: University Press of Kansas, 2000.
- Croom Jr., Major General Charles E. "Warfighting Integrator." *Military Information Technology: Online Edition*, Vol 7, Issue 6, 9 August 2003. On-line. Internet, 28 January 2005. Available from http://www.military-information-technology.com/print_article.cfm?DocID=166.
- Curry, Lt Col Hugh. "The Current Battle Damage Assessment Paradigm is Obsolete." *Air & Space Power Journal*, (Winter 2004): [13-17].
- "DLARS." C2 Battlelab. On-line. Internet, 10 April 2005. Available from <http://www.c2b.hurlburt.af.mil/dlars.htm>.
- Eggenberger, David. *An Encyclopedia of Battles: Accounts of Over 1,560 Battles from 1479 B.C. to the Present*. New York, N.Y.: Dover Publications, 1985.
- Endersby, Lt Col (ret) Gary, and Searle, Thomas R. "Thinking Effects: Effects-based Methodology for Joint Operations." CADRE Paper No. 15, College of Aerospace Doctrine, Research and Education. Maxwell AFB, Ala.: Air University Press, 2002.
- "Functional Capabilities Document for the Theater Battle Operations Net-Centric Environment (T-BONE)." DRAFT Document ver1.0. C2 Battlelab, February 2005.
- Franks, General Tommy. "Statement by General Tommy Franks US Army Before the House Armed Services Committee US House of Representatives." 10 July 2003. On-line. Internet, 14 February 2005. Available from <http://www.iwar.org.uk/news-archive/iraq/03-07-10franks.htm>.
- Gorman, Tom. "TBMCS Executive Overviews and Read Ahead Information." C2TIG/LMMS, Hurlburt Field, Fl.
- Hallion, Richard P. *Storm Over Iraq: Air Power and the Gulf War*. Washington D.C.: Smithsonian Institute Press, 1992.
- Hewish, Mark. "Out of the CAOC Comes Order." *Jane's International Defense Review*, 1 May 2003.
- Holmes, Richard, ed. *The Oxford Companion to Military History*. Oxford, U.K.: Oxford University Press, 2001.
- Joint Publication (JP) 1-02. *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (As Amended Through 5 June 2003).

- Joint Publication 2-01. *Joint Intelligence Support to Military Operations*, 20 November 96.
- Joint Publication (JP) 2-01.1. *Joint Tactics, Techniques, and Procedures for Intelligence Support to Targeting*, 9 January 2003.
- Joint Publication (JP) 3-30. *Command and Control for Joint Air Operations*, 5 June 2003.
- Joint Publication (JP) 3-60. *Joint Doctrine for Targeting*, 17 January 2002.
- “JTT Short Description”, April 2001. On-line. Internet, 8 February 2005. Available from <http://www.rl.af.mil/tech/programs/jtt/>.
- Luttwak, Edward N. *Strategy: The Logic of War and Peace*. Cambridge, Mass.: The Belknap Press of Harvard University, 2001.
- MacIsaac, David. *Strategic Bombing Survey in WW II: The Story of the United States Strategic Bombing Survey*, New York, N.Y.: Garland Publishing, Inc., 1976.
- McLaughlin, Maj Mark C. “Combat Assessment: A Commander’s Responsibility.” In *Deliberate Force: A Case Study in Effective Air Campaigning*. Edited by Col Robert C. Owen. Maxwell AFB, Ala.: Air University Press, 2000.
- Meilinger, Col Philip S. “A History of Effects-based Air Operations.” *RAF Airpower Review* 6, no. 3 (Autumn 2003): [1-26].
- Meilinger, Col Phillip S. “Ten Propositions Regarding Airpower.” *Airpower Journal*, (Spring 1996): [1-18].
- Moseley, Maj Gen T. Michael. “OIF Lessons Learned.” Lecture, Air Command and Staff College, Maxwell AFB, Ala., 15 March 2004.
- Murray, Williamson, and Scales, Jr., Major General Robert H. *The Iraq War: A Military History*. Cambridge, Mass.: The Belknap Press of Harvard University Press, 2003.
- Olschner, Clarence. “Effects-based Operations.” Lecture, 505 TRS Command and Control Warrior Advanced Course, 7 April 2005.
- Operation Iraqi Freedom—By the Numbers*. Prince Sultan Air Base, Saudi Arabia: USCENTAF Assessment and Analysis Division, April 2003.
- “Products: ITS.” *Intelligent Software Solutions, Inc.* 30 March 2005. On-line. Internet, 14 March 2005. Available from <http://www.issinc.com/products/its/shtml>.

Schlight, John. "The War in South Vietnam: The Years of the Offensive (1965-1968)." In *The United States Air Force in Southeast Asia*. Washington D.C.: Office of Air Force History, 1988.

Sharp, U.S. Grant, and Westmoreland, William C. *Report on the War in Vietnam (as of 30 June 1968)*. Washington D.C.: U.S. Government Printing Office, 1969. In Clodfelter, Mark. *The Limits of Air Power: The American Bombing of North Vietnam*. New York, NY: The Free Press, 1989.

TO AN/USQ-163-1, Block 10, Version 1-0, Revision 7. 26 November 2002.

Wells, Mark K. *Courage and Air Warfare: The Allied Aircrew Experience in the Second World War*. London: Frank Cass, 1995.

XP Branch, ACC. "Effects-based Operations." ACC White Paper. Langley AFB, Va.: May 2002.