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AIR POWER VERSUS A FIELDED ARMY:

A CONSTRUCT

FOR AIR OPERATIONS IN THE 21ST CENTURY

by

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Abstract

Operation Desert Storm, the 1991 Gulf War, and Operation Allied Force, the 1999 Air War over Serbia, saw US and coalition Air Forces attacking enemy fielded forces at unprecedented levels. Given the real change in the nature, strategy, and conduct of air operations in the last decade, this study examines how to most efficiently employ airpower to achieve its objectives in the asymmetric attack against a fielded army.

During Desert Storm, US Air Forces developed medium altitude tactics increasing survivability by over-flying the range of Iraqi AAA and MANPADS. Difficulties in attacking from medium altitude were countered with massed formations of specialized armor-killing A-10s, the development of F-16 "Killer Scouts," and the F-111 and F-15E tactic of "Tank Plinking" with laser guided bombs. During Allied Force, the challenge lay not in attacking the enemy, but in locating and identifying an army interspersed with a large number of civilian refugees.

A systems approach is required to most efficiently attack a fielded army by air. The key is the integration of ISR assets through an intelligence "flex targeting" cell and the use of terminal air controllers such as Forward Air Controllers Airborne (FACAs), along with trained strikers capable of precision attack. This approach requires a change in Joint and Air Force doctrine acknowledging the supported role that US Air Forces have performed against enemy fielded forces over the last decade. It calls for the adaptation of the tactics, techniques, and procedures necessary to ensure the USAF prepares for these kinds of operations in the future.

Chapter 1

Introduction: the Airpower Debate

Though this paper focuses predominantly on operational and tactical concerns, it is firmly rooted in the larger issues of airpower and warfare. Even as the one hundredth anniversary of powered flight approaches, debate over the military effectiveness of airpower continues. Both theorists and practitioners have addressed this most important question and, more often than not, their answers have stressed the strategic dimensions of aerial warfare. The critical component of strategic airpower theory and doctrine has been the need to strike directly at the enemy's heartland in order to destroy the enemy's willingness or capability to wage war. Theorists and practitioners of air warfare from Douhet to Warden have equated airpower effectiveness with attacks on strategic targets: the enemy's population, war-making industries or industrial web, or the enemy's leadership. Whether command of the air, high-altitude daylight precision bombardment, or strategic paralysis, the focus has been on attacking targets characterized as strategic in nature.

However, in the wake of the Gulf War, some theorists and practitioners are suggesting that a more effective (and politically palatable) use of airpower lies not only in attacking strategic targets, but also in directly attacking an opponent's fielded forces. This new emphasis does not suggest targeting fielded forces in <u>support</u> of planned or actual ground operations, but rather targeting fielded forces independently with a goal of destroying or degrading them to the point of

enemy accession to demands. Robert Pape suggests such an approach in his book Bombing to Win. Pape divides coercive air strategies into four categories. Punishment strategy attempts to increase the pain to enemy civilians to the point where the cost of continued resistance by the state exceeds the benefits of their territorial interests[1]. The bombing of cities to create homeless citizens and severe shortages of key supplies is an example of this strategy. Risk strategy slowly raises the costs of continued resistance over time, forcing the enemy to weigh future risks with continued resistance.[2] Vietnam's Rolling Thunder air campaign, based on the logic of Schelling's gradualism, provides this classic example of this strategy put into practice. A decapitation strategy strikes key leadership and command and control facilities. This was applied in the initial air strikes of the Gulf War.[3] Finally, denial strategy targets the enemy's ability to achieve its military objectives.[4] In his analysis of thirty-three airpower case studies, Pape concludes that only denial strategy has been decisive in aerial warfare.[5] Though Pape's analysis and conclusions are subject to challenge, his conclusions have ignited a serious debate within America's security community on the effective use of airpower.[6]

Not only theorists, but also Air Force practitioners, have recently debated the effectiveness of direct aerial attack against an advancing enemy army. Major General Charles Link championed the use of airpower asymmetrically against enemy ground forces during the "Halt" phase.[7] This halt strategy is designed to stop the enemy short of their objective. Once stopped, the enemy must resolve either to survive in friendly territory under aerial bombardment or to withdraw to a position where they are no longer threatened.[8] A halt strategy is not just a defensive posture, but an application of airpower to directly defeat an enemy by defeating/destroying its fielded forces. The debate on how to best coerce an opponent through application of airpower now involves more than just strategic attack.

The purpose of sketching these distinctions between theories is not one of semantics. Rather, it is background to the real change in the nature, strategy and conduct of air operations in the last decade. If there is any validity in the theories put forward by thinkers like Pape and Link, then practitioners must develop the systems to most efficiently strike fielded forces with the appropriate lethality, flexibility, and controllability. Reinforcing this requirement are the recent policy and strategy shifts towards the use of airpower to attack not only traditional strategic targets, but also fielded forces independent of friendly ground operations. As both the earlier operations in Bosnia and the latest in Kosovo illustrate, political leaders are looking to coerce opponents with attacks directed at fielded forces accomplished primarily, if not solely, through airpower. This paper draws on the experiences of attacking Iraqi and Serbian fielded forces during Desert Storm and Allied Force. It then lays out the operational and tactical framework, emphasizing a systems approach, for efficiently conducting air operations against fielded forces.

