

# **Combat Assessment Analyzing the Results of an Air Campaign**

**Maj Mark G. Sopko, USAF**

*The purpose of combat assessment is to determine if the desired results were achieved.*

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## **Prologue**

Joint air operations center, sometime in the future: The air campaign is in its third day. One of hundreds of telephones rings in combat operations division. The Director of Combat Operations (DCO) picks up the phone and it is one of the wing commanders in support of this campaign. The Colonel wants to know what his wing's BDA was for today's missions. The DCO passes the phone to the intelligence officer on duty. The Lieutenant stammers a bit at first, then informs the Colonel that the information is not yet available. A first phase BDA report will be sent in the next six hours summarizing the targets the wing had struck. The Lieutenant hangs up, glad to get off the phone and continue working on the latest fire he has to extinguish, getting a segment of weapons system video on a recent strike mission to the Public Affairs Office for a press release. The Colonel on the phone is frustrated because he did not get his answer.

## **Introduction**

What really happened in this hypothetical situation? Why wasn't the wing commander satisfied? What was the Colonel really looking for? The more important questions that should be asked are; is the joint force air component commander (JFACC) getting the information he needs to assess the results of the air campaign? Is the joint force commander (JFC) receiving the proper assessments that will impact changes in strategy?

The term battle damage assessment (BDA) evokes different images at the different levels of war. The tactical commander's view of BDA is more focused. Was the mission a success? Did my unit hit the correct target? Did the ordnance detonate correctly? Were the desired results achieved? The operational commander is focused on the campaign. A JFACC, for example, is looking for whether his air campaign objectives are being met. Does he need to restrike certain targets? Is the application of air power correctly employed to meet the JFC objectives? Strategic leaders look to BDA as a means to help decide whether they have achieved their goals. Are they ready to move on to a new phase of the war? Should campaign strategies change? This paper is designed to get you, the war fighter, to think about what kind of assessment you are asking for and to

help prepare the commanders to better structure the joint air operations center (JAOC) for combat assessment (CA).

## **History**

It is very important to remember that BDA is only a third of the whole picture of CA. Most of us incorrectly think that BDA answers all the damage assessment questions. This belief has a historical basis. From the dawn of air power, assessments were made on its effectiveness in war. At one time, BDA meant "bomb damage assessment." This nearly described the effect the bomb had on the target. In an effort to refine the term over the years, "bomb" was replaced by "battle." But as more complex systems were developed, BDA still failed to address the entire damage assessment picture. From World War II through the most recent air operation in Bosnia, Deliberate Force, the damage assessment process has expanded and matured as the nature of war has changed. Throughout the spectrum of modern war, the increased accuracy of weapon systems and the increased tempo of warfare have correspondingly increased the necessity for more detailed and accurate information.<sup>1</sup>

## **World War II**

Damage assessment was at its infancy during World War II. Before the Normandy invasion in June 1944, detailed and reliable ground information describing the extent of damage done to Germany's industrial base by the combined allied bomber offensive was not generally available.<sup>2</sup> Strategic operations, such as the Schweinfurt raid of 1943, used aerial photographs to determine the effectiveness of its various bombing campaigns. "Bomb" damage was assessed in two distinct phases: preattack and postattack analysis. In preattack analysis, the function of an industrial system was established. This analysis featured collaboration between photo-interpreters and industrial engineers, allowing for an appraisal of both the area and locations of the industrial system and the functional components of the system. This process was a precursor for any subsequent damage assessed against a particular target. The postattack analysis summarized the damage from the bombing strikes in a damage interpretation report. From this report, options to reattack, feasibility of reattack, and the degree of production loss were assessed. The meager beginnings of a damage assessment cell called the Allied Central Interpretation Unit created the art and science of battle damage assessment.<sup>3</sup>



**Reconnaissance photo of Schweinfurt, Germany after raids shows hits on machine shops (A and B) and powerhouse for shops (C). Arrows in left part of photo show where camouflage is used to confuse damage assessors. *U.S. Air Force Photo*<sup>4</sup>**

The information available to the allies on the effect of bombing German industrial systems was derived primarily from aerial photography and supplemented with interrogations of prisoners of war (POWs), and friendly agents working behind enemy lines. To justify the tremendous effort spent by the allies in both blood and treasure, and to validate the US Army Air Forces strategic bombing doctrine, on-the-spot investigation of the targets was required to assess the final results.<sup>5</sup> The strategic bombing missions, by their very nature, were flown great distances behind enemy lines. As a result, actual damage could not be verified by allied ground forces until after the territory had been captured, delaying the ground truth verification of the bombing by weeks, months, or even years. It was during the later stages of World War II and the immediate post-war period that witnessed almost exponential evolution of CA. The United States Strategic Bombing Survey (USSBS), conducted after the war, was an attempt by the US military to document the effectiveness of the United States Army Air Corps strategic campaign during World War II. The results of this survey were recorded and became the training benchmark for all future damage assessments.<sup>6</sup>



**Example of pre and post aerial reconnaissance Photographs. Photo on the left is the Tiergarten in Berlin, Germany before the Eighth Air Force, 24 February 1945, bombardment. Post mission photo (right) shows the damage to residential section of the city. *U.S. Air Force Photo*<sup>7</sup>**