Notes

[1] Robert A. Pape, *Bombing to Win: Air Power and Coercion in War,* Faber, (Ithaca, New York: Cornell University Press, 1996), 58.

[2] Ibid., 66.

[3] Ibid., 79.

[4] Ibid., 69.

[5] Ibid., 10.

[6] Colonel John A. Warden, USAF (ret),"A Response to Robert Pape's Bombing to Win," *Security Studies* 7, no.2 (winter 1997/8): 172-90. And Watts, Barry D., "Ignoring Reality: Problems of Theory and Evidence in Security Studies," *Security Studies* 7, no.2 (winter 1997/8): 115-71.

[7]Major General Charles Link, USAF (retired) was the special assistant to the USAF chief of staff during the 1996 Quadrennial Defense Review (QDR).

[8]Major General Charles Link, "The New View of Airpower," *Air Force Magazine*, August 1997, Vol. 80, No. 8.

Chapter 2

Desert Storm: Attacking the Republican Guard

On 17 January, 1991 United States and coalition forces launched the Gulf War air offensive. Waves of aircraft flooded into Kuwait and Iraq, attacking key integrated air defense system nodes, airfields, command and control systems, nuclear/biological/chemical sites, and electric plants.[1] Daybreak of day one witnessed the start of attacks against Iraqi ground forces in Kuwait. Among the centers of gravity identified by General Schwarzkopf, the US Joint Forces Commander, were the seven elite Republican Guard divisions held in reserve along the Iraq-Kuwait border.[2] While aerial attack continued against key "strategic" targets in Iraq, 75% of the coalition strike missions focused on the Iraqi forces in Kuwait.[3]

Operation Desert Storm provided a catalyst for airpower thinkers like Pape and Link. The Gulf War demonstrated the ability of air forces to effectively attack fielded forces, fundamentally changing the perspective of many senior military leaders and policy makers on how warfare should be conducted. Never before had airpower been called upon to produce the level of destruction upon fielded forces that coalition air forces were expected to achieve prior to a ground invasion of Kuwait. Because US casualty estimates were predicted to be as high as fifteen thousand, US concern over these possible losses led the national command authority and General Schwarzkopf to develop a strategy emphasizing the use of airpower to significantly reduce the Iraqi army's size, maneuver capability, and will to fight.[4] The same capabilities

Colonel Warden and his planners capitalized upon to enable their strategic attacks, improvements in target acquisition and precision weapons delivery, provided a quantum leap in airpower's lethality against an army.

This air-first strategy proved immensely successful, with friendly casualty rates far below even the most optimistic estimates and with friendly ground forces achieving objectives well ahead of schedule, with limited Iraqi resistance. The exact relationship between the destruction of Iraqi ground forces by air attack and the ultimate decision by Iraq to abandon Kuwait and agree to negotiations is still debated. Still, the fact remains that airpower played a deliberate, leading roll in the defeat of the Iraqi Army. However, this aerial achievement was not accomplished without major modification to existing tactics, techniques and procedures. Desert Storm educated the USAF on how to organize and train airpower to accurately attack a fielded army and the Gulf War has reshaped how the United States employs its airpower.

The Gulf War air offensive consisted of three phases, conducted nearly simultaneously. Phases I and II were directed against strategic target sets to include leadership, command and control facilities, nuclear, biological and chemical (NBC) facilities, airfields, aircraft, and the integrated air defense system. Phase III was the air attack against Iraq's fielded forces. It called for the 50% attrition of Iraqi's 5,000 pieces of dug in armor and artillery prior to any ground offensive.[5] In this phase, Schwarzkopf was most concerned with the three heavy divisions of the seven Republican Guard divisions along the Kuwait-Iraq border.[6] The units were widely dispersed and dug in with thousands of U-shaped earthen berms protecting their T-72 tanks.[7] Their defenses included anti-aircraft artillery (AAA), infrared SA-13 surface-to-air-missiles (SAMs) and radar-guided SA-6 SAMs.

Phase III required the unprecedented success of airpower against a fielded army.[8] Air planning boss Brigadier General Buster Glosson's briefing to Schwarzkopf in December 1990 indicated the Republican Guard could be attrited to 50% in five days, assuming 600 sorties a day.[9] Air planners divided Kuwait and Iraq into a grid pattern with the smallest division being a 30 nautical mile x 30 nautical mile square known as a "kill box". Aircraft were then assigned kill boxes and ordered to locate and destroy Iraqi forces within that area.[10] The job of attacking the elite Republican Guard fell to F-16s and B-52s, while A-10s were used against the regular Iraqi divisions dug in along the Kuwait-Saudi border.[11]