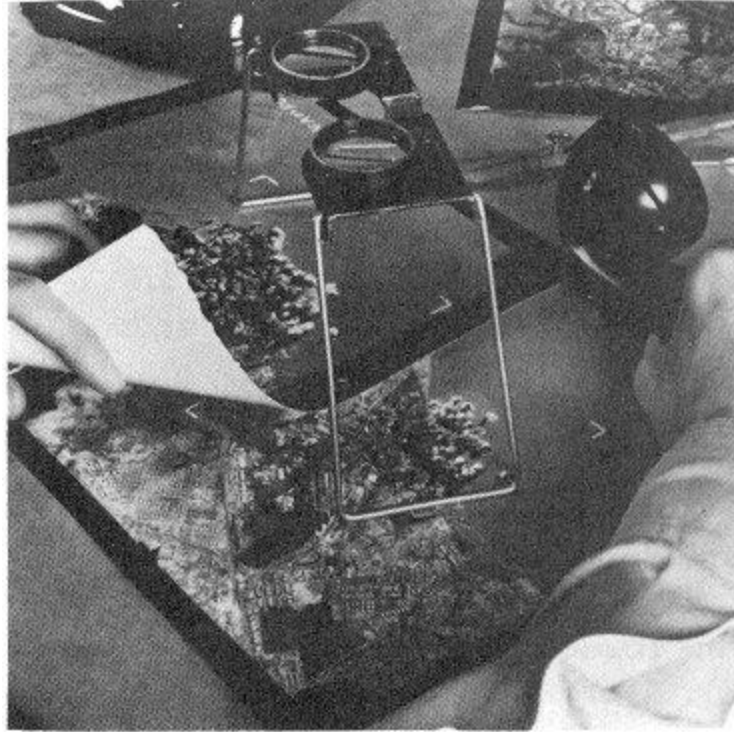
## **Korean War**

The Korean War put to the test procedures outlined in the USSBS. Employing a World War II mindset, the preattack analysis of the strategic air campaign focused on targeting limited North Korean industrial capacity. War-supporting industries would be targeted first, followed by general industries, with basic process industries last. When it was all over, a target folder system provided immediate operational intelligence for air strikes on 159 targets in South Korea and 53 in North Korea.<sup>8</sup> Factors such as improved strike assessment cameras, aerial reconnaissance, and the presence of troops in close contact with the enemy altered some of the previous methods of assessing damage. Most strike assessment footage provided timely results achieved by a particular aircraft on a particular mission, but did not provide an assessment of the status on a particular target. In the absence of any assessment cameras, aircrew would report damage and mission results from fleeting memories of their latest combat missions.



**Another example of before and after photos during the Korean War. Prestrike photo (top) of the storage center, which supplied Anak airfield, Korea. The supply center (bottom) after it was hit by more than 400 bombs, August 1952. <sup>9</sup>**

Once again, aerial photography emerged as the most reliable source of damage information. Damage assessment, thus, evolved from aircrew reports to actual photographs that had sufficient resolution to make an assessment. The Korean War also marked the presence of a new challenge: organizational disconnects. According to agreements between the US Army and the recently formed US Air Force, the Army managed the interpretation and quantity of reconnaissance photographs from missions flown by the Air Force. A joint training directive for air-ground operations provided for a joint photo center that consisted of reconnaissance technicians on the air side and photo-interpreters and distribution on the ground side. This was an arduous process, and it was frequently so slow the fluid conditions of the forward line of troops would make the photos and their interpretations obsolete.<sup>10</sup>



**During the Korean War, preliminary Bomb Damage Assessments were phoned in from these still wet "quickies."<sup>11</sup>**

Much like World War II, the Korean War was conducted over an extended period. This allowed military leaders sufficient time to further refine the damage assessment process. It was during the Korean War that the next major milestone for CA was established -- a periodic theatre-wide reporting system. The Weekly Korean Summary and the USAF Korean Summary included assessment information such as tonnage of bombs on target estimated enemy casualties, and equipment destroyed.<sup>12</sup> These summaries established a mechanism that the commanders throughout the theater were able to receive all the damage assessment reports.

### **Vietnam Conflict**

During the Vietnam conflict, damage assessment quickly rose to the forefront. The process of damage assessment became very visible when reports of equipment destroyed and personnel killed were reported every night on network news. Tactical reconnaissance became a necessary part of every mission, both for preattack and postattack analysis. Technology had changed how CA was assessed. The types of targets were the same in most cases, but the speed and altitude of the strike aircraft, coupled with the unusual terrain, made the process tedious at best. Because of hidden underground bunkers and the triple jungle canopy, many estimates of the enemy losses were "unknown." Due to the pressures from senior military leaders to show progress, many of the damage assessments were exaggerated. To further hinder the damage assessment process, yet another organizational disconnects evolved. Because

reconnaissance was so widely used, there was a massive influx of photographs to the operational headquarters. Copies of the processed photographs went to the intelligence officer assigned to the squadrons, yet the pilots did not always see them. The problem was not dereliction of duty on the part of the intelligence officers; rather, inexperience and the sheer numbers of strike photos were to blame.<sup>13</sup> This was the beginning of a situation that has perpetuated itself over the years and has become what some have called the ops-intel mutual distrust society.<sup>14</sup>



**Hanoi Petroleum storage site. On 30 June 1966 Air Force F-105s bombed a petroleum storage area three miles north of Hanoi, North Vietnam. Although damage assessments indicated that the North Vietnamese petroleum storage capacity was 70% destroyed during Phase II of Rolling Thunder, destruction of such facilities had little impact on their ability to prosecute the war inside South Vietnam.<sup>15</sup>**

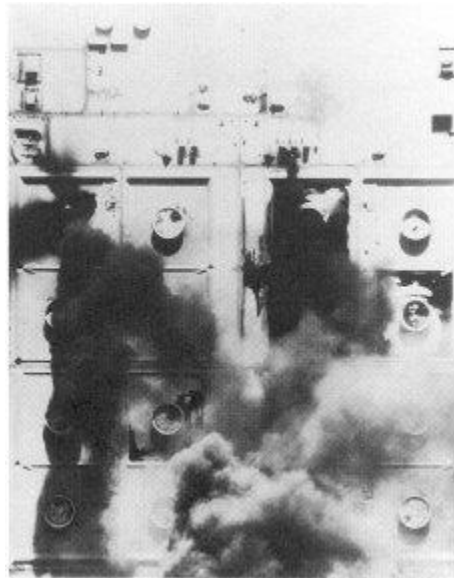
The years that followed the Vietnam Conflict witnessed an explosion in intelligence collection technology. Damage assessment, however, was overlooked during this intelligence revolution. Small operations in Grenada and Panama were too short and did not have a traditional air campaign that would allow CA to develop. What was missed was the actual practice of assessing damage. Without testing the damage assessment process with the new intelligence technologies, intelligence personnel were not prepared for the speed of a modern air campaign.

## **Desert Storm**

August 1990, Iraqi forces crossed the border of Kuwait and occupying that country. President George Bush, with the help of a coalition of nations, began to deploy forces into Saudi Arabia and the Persian Gulf region. The primary objective then was to defend Saudi Arabia with limited air assets. Desert Shield however, grew to one of the largest military build-ups in recent US history. As forces deployed, new objectives

evolved. The change in mission and objectives moved the operation from defensive to offensive.

Damage assessment was not a thought out process when planning began for Desert Storm. The intelligence community<sup>16</sup> with its high-speed surveillance technology, thought they had a plan. The community disregarded the traditional art of damage assessment (analysis of pilot reports, gunsight photos, follow up reconnaissance images/reports, and human resources intelligence (HUMINT) that trickled in from behind enemy lines) and tried to make it into a science relying primarily on national reconnaissance. It was not, however, prepared for the pace and rate of sortie generation that occurred. When intelligence analysts did get timely products, they did not have vital information such as time over target or desired mean points of impact (DMPI) which are critical when assessing damage. Even though former chairman of the Joint Chiefs of Staff General Colin Powell then stated "no combat commander has ever had as full and complete a view of his adversary as did our field commander," damage assessments came too late to impact air planning.<sup>17</sup>



**Smoke pours from a burning oil refinery hit by Coalition bombs during Desert Storm.<sup>18</sup>**

Damage assessments suffered from other problems. Because the intelligence community was so diverse, there was no standard criteria established for assessing damage and a serious shortage of trained personnel. (The former Armed Forces Targeting Course only provided five hours of instruction on Combat Assessment). This led to conflicting reports. Gen. Schwarzkopf, the Joint Force Commander for Desert Storm, once remarked during an evening intelligence update "well, if we knocked out one span of a four-span bridge so that anything that tried to cross fell into the Euphrates, you intelligence guys would tell me the bridge was only twenty-five percent damaged."<sup>19</sup> Gen. Schwarzkopf's recognized this conflict and had his staff create a methodology that combine the old art and new science in a way that tied damage assessment to his objectives. Even then, not all the intelligence community agreed; Gen.



Schwarzkopf commented "On the eve of the ground war, (the CIA) was still telling the President that we were grossly exaggerating the damage inflicted on the Iraqis. If we'd waited to convince the CIA, we'd still be in Saudi Arabia."<sup>20</sup>

The Desert Storm airwar lasted only 42 days. Unlike previous conflicts, this operation was not long enough to allow the damage assessment process to mature. By the close of the war, damage assessments were still conflicting and slow. In the Conduct of the Persian Gulf War: Final Report to Congress, 1992, the damage assessment process at the theater level was characterized as suffering from a lack of adequate systems, procedures, and manpower and had difficulty trying to keep pace with the size speed and scope of the air campaign.<sup>21</sup>

Realizing there was a lack of common terms and definitions for assessing damage in the aftermath of the Gulf War, the Military Target Intelligence Committee (MTIC) chartered the Battle Damage Assessment Working Group (BDAWG). The primary purpose of the BDAWG is to prepare the intelligence community to perform BDA more effectively when required in the future.<sup>22</sup> Among other things, the old term "bomb damage assessment" was broadened. The new definition of "battle damage assessment" included a broader perspective of the battlefield and encompasses the new intelligence technologies that were being developed.

## **Deliberate Force**

On August 28, 1995, an artillery shell ripped through the stalls of an open market in Sarajevo, Bosnia, killing 38 civilians and injuring 85 others. This was the last straw that triggered the three-week joint NATO campaign called Deliberate Force. Deliberate Force is thought of as the modern example of how judicious use of air power coupled with hard-nosed diplomacy can stop a military force in its tracks. The operations objectives were to take away the military capability of the Bosnian Serbs that made them a dominant military force in the Bosnia conflict and force them to the bargaining table. The target set was small (48 targets with 338 DMPI) and individually selected by senior NATO leadership.<sup>23</sup> Economical use of air power was achieved by the heavy reliance of precision guided munitions (over 90%).<sup>24</sup> Paul G. Kaminski, then a DoD top weapons official, in a speech given to the Air Force Academy, 2 May 1996, stated that "we are moving closer to a situation known as one target, one weapon."<sup>25</sup>