By the fifth day of phase III, coalition air attacks against the Republican Guard had not achieved anywhere near the 50% attrition levels expected by Schwarzkopf.[12] Post war analysis indicated that between 24-34% of Republican Guard heavy division armor was actually attrited during the entire 38 days of the air campaign.[13] Glosson's 5-day estimate proved overly optimistic for two reasons. First, air attacks were not as effective as war-gaming analysis predicted.[14] US Air Forces used medium altitude tactics to reduce the threat from Iraqi air defenses. While this greatly improved survivability, US pilots were relatively unfamiliar with medium altitude tactics. Unforeseen difficulties with target identification, poor weather, and inaccuracies in delivering medium altitude munitions reduced effectiveness. Second, the number of sorties flown against the Republican Guard fell well short of 600 sorties a day. A combination of initial emphasis on phase I operations, a reluctance to employ A-10s that deep in the battlespace, and unanticipated Scud hunting missions reduced the number of sorties available to attack the Republican Guard. For the first 5 days, total strikes against Republican Guard units were constant at around 100 missions per day. By the end of day 10, a cumulative count of

sorties against the Republican guard totaled 728 missions, an average of only 72.8 sorties a day.[15]

In addition to the lower than estimated sortie rates, intelligence and targeting support against the Iraqi fielded forces proved extremely difficult. The Joint Air Operations Center (JAOC) intelligence cell at Riyadh was overwhelmed with concurrent requests to support strategic, counterair, counterland, and scud hunting operations.[16] The task of destroying the Iraqi army, with thousands of vehicles spread out over thousands of square miles of desert was enormous. This, coupled with an underlying assumption that imagery of a potentially mobile unit had limited viability, restricted the precision imagery available to help plan and direct attacks on the Iraqi Army.[17] The intelligence system was neither designed nor prepared to provide the quantity of imagery required by the flying units.[18] Some flying unit intelligence shops provided comprehensive information on the Iraqi's Ground Order of Battle, based on the Joint Forces Air Component Commander's priorities. This included available imagery, GPS-based coordinates, and unit derived target areas of interest products.[19] However, no one at the JAOC was responsible for producing these materials and, consequently, many aircrews launched on missions with little more than the approximate location of enemy divisions within an assigned kill box.[20]

Even when intelligence products were available, the usefulness of the material was suspect. Aircrew had difficulty in locating the exact coordinates of potential targets dispersed throughout the desert. The flat, featureless terrain made detailed maps (such as 1-50,000') unusable for target location criteria. Limited GPS navigation capability of tactical aircraft left aircrews reliant on inertial navigation systems (INS) that were sufficient for basic navigation, but inadequate for

precise coordinate location.[21] Aircrews flew to known or suspected target areas and then commenced visual searches for any viable targets.

The intelligence deficit was not insurmountable. More accurate information including photos and graphics was available. The Army Intelligence Agency had studied the Kuwait Theater of Operations (KTO) continuously and produced highly accurate and detailed templates with individual tanks plotted, which were then supplied to US Army units in theater.[22] But this information was never made available to the air units and crews responsible for attacking the Iraqi army. This disconnect between the US Army and Air Force was just one indication of a chasm between the two services intelligence and targeting systems.

As problematic as the intelligence support was the lack of coordination between Army and Air Force over the rules governing Battle Damage Assessment (BDA). The objective of 50% attrition of Iraqi armor and artillery meant that BDA had to accurately track the damage being done by air attack. This proved difficult for a variety of reasons. First, from medium altitude it was difficult to identify what was being attacked. While differentiating tank, artillery, and soft skin vehicles was possible, assessing bombing damage proved difficult.[23] From medium altitude it was nearly impossible for pilots to know exactly what they had destroyed. Also the HUD (Heads-Up-Display) video footage provided by most fighter aircraft from medium altitude weapon delivery attacks was unusable for BDA purposes.[24]

Second, Central Command Air Force (CENTAF) intelligence was overwhelmed and had no overall framework to integrate the reports from the numerous wings into an overall picture of the effectiveness of the air attacks.[25] Compounding this problem was Schwarzkopf's decision to allow the Army and Marines to separately determine the attrition rates of enemy ground forces. The lack of pre-coordinated Joint BDA guidelines led to vast disagreements over the state of the

Republican Guard. The Army's lack of confidence in medium altitude attack led them to only accept BDA from laser guided bombs (with accompanying targeting pod film) and A-10 attacks.[26] The friction between services and the BDA calculating formulas and permutations floating around Riyadh ultimately led Schwarzkopf to abandon the percentages game.[27] He instead relied on reports from the coalition ground commanders, to evaluate whether the air attacks had achieved adequate levels of battlefield preparation.