In reality, Deliberate Force expended 1 + weapons per DMPI, but the trend are apparent. The increased reliance on precision weapons will increase the need for more precise damage assessments. Operation Deliberate Force relied heavily on airborne reconnaissance to confirm hits. Photos from Bosnia usually showed one crater where the target used to be with virtually no collateral damage.<sup>26</sup> After only one week of the air campaign (30 Aug - 7 Sept 1995), damage assessments indicated the initial target list was more than 80% destroyed and a new list was drawn up. By 20 Sept 1995, NATO and the UN Leadership issued a statement that "the resumption of air strikes is currently not necessary," indicating the close of Deliberate Force.<sup>27</sup>

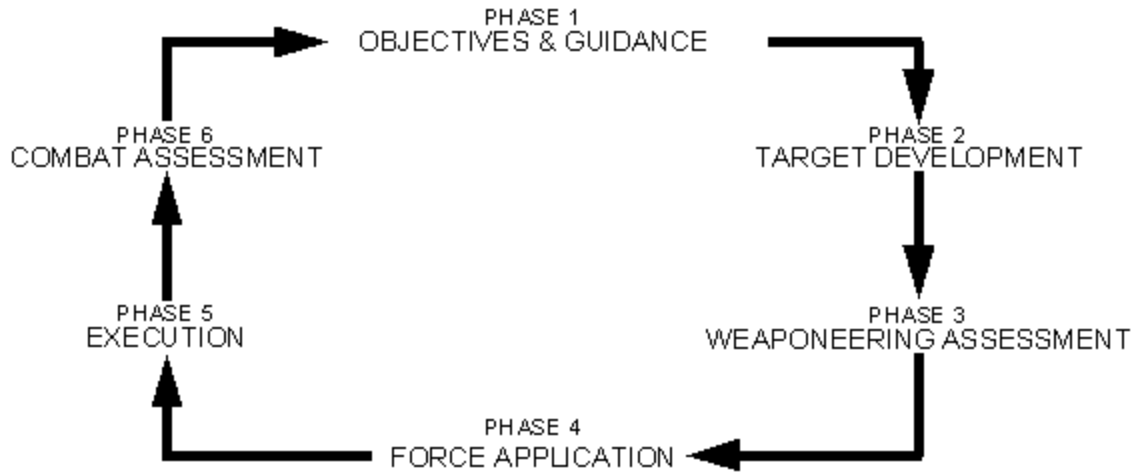
Two things can be learned from this operation as it pertains to CA. First, we must expect in this era of communication, that CA will be Joint, combined and it is going to be on CNN. Second is that as we move toward precision guided munitions, CA will have to be much more accurate. Chief of Staff of the Air Force, General Michael Ryan stated in a 1997 congressional report that Deliberate Force...offered probably the best documented...BDA of any operation that's been done in years."<sup>28</sup> This may be misleading due to the relatively small size and limited objectives of this operation.<sup>29</sup>

## **Terms and Definitions**

Future operations must plan for damage assessments before the first bomb is dropped. As accuracy of the weapons increases, so must the mechanism assessing damage. The warfighter must be familiar with these mechanisms in order to organize correctly and incorporate accurate damage assessments into the air campaign. The following is a brief description of the terms and definitions the warfighter must know to understand the complexity of the damage assessment problem.<sup>30</sup>

### **Combat Assessment Concept.**

Combat Assessment (CA) occurs at the end of the targeting process (figure 1).<sup>31</sup> To perform CA in an effective and timely manner an analyst must prepare well in advance of the operational forces delivering the first weapon. Therefore, the time to begin thinking about assessing damage is prior to the execution phase, not after. CA is not a separate, post-attack activity, but should be an integral component of the targeting and planning processes. Without an adequate understanding of mission objectives, target systems and critical elements, and mission specific operational data, numerous problems and possible errors may arise when conducting CA. The following paragraphs summarize the first five phases of the targeting cycle.<sup>32</sup>



### TARGETING PROCESS

FIGURE 1.

The first phase of this process is the development of objectives and guidance. They originate at the national level and become more specific and dynamic with progressively lower echelons of command. Command objectives establish priorities for target damage criteria and restrictions on force employment. Specific tasks are associated with each objective. Measures of merit (or effectiveness) are developed for each task in order to determine when the particular task is met. Guidance includes principles of war, the international Law of Armed Conflict, and established rules of engagement.

The second phase of the targeting process is target development. Target development analyzes a potential target system and its components to determine the type of military action required achieving a given objective. All-source intelligence databases are reviewed and potential target systems and targets are selected for consideration. A subset of target development is target analysis. Target analysis examines potential targets to determine military importance, priority of attack, and weapons required obtaining a desired level of lethal or nonlethal damage. Selected targets are analyzed to determine their significant elements. A priority listing of these significant elements is then used for weaponneering assessment.

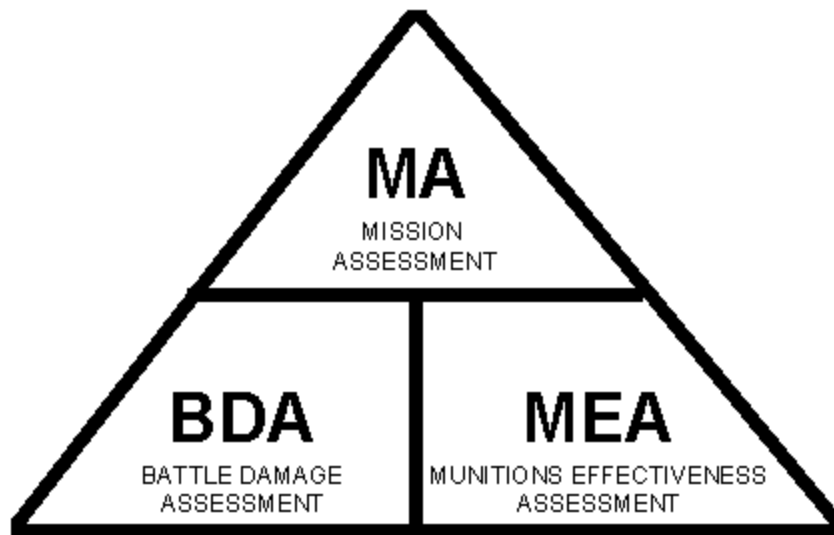
Weaponneering assessment is the third phase of the targeting process. This phase can run concurrently with the next, force applications. Weaponneering assessment determines the quantity, type, and mix of lethal and nonlethal weapons required to achieve a specific level of target damage.

The fourth phase is force application planning. The fusion of target nominations with the optimum available lethal and nonlethal force is the basis of force application planning. In this phase, forces are analyzed to determine likely results to be achieved

against target systems and their activities. The results of force application planning are strike packages that build the master air attack plan (MAAP) for the JFACC's approval.

Execution is the fifth phase of the targeting process. Once the MAAP is approved by the JFACC, it is then translated into an air tasking order (ATO). Units will execute the plan and report any discrepancies back to the JAOC.

The final phase of the targeting process is CA. CA is an overall evaluation of combat operations in relation to command objectives. An effective air operation planning requires a continuing evaluation of the impact of joint force combat operations on the overall campaign. The CA process for air operations must start at the JAOC level, where the requisite expertise and equipment are in place to assess continuous operations. CA is the continuous evaluation of air operations results which must be provided to the JFC for consolidation and overall evaluation of the JFC's campaign. CA is composed of three major components; BDA, munitions effectiveness assessment (MEA), and mission assessment (MA). This definition differs with Joint Publication 1-02, which defines the third component of combat assessment as reattack recommendations, but it represents current Air Force policy.<sup>33</sup> Mission assessment is more appropriate. Reattack recommendation is a conclusion, vice assessment, drawn in all phases of combat assessment. On the other hand mission assessment addresses the effectiveness of overall strike operations in light of the command objectives and assigned missions.<sup>34</sup> Battle damage assessment and munitions effectiveness assessment form the pillars that support mission assessment used to determine air operations plan effectiveness (Figure 2).<sup>35</sup>



**COMBAT ASSESSMENT  
DEFINITION PYRAMID**

FIGURE 2.

George Bernard Shaw once noted, the United States and England are "two countries divided by a common language." Likewise, operators and intelligence personnel are sometimes divided over a common term, in this case, BDA. Both sides are often perplexed by the confusion, which surrounds its use. What does BDA mean and why should there be any confusion at all? New buzzwords like "mission assessment" or "effects-based damage assessment" are not really new despite their apparent rediscovery and emphasis post Desert Storm. The BDAWG developed and approved for general use BDA related terminology.<sup>36</sup> The following terms and definitions are compiled from the results of the BDAWG, Joint and Air Force Doctrine.

**Battle Damage Assessment.** BDA and combat assessment are not synonymous. BDA is one of the principle subordinate elements of combat assessment. BDA is the timely and accurate estimate of damage to a target or target system resulting from the lethal or nonlethal application of military force. BDA is an intelligence function that looks at the executed ATO from a target perspective. BDA is composed of physical damage assessment, functional damage assessment, and target system assessment.

Physical Damage Assessment. The estimate of the quantitative extent of physical damage (through munitions blast, fragmentation, and/or fire damage effects) to a target resulting from the application of military force. This assessment is based upon observed or interpreted damage. Collateral and additional damage is also assessed in this process.

Functional Damage Assessment. The estimates of the effect of military force to degrade/destroy the functional or operational capability of the target to perform its intended mission. It includes the level of success of the force applied relative to the operational objective established against the target. This assessment is inferred based upon all-source information and includes an estimation of the time required for recuperation or replacement of the target.

Target Systems Assessment. 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 effectiveness (including significant subdivisions of the system) relative to the operational objectives established.

**Munitions Effectiveness Assessment.** Conducted concurrently and interactively with BDA, the assessment of the military force applied in terms of the weapons system and munitions effectiveness to determine and recommend any required changes to the methodology, tactics, weapon system, munitions, and/or weapon delivery parameters to increase force effectiveness. MEA is the function of weaponeers, engineers, and operators. Essentially there are two types of MEA, short-term feedback for the operators, and the long-term analysis for weapons development and acquisitions communities. MEA includes:

Munitions Assessment. The estimate of munitions (or submunitions) effectiveness and level of success against a particular target or sets of targets compared to expected results. The conclusion of this assessment may include changed recommendations for penetration, cluster, or fragmentation munitions on particular targets or the development of new munitions capabilities.

Weapons System Assessment. The estimate of weapons system effectiveness and level of success against particular targets or target sets struck by those weapon systems. Results from this assessment may include package success rates, weapon system performance, and recommendations for or against weapon systems like Conventional Air Launched Cruise Missiles (CALCM) and Tomahawk Land Attack Missiles (TLAM).