At the tactical level, the problem was one of how best to destroy the dug in Republican Guard. While the JAOC never solved the intelligence challenges of locating and identifying enemy army forces, they incorporated three tactical changes to increase the efficiency of the operational air forces. The first tactic involved directing the unique firepower of A-10s against exposed and vulnerable Republican Guard forces. A-10s employed initially against front line forces near the Kuwaiti-Saudi Arabian border. On 27 February, Glosson instructed A-10 commanders to prepare to attack the Republican Guard Tawakalna armored division.[28] In attacking such a heavily defended area, A-10s flew in mass formations, in lieu of their usual two-ship formations. A-10s mounted three days of wing-sized attacks against the division, with powerful results despite Iraqi efforts to dig their forces deeper under the desert sand and stepped up efforts at deception. The combination of massed attack and a unique airframe designed and manned by pilots trained in the art of destroying armor proved a major step forward for coalition air strikes against Iraq's Republican Guard.[29]

The second tactical innovation used against the Republican Guard was the introduction of the F-16 "Killer Scout."[30] Killer Scouts would take off early and reconnoiter the target area. Once identifying targets, they would then bring in additional fighters to attack these locations. The Killer Scouts were allocated air-refueling tankers and could thus remain on station for much

longer periods of time, becoming familiar with the area and increasing their situational awareness. Along with identifying viable target areas for attack, Killer Scouts also aided in the collection of BDA. However, they did not completely solve the problem of target discrimination. Although they used binoculars, they still could not accurately tell the number of vehicles destroyed during their attacks. While the Killer Scout role had its limitations, this innovation allowed for the F-16s to more efficiently use their resources against the Iraqi fielded forces.

The third innovation was the introduction of "tank plinking," locating targets from medium altitude with infrared targeting pods and then attacking them with precision laser guided bombs.[31] One of the most pervasive arguments for tank plinking was the targeting pod video, which could clearly indicate the infrared contrast of Iraqi armor against the cold desert background.[32] This added to the ability to verify BDA and boosted Army Central Command (ARCENT) BDA estimates.

These tactical innovations by the USAF against the Republican Guard significantly increased the efficiency of airpower in directly attacking ground forces. The massed formations of A-10s, the introduction of Killer Scouts, and tank plinking combined to produce a quantum leap in medium altitude tactics. While these tactics were effective at prosecuting attacks, the lag in the integration of intelligence and Imagery, Surveillance, and Reconnaissance (ISR) assets hindered further gains. Even if intelligence products were available, the lack of GPS equipped strikers operating over a featureless desert would have limited the effectiveness of the information.

Notes

[1] G*ulf War Air Power Survey Summary Report*, (Washington, D.C.: Government Printing Office [GPO], 1993), 12.

Notes

[2]General Norman Schwarzkopf and Peter Petre, *It Doesn't Take a Hero,* (New York: Bantom, 1992), 371.

[3]*GWAPS Summary Report*, 65.

[4]Colin L. Powell with Joseph E. Persico, *My American Journey,* (New York: Random House, 1995), 498.

[5]*GWAPS Summary Report*, 48-51.

[6]Lieutenant Colonel William F. Andrews, *Airpower Against an Army: Challenge and Response in CENTAF's Duel with the Republican Army,* (Maxwell Air Force Base, Alabama: Air University Press, 1998), 14.

[7]National Training Center Handbook 100-91, *The Iraqi Army: Organization and Tactics,* (Fort Irwin, Calif., 1991), 25-31.

[8]*GWAPS Summary Report*, 51.

[9] Ibid., 49.

[10]*Gulf War Air Power Survey,* Vol. 5, (Washington, D.C.: Government Printing Office [GPO], 1993), pt. 1: 463-539.

[11]Andrews, 29. Air Force assets were not the only air assets attacking fielded forces. Carrier-based strikers including F-18s also attacked fielded forces, however they did not begin to attack the Republican Guard in earnest until a week after the air war had started.

[12]Lieutenant Colonel Christopher P. Weggeman, F-16 pilot with 388th TFW flying the Killer Scout mission against the Republican guard, e-mail interview with author, 28 November 2000. The Army was concerned not only with armor but support assets such as artillery, mechanized infantry vehicles, support vehicles, ammunition supplies and POL storage.

[13]*GWAPS Summary Report*, 106.

[14]Weggeman.

[15]*Gulf War Air Power Survey,* Vol. 5, (Washington, D.C.: Government Printing Office [GPO], 1993), pt. 1: 463-539. The majority of these missions, 569, were delivered by F-16's employing non-precision, free falling general purpose bombs as well as older generation cluster bomb units, MK-20 Rockeye, CBU-52, and CBU-58. Battlefield effectiveness was below expectations, which led to concern over the high consumption rates of the more modern, armor piercing CBU-87 during the first two weeks. "CENTAF TACC/NCO Log, January-February 1991" (U), 30 January 1991, 21. (Secret) Information extracted is unclassified.

[16]Ibid., 30.

[17]Ibid., 37.

[18]Major Laura Berry, F-15E squadron intelligence officer, interviewed by author, Maxwell AFB, Ala., 27 November 2000.

[19]Weggeman.

[20]Andrews, 30.

[21] Major Robert Givens, A-10 pilot with Myrtle Beach Wing, interview with author, Maxwell Air Base, Ala., 2 March 2001. And Lt Col Christopher P Weggeman, F-16 pilot with 388th TFW flying the Killer Scout mission against the Republican guard, e-mail interview with author, 6 March 2001. The F-16 (Block 40) aircraft from Hill AFB were the only strikers with GPS navigation.