Tactics Assessment. The analysis of weapon system delivery and employment tactics during an air operation plan to effectively implement the campaign objectives. This assessment may impact commander's guidance by recommending changes to tactics or procedures that can effect current or future rules of engagement.

**Mission Assessment.** Mission assessment addresses the effectiveness of a particular mission e.g., offensive counter air, interdiction, strategic attack. It gives the commander a broad perspective of the impact and effectiveness of military operations waged against

the enemy. While BDA and MEA address lethal force employment against individual target systems and weapons, mission assessment evaluates the impact of assigned missions and apportionment. It directly impacts the JFACC's apportionment nominations and the resultant JFC decision. The supported commander makes Mission assessments.<sup>37</sup>

## **Combat Assessment Problems in the Joint Air Operations Center**

### **BDA vs. CA**

The most common mistake among operators and intelligence support personnel alike is the confusion between BDA and CA. BDA is a familiar term with historical roots and tends to overshadow the CA process. Unfortunately, BDA is just one part of this process. BDA is intelligence driven while CA is the responsibility of the commander. BDA focuses damage to the target and target system while CA is much broader and tries to answer the question: "how well are we doing and what's next?" Like BDA, CA provides information to commanders, battle staffs, planners, and other decision-makers. This wide audience complicates definitions and functions as it is applied across all components and joint staffs. The bottom line is that this audience must understand what type of information they need. Commanders must be educated in the process and be able to practice this. All too often, CA is an afterthought. CA must be considered in the beginning of the targeting process with the development of the commander's objectives.

### **Measuring CA**

All objectives should have measures of merit developed during the planning phase. This, simply put, asks the question: "what do I want to accomplish and how do I know when I have accomplished it?" Measures of merit define the objective and allow a means to track its progress. These measures are derived from both inductive (using sensors or aircrew to directly observe damage inflicted) and deductive (using indirect means to ascertain results) assessments. Examples of inductive observation could involve secondary explosions seen by aircrew or movement stopped after attacks. Assessment can be deductive if damage is unobserved but verified by third party sources (large numbers of enemy personnel surrender right after a B-52 strike). Qualitative assessment should be used in addition to quantitative analysis. Single methods of measurement should be avoided because they lead to unsound or distorted results. By applying this logic, both the art and science of CA is maintained.

### **MEA**

MEA is continuously overlooked, but has the highest payoff for weapons and tactics development. Wartime environment offers one of the best means to collect delivery parameters without requiring a large amount of resources. Its impact on wartime operations is immediate. If a tactic or parameter (bomb fuze setting for example) is discovered ineffective, on the spot changes will save aircraft, resources, and lives. In peacetime, this data is collected and incorporated into the Joint Munitions

Effectiveness Manuals (JMEM) and other service and platform specific products. These manuals include methodologies from target acquisition and delivery parameters to weapons effects. The Joint Technical Coordinating Group for Munitions Effectiveness (JTTCG/ME) manual was developed to provide tri-Service-approved and accepted data and methodologies to permit standardised comparison of weapon effectiveness.

Peacetime and wartime planning, JMEM allow all services to draw the same conclusions on how many bombs, weapons, and type of tactics are needed to apply effective air power. These manuals were developed under a 14 December 1963 mandate by the Joint Chiefs of Staff to the military Services to create a manual that would provide effectiveness information on air-to-surface non-nuclear munitions. The Army was named the executive agent and the resulting manuals prepared by the JTTCG/ME were reviewed and approved by the Office of the Secretary of Defense, the military Services and the Defense Intelligence Agency. These manuals have been continually updated and are now being converted from the huge bulky orange covered documents all operators dread to hypertext documents that will speed up the process of weaponeering.<sup>38</sup> Although this long-term analysis process is highly effective for standardization of weapon effects throughout the Services, it is not responsive enough to effect air operations during contingencies.<sup>39</sup>

In wartime, the pace at which data on weapons delivery and effects are received increases exponentially. More importantly, changes in applications must be made with equal speed or the effectiveness of the weapons can degrade and lives may be lost. Short-term MEA feedback is critical for operators at the unit and AOC levels. A good example of the MEA process working (and weaponeering process not) is during Desert Storm. In August 1990, CENTAF targeting personnel recommended that bridges only be struck with precision guided munitions (PGM). Initially, this advice was ignored. Based on unacceptable results, planners shifted to using PGM against bridges.

### **Structure the Air Operations Center for Combat Assessment**

The JFACC's JAOC is structured to operate as a fully integrated facility staffed to fulfill all of the JFACC's responsibilities. The two organizations or functions, which should be common to all JAOCs, are Combat Plans (future joint air operations) and Combat Operations (executions of the daily joint ATO). The role of intelligence is extremely important and an integral part of the daily function of Combat Plans and Combat Operations.<sup>40</sup> Intelligence personnel monitor and assess adversary capabilities and intentions and provide assistance in target, weapon and platform selection, conduct battle damage assessment as well as provide an up-to-date picture of the adversary, expected adversary operations, and the status and priority of assigned targets to assist in execution-day changes.<sup>41</sup> Under control of the senior intelligence officer on the JFACC staff (J2), the intelligence organization overlaps both Combat Operations and Combat Plans, providing personnel to support both functions.