[22]Andrews, 31.

[23]Weggeman.

Notes

[24]Andrews, 37.

[25]Ibid. 38.

[26]Andrews, 60. Due to using the precision guided Maverick missiles and the perception by the Army that the A-10s were better at attacking armor due to close air support training.

[27]General Norman Schwarzkopf and Peter Petre, *It Doesn't Take a Hero,* (New York: Bantom, 1992), 500.

[28]William L. Smallwood, *Warthog: Flying the A-10 in the Gulf War,* (Washington, D.C.: Brassey's, 1993), 123-24.

[29]Andrews, 44.

[30]Air Force Doctrine Document 2-1.3, *Counterland*, (August 27, 1999), 102. Counterland doctrine now incorporates the Killer Scout mission.

[31]*GWAPS Summary Report*, 21, and Andrews, 54. F-111Fs developed the tactic using their Pave Tack laser designator. Lessons learned during a Desert Shield exercise had shown the potential for identifying and targeting armor from medium altitude. On 5 February, 2 F-111Fs successfully dropped two GBU-12s on revetted positions. Within 3 days 50 sorties a night were devoted to tank plinking. Navy A-6Es began dropping a limited number of LGBs as did F-15E crews. The F-15Es were limited by the number of LANTIRN pods and quickly developed buddy lasing techniques. Fred L. Frostic, *Air Campaign against the Iraqi Army in the Kuwaiti Theater of Operations,* Project Air Force (Santa Monica, Calif.: RAND, 1994).

[32]Andrews, 56.

Chapter 3

Operation Allied Force: Attacking the Serbian 3rd Army

Despite the primacy of strategic attack in Air Force thinking and doctrine, the preponderance of coalition airpower in the Gulf War was directed against Iraqi fielded forces. Some commentators have dismissed the importance of these attacks or viewed them as an anomaly based on the unique contextual elements of the Gulf War.[1] For those who believed attacking fielded forces was reserved for the arena of a flat open desert, Operation Allied Force, the air operations against Serbia, proved otherwise.[2] Once again, a combination of context, policy, and overall military strategy compelled airmen to apply airpower in direct attack of a fielded army. The situation was further complicated by the much-publicized caveat that the Serbian army would face no threat from NATO ground forces.

Planning for possible air operations against Serbia began in earnest May of 1998. By July, General Wesley Clark, Supreme Allied Commander Europe (SACEUR), was focusing NATO's military actions around a phased air operation, with an incremental approach to hold military escalation firmly under political control.[3] Until mid-February 1999, planning focused on punitive strikes against fixed command and control and military facilities in Kosovo, Montenegro and Serbia. However, while negotiations were being conducted at Rambouillet, France, General Clark ordered his Combined Forces Air Component Commander (CFACC), Air Force Lieutenant General Mike Short, to increase the scope of planned strikes to include attacks

on the Serbian fielded forces in Kosovo. General Short was not convinced that direct attacks would be the best use of airpower, believing the key to meeting NATO's objectives lay in attacking the political leadership in Belgrade.[4] However, NATO's stated military objectives included two dealing directly with the Serbian fielded forces: deterring further Serbian action against the Kosovar Albanians, and reducing the ability of the Serbian military to continue offensive operations against them.[5] Prodded by General Clark, General Short tasked air planners to formulate a plan for attacking the Serbian 3rd Army. However, unlike Desert Storm, where the somewhat quantifiable objective of 50% attrition of Iraqi armor had been set, no such measurable goals were set before or during Allied Force.

Attacking the Serbian Army in Kosovo was a much different venture than going after the Republican Guard. The terrain in Kosovo differed greatly from the desert of Kuwait. The entire region of Kosovo lies within a valley measuring a mere 60 by 60 miles. Small cities and villages are well dispersed throughout the region. The valley sits at approximately 2,000 ft. mean sea level (MSL), but the surrounding mountains rise as high as 10,000 ft. MSL. The valley is a patchwork of wheat fields and forests, a terrain well suited for concealing an armored army. The weather in Kosovo is some of the worst weather in all of Europe for conducting air operations. Further, Kosovo was overflowing with nearly a million refugees. Kosovar Albanians were being forced from their homes and either fleeing as refugees to Macedonia or Albania, or retreating to the foothills and living in makeshift tents and shelters as internally displaced persons. With the Serbian Army operating in close proximity to these civilians, the potential for collateral damage and casualties was great.

Concealed within this verdant, cloud covered valley roamed 40,000 soldiers of the Serbian 3rd Army, protected by a wall of mobile radar guided SA-6 SAMS and a squadron of MiG 21

fighter aircraft[6]. Additional air defenses included large numbers of man portable air defense systems (MANPADS) and medium caliber towed AAA.[7] Though outdated by western standards, the armor and artillery they deployed numbered in the hundreds and included M-84 and T-54/55 tanks, M-80 Armored Personnel Carriers (APC) and self-propelled and towed artillery. [8]

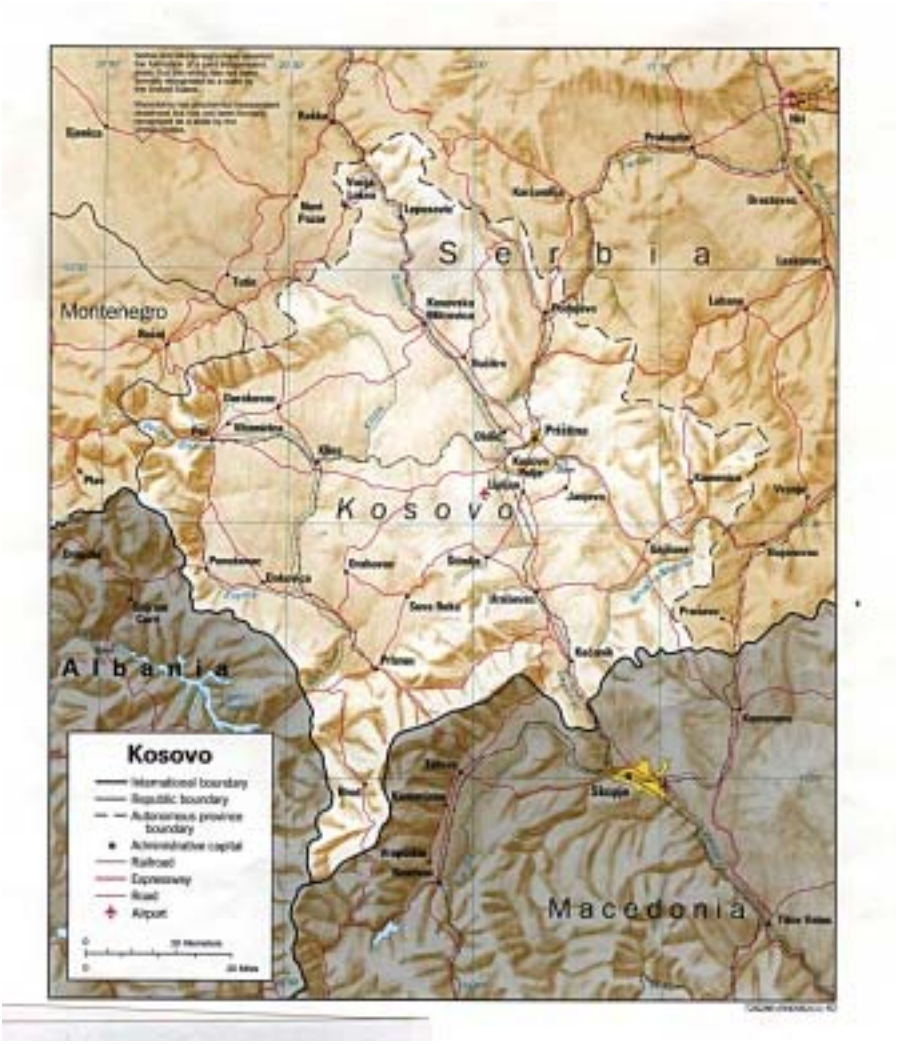

Figure 1: Map of Kosovo

In developing the air plan against the Serbian 3rd Army, air planners focused on adapting a combination of known techniques to the situation. Air superiority would be achieved NATO Airborne Early Warning (NAEW) and a continuous fighter presence.[9] To counter the SA-6

threat, USAF F-16CJ (Block 50) and German ECR Tornados provided reactive cover with High speed Anti-Radiation Missiles (HARMs). Also, US Navy and Marine EA-6Bs jammers and "Compass Call" USAF EC-130s would confuse and degrade the Serbian Integrated Air Defense System (IADS).

Once air superiority was achieved over Kosovo, strikes would be directed against the Serbian army. Two tactical problems remained: how to locate and identify the targets and how to successfully attack them while limiting collateral damage. A squadron of A-10s and two squadrons of F-16CG (Block 40) Forward Air Controllers Airborne (FACAs) were available to perform this critical task. These pilots were trained in visual reconnaissance and air strike control.[10] They would search out targets either identified from ISR assets during pre-mission planning, or real time from the Joint Surveillance Target Attack Radar System (JSTARS). Once targets were identified, the FACAs would control strikes using available NATO aircraft. A-10 pilots, trained with space-stabilized binoculars, would be the primary day FACA, while F-16CGs with targeting pods would be the primary night FACA[11].