Most intelligence commanders think the way to fix the CA is to throw people at the problem. This could not be further from the truth. Restructuring the JAOC or creating a new Combat Assessment Cell with the JAOC is not necessary. In this modern



environment of dwindling personnel, the intelligence commanders should be thinking smarter not larger. The intelligence function in a JAOC prior to the execution of the first ATO is to prepare the commander on what to expect from the enemy and assist in the target planning process. Once the first bomb is dropped the scope and function of intelligence changes. Now, the damage or lack of damage done by the ongoing operation impacts assessing the enemy's capabilities. In effect, the J2's organization becomes one big CA cell. Predictive analysis is still important, but it must include the results of the air campaign and combined this with the commander's objectives. The result is no change in structure within the JAOC, rather, a change of direction.

Figure 3<sup>42</sup> is an example of a generic JAOC delineating Combat Operations and Combat Plans with the overlapping intelligence structure. Included is the intelligence flow for CA, showing where each portion of CA is performed and where it is used.

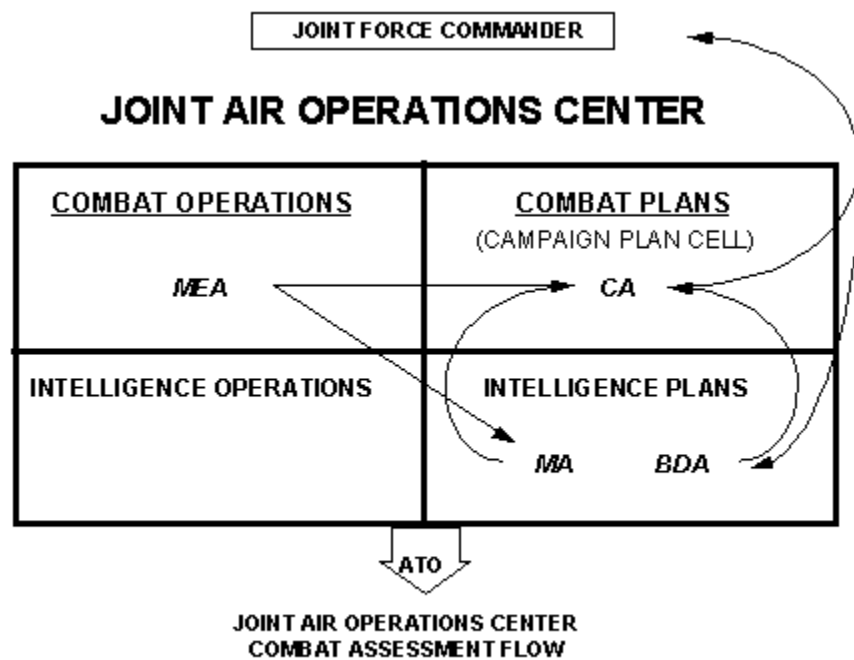


FIGURE 3.

CA flow in the JAOC can be divided into four areas. BDA is compiled and reported in the intelligence division within Combat Plans, then forwarded to the campaign planning cell of Combat Plans and outside of the JAOC to the JFC's BDA intelligence effort. The joint force intelligence effort also provides its big picture BDA back to the JAOC. MEA should be correlated by operators with the help of target intelligence personnel in the Combat Operations. MEA would then be passed to the intelligence personnel in Combat Plans and the campaign-planning cell. The intelligence effort in Combat Plans will take MEA and BDA from the day to day ATO and correlate it into a daily MA summary that gets passed to the campaign planning cell. Targeteers, analysts, operators, and logisticians within the campaign planning cell tie BDA, MEA, and MA with the air objectives and turn it into the JFACC's Combat Assessment. Combat

Assessment is then passed to the JFC as the JFACC's assessment of the air operations plan.

## **Summary**

The Air Force is currently in a period where CA is one of its least concerns. Unfortunately, history is doomed to repeat itself. Even with the greatest computers and intelligence systems, we are no farther along in the CA process as we were in the post Vietnam period. Without practice and emphasis, the art and science of CA will be forgotten. The intelligence community is making an attempt to keep CA alive with the efforts of the MITC and the BDAWG. However, they are continuing an old trend of trying to take the art of assessing damage and make it into a science. Their focus revolves around only one third of the problem, BDA. MEA and MA are not emphasised. Regardless, efforts like the MITC and BDAWG should be applauded. But without any emphasis or guidance from senior operational leadership, these efforts will have limited impact on our future air operations.

Commanders first need to recognize that there still is a CA problem. They must understand the CA process and be able to structure their organization to accomplish CA. Finally, they must create exercises that can practice this structure. CA is not just an intelligence problem. Both intelligence personnel and operators must be educated in the CA process and be able to distinguish the difference between terms like BDA and MEA. Mistakes will be made in the CA process, but with informed commanders and experienced staff, these problems will only help refine the continuing evolution of Combat Assessment.

## **Epilogue**

Same Joint Air Operations Center sometime in the future. The air campaign is now in its sixth day. One of hundreds of telephones rings in Combat Operations Division. The Director of Combat Operations (DCO) picks up the phone and it is the B-1 wing commander supporting the strategic bombing campaign. The Colonel wants to know why he is attacking the same targets for the third day in a row. Remembering a discussion about the B-1s during the morning changeover brief, the DCO asks the Intelligence Officer on duty the question. The Lieutenant checks his computer and discovers that the B-1 targets support the objective; "prepare the battlefield for the ground offensive." He quickly checks the target BDA file to find that the B-1s have had minimal physical and functional damage to the targets. However, upon checking with the intelligence planner for the Campaign Planning Cell, he and finds out that intelligence has been reporting a dramatic increase in the number of soldiers deserting from units that were struck by the B-1s. In addition, he relays from the Director of Combat Plans that the JFACC has decided to continue the B-1 strikes for another three days. The DCO passes this information back to the B-1 commander. The Lieutenant was happy to get a 10 minute break from his current project and goes back to sending another segment of weapons system video on a recent strike mission to the Public

Affairs Office for a press release. The B-1 commander was satisfied and requested that he be called if there are any changes to his missions.