General Short approved the plan to attack the Serbian 3rd Army on 15 March, 1999. Meanwhile at Rambouillet, negotiations were at a standstill and NATO began preparations for punitive air strikes on Serbia to begin the night of 24 March. Short had approval for enough fixed targets spread throughout Serbia proper, Kosovo, and the Montenegro province for two or three nights of limited strikes. The Combined Air Operations Center (CAOC) had developed a two-day air tasking order (ATO) for the strikes.[12] However, as NATO bombs began to rain down, the Serbian 3rd Army responded by accelerating the mass ethnic cleansing operation against the Kosovar Albanians. Responding to this situation, General Clark, ordered Short to begin attacks on Serbian fielded forces commencing 30 March.[13]

Air attacks against targets in Serbia and Kosovo were conducted under rules of engagement (ROE) approved by General Short. Part of the ROE included a 15,000' AGL altitude restriction aimed primarily as a means to protect NATO aircraft against hostile fire. The resulting tradeoff was added difficulty in locating and identifying targets. To compensate for this, the ROE allowed FACAs to fly as low as 10,000 ft. AGL to identify targets.[14] As Allied Force progressed, the ROE was continually adjusted to restrict the types of targets to be attacked. Initially, FACAs could attack any Serbian Army vehicles, wherever located. By early June, FACAs were required to receive permission from the CAOC for any targets attacked. Likewise, certain areas within Kosovo were off limits to attack including a ten-mile wide strip along the Kosovo-Macedonia border. [15]

30 March saw the first air missions against the Serbian fielded forces.[16] SA-6 operators were reluctant to switch on their radars with HARM equipped fighters overhead and, after having previously lost several fighters, the Serbian Air Force refused to meet the NATO attackers in the air. But NATO's Air Force did not have the element of surprise and the 3rd Army units limited their movement when FACAs circled overhead. Now facing a static enemy, two problems quickly surfaced. First, just as in Desert Storm, the intelligence support and imagery provided to aircrews was not adequate to accomplish the mission. Second, with the Serbs sitting on the sides of the roads during strike windows, the usefulness of JSTARs and its moving target indicator was limited.

Monitoring of the Serbian 3rd Army was the responsibility of NATO's in-theater intelligence organizations consisting primarily of intelligence assets based at the Joint Analysis Center (JAC) in Molesworth, England and at the CAOC's C2 intelligence cell in Vicenza, Italy. With NATO's initial plans having focused on attacking fixed target sets, neither facility was fully prepared for

the enormous demand for tactical imagery required to efficiently attack fielded forces. The lack of a strong Army intelligence presence at the CAOC further exacerbated the problem.[17] This resulted in an incomplete picture of the Serbian Order of Battle in Kosovo during March and April. This overall weakness in intelligence capability existed throughout the operation, but the arrival of the US Army's Task Force Hawk to Tirana, Albania and the construction of a flexible targeting cell within the CAOC improved matters.

Compounding the limited tactical intelligence support, tactical imagery of the Serbian 3rd Army was inadequate, both in the quantity produced and timeliness of dissemination. The poor weather over Kosovo during late March and early April prevented US reconnaissance assets from producing imagery and those products that were received were outdated. Similar to Desert Storm, aircrews stepped to jets with inadequate imagery and only a general idea of Serbian locations. Even with good weather, requests for tactical imagery had to compete at the National Command Authority (NCA) level for priority. Often there were timely photographs of the refugees hiding in the hills, but no imagery of the Serbian armor that had driven them there.[18] In-theater tactical reconnaissance assets were available, albeit to a limited degree. However, dissemination of the information proved ineffective. A process was never developed for timely distribution of the tactical imagery produced by Navy Tactical Air Reconnaissance Pods (TARPs) equipped F-14s, French Mirage or British GR-7 tactical reconnaissance pods.

Viable intelligence and imagery was critical for locating and destroying Serbian fielded forces, but other systems were also available to try and fill in the gap. One such system, JSTARS had the unique capability of tracking hundreds of vehicles throughout Kosovo with its Moving Target Indicator. [19] JSTARS data was used on several occasions locating targets. However, the successes were few and far between. The real limitation of JSTARS was the lack

of a viable onboard target identification capability. JSTARS could see all the vehicles moving around Kosovo, but could not distinguish a T-72 tank from a tractor pulling a trailer loaded with refugees. Collateral damage concerns, the necessity for positive target identification, and a rugged terrain were all contextual elements which had not existed in the Kuwaiti desert. JSTARS did develop tactics in an attempt to overcome the challenge of target ID and, on occasion, was able to correlate vehicle identification from unmanned aerial vehicles (UAVs) to provide real time targeting information to airborne FACs. But, for the most part the lack of target identification capability severely limited JSTARS impact on the battlefield.

While JSTARS's lack of onboard target ID capability limited its usefulness, UAVs such as USAF Predator and USA Hunter could identify targets through their real time video output. Limits on the efficient use of UAVs during Allied Force were due mostly to the lack of integration with the conventional operational forces. UAVs had never been integrated into the air tasking order (ATO) with strike packages and the lack of training between UAVs and FACAs made tasks such as altitude deconfliction and target talk-ons difficult. Even so, the ability of UAVs to locate and identify Serbian forces was a much sought after capability and operational techniques were quickly patched together. One example was the effort to connect Predator with the FACA. A Tactical Air Control Party (TACP) controller located at the CAOC, monitored Predator video and performed real time target talk-ons via a radio link through the Airborne Command and Control Center (ABCCC) to FACAs overflying the target area. The occasions when these missions were successful provided a glimpse into the potential of fully integrated UAV platforms with conventional strike aircraft. But UAV-FACA employment techniques were in their infancy at the end of Allied Force and did not produce a significant number of target engagements.

With limited intelligence, imagery, JSTAR, and UAV support, the FACA was forced to independently locate and identify the Serbian army. FACAs were required to positively identify all targets prior to attack. Visual target identification was difficult during the day and virtually impossible at night, even with the use of Night Vision Goggles (NVGs) and targeting pods. But, whereas locating and identifying targets proved difficult, once identified the destruction of those targets was relatively easy. Precision guided munitions proved effective against Serbian armor, as did cluster bomb units and general purpose bombs dropped by strikers with computed delivery systems. For the most part, once a target was identified, it would be killed.

Despite this ability, the results against the 3rd Army were mixed and bear some explanation. The first week of attacks in Kosovo from 30 March through 5 April were severely hampered by bad weather. Attacks against the 3rd Army began in earnest on 7 April with A-10 FACAs destroying moving armor. Within a week the Serbian military had responded by severely limiting its movement of vehicles during good weather and had begun to hide its armor. Although late April to mid-May was characterized by better weather, the Serbs increased their efforts at camouflage and deception tactics. Late May ushered in the emergence of improved intelligence with the introduction of the CAOC's flexible targeting cell. This, coupled with a KLA offensive, which forced the 3rd Army out of hiding, increased Serbian vulnerability to attack from the air.

Measuring the effectiveness of air strikes proved as problematic as locating and identifying Serbian armor. Unlike Desert Storm where mission objectives called for a 50% attrition of the Republican Guard's armor, no such quantitative objective was ever set for Allied Force. Furthermore, total numbers of Serbian armor in Kosovo were never well tracked, leaving no way for NATO intelligence to adequately assess attrition rates, even if that had been an objective.

While the conflict between Army and Air Force BDA had been a major source of friction during Desert Storm, the BDA count was not an issue until after Allied Force. The measure of effectiveness of the air attacks was then reduced to the question of how much armor was destroyed. In a September, 1999 NATO news conference, General Clark, when asked how much of the 3rd Army was destroyed, replied, "Enough."[20] This alludes to the fact that NATO's air strikes against the Serbs in Kosovo were designed to coerce, not just attrit. The objectives of deterring Serbian action against the Kosovar Albanians and of reducing the ability of the Serbian military to continue offensive operations was not measured in number of vehicles destroyed, but by the Serbs' actions. Nonetheless, the fact remains that the primary target of NATO warplanes in Kosovo was the 3rd Army's armor and artillery. It seems reasonable that accurate BDA would shed light upon the effectiveness of attacking fielded forces at the tactical level.

Unfortunately, Allied Force BDA has been clouded by controversy since the final air strikes in Kosovo. Table 1 reflects the BDA reported from several sources. Regardless of which set of numbers are closest to being accurate, having an accurate number/percentage of vehicles destroyed would still be meaningless without a yardstick to measure overall effectiveness.

BDA Source	Tanks	APCs	Artillery
Shelton, 10 June 99	120	220	450
Serbian Army	13	6	27
Newsweek 15 May 00	14	18	20
NATO, 16 Sep 99	93	153	389

Table 1: Allied Force Tactical BDA estimates[21]

Unlike Desert Storm, for which attacking fielded forces was a prelude to land warfare, Allied Force was an air only campaign. Since airpower's goal was not the preparation of the

battlefield for a US Army attack, conventional attrition ranging from 30-50% made little sense. In Allied Force, the only measure of the effectiveness of attacking fielded forces was in achieving NATO's stated military objectives of deterring further Serbian action against Kosovar Albanians and reducing the ability of the Serbian military to continue offensive operations. Since no quantifiable numbers or percentages can be readily drawn from these objectives, the goal became to attack fielded forces in the most efficient manner. The operational measurement of success was not determined by destroying a preset quantity of targets, but rather the destruction of as much armor as could be positively identified.

The challenge of attacking the Serbian 3rd Army in Kosovo lay in such contextual factors as conducting an air operation in poor weather, over a rugged, well-vegetated terrain, amidst a million refugees. In addition, other critical areas identified as airpower weaknesses during the Gulf War were amplified over Kosovo. As in Desert Storm, Air Force intelligence and reconnaissance communities were ill prepared to provide a detailed enemy ground order of battle and time sensitive tactical imagery requirements for attacking mobile armor. Medium altitude tactics by conventional strike assets were limited by onboard and off-board sensors for target location and identification. Likewise, accurate BDA assessments and synthesis with the overall intelligence picture proved illusive, with BDA unable to provide an accurate measure for air strike effectiveness. For both Desert Storm and Allied Force, target identification and post strike assessment proved the most challenging aspects of attacking a fielded force. Both conflicts demonstrate that while technology shows great potential, there is no single silver bullet to solve the target identification problem. Improvements in airpower efficiency against a fielded army only begin to accumulate once the Air Force recognizes that it will again be required to attack fielded forces in future conflicts. Regardless of how strongly strategic airpower theorists argue,

an enemy's fielded force will continue