Majors Rick Anderson, Larry Grundhauser, Hugh Hortsman and Susan Mashinko, "The Future of BDA" in Maj Kevin M. Dunleavy. and Maj. Lester C. Ferguson, *Concepts in Air Power for the Campaign Planner* (Maxwell AFB, Ala: Air University Press, 1993), 85.

## Notes

1. Majors Rick Anderson, Larry Grundhauser, Hugh Hortsman and Susan Mashinko, "The Future of BDA" in Maj Kevin M. Dunleavy and Maj. Lester C. Ferguson, *Concepts in Air Power for the Campaign Planner* (Maxwell AFB, Ala: Air University Press, 1993), 85.
2. Ibid., 85.
3. Ibid., 85-86.
4. Thomas M. Colfey, *Decision over Schweinfurt, the U.S. 8<sup>th</sup> Air Force Battle for Daylight Bombing*, (NY, David McKay Co INC.,1977)
5. Anderson, Grundhauser, Hortsman and Mashinko, 86.
6. Ibid., 86.
7. Richard G. Davis, *Carl A. Spaatz and the Air War in Europe*, (Washington DC, Office of the Air Force History, USAF, 1993) 567.
8. Anderson, Grundhauser, Hortsman and Mashinko, 86.
9. Robert F. Futrell, *The United States Air Force in Korea 1950-1953* (Washington DC, Office of the Air Force History, USAF, 1983)523.
10. Anderson, Grundhauser, Hortsman and Mashinko, 87.
11. Futrell, 71.
12. Anderson, Grundhauser, Hortsman and Mashinko, 88.
13. Mark Clodfelter, *The Limits of Airpower*, (NY; The Free Press), 131.
14. Anderson, Grundhauser, Hortsman and Mashinko, 87.
15. Earl H. Tilford, Jr., *Set-up; What the Air Force did in Vietnam and Why* (Maxwell AFB, Ala., Air University Press, 1991)119.
16. Intelligence Community is defined in this paper as the collective organizations that include but are not limited too; the Central Intelligence Agency, the National Security Agency, the Defense Intelligence Agency, Military Command and Component intelligence units that collect analyze and provide intelligence products.
17. Major Kevin W. Smith, *COCPIT VIDEO; A Low Cost BDA Source*, (Maxwell AFB, Ala: Air University Press, 1993), 1.
18. R. Cargill Hall, *Case Studies in Strategic Bombardment*, (Washington DC, Air Force History and Museums Program, USAF, 1998) 572.
19. H. Norman Schwarzkopf, with Peter Petre, *General H. Norman Schwarzkopf, The Autobiography; It Doesn't Take A Hero*, (NY: Bantam Books, 1992), 431.
20. Ibid., 432.
21. Department of Defense (DOD), *Conduct of the Persian Gulf War: Final Report to Congress*, appendices A-S, April 1992, C-1.

22. Battle Damage Assessment Working Group Charter, (Defense Intelligence Agency, Mar 92)1.
23. John A. Tirpak, "Deliberate Force," Air Force Magazine, (Arlington, VA, Air Force Association, Oct 97, Vol.80, No. 10)39.
24. Ibid., 38.
25. Ibid., 39.
26. Ibid., 39.
27. Ibid., 40.
28. Ibid., 43.
29. 3515 NATO air sorties, about one days work in the 1991 Gulf War.
30. The following concepts and definitions were extracted from a combination of Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*, Joint Publication (JP) 3-56.1, *Command and Control for Joint Air Operations*, Air Force Pamphlet (AFPAM) 14-210, *USAF Intelligence Targeting Guide*, Joint Publication, *Joint Forces Air Component Commander (JFACC) Primer*, Defense Intelligence Agency (DIA) Publication, *DIA Battle Damage Assessment Quick Guide* and *United States Central Command Air Forces Air Operations Center Concept of Operation for Combat Assessment*).
31. United States Central Command Air Forces (USCENTAF) Concept of Operation (CONOP), *USCENTAF Air Operations Center CONOP for Combat Assessment*, 29 Feb 1996, 3.1.
32. Refer to Joint Publication 2-01.1 for additional information on the process.
33. Air Force Instruction (AFI) 14-117, *Intelligence*, 1998 7.6.1.
34. Air Force Pamphlet (AFPAM) 14-210, *USAF Intelligence Targeting Guide*, 1998, 9.6.
35. *USCENTAF Air Operation Center CONOP for Combat Assessment*, 3.2.
36. *Battle Damage Assessment (BDA) Quick Guide*, (Defense Intelligence Agency, Feb 96).
37. AFPAM 14-210, 9.6
38. Ibid., 6.5.
39. Captain John R. Glock, "The Evolution of Air Force Targeting," *Air Power Journal*, (Fall 1994, Vol VIII, No. 3)25.
40. Joint Publication (JP) 3-56.1, *Command and Control for Air operations*, 1994, vii.
41. Ibid., H-7.
42. *USCENTAF Air Operation Center CONOP for Combat Assessment*, 3.3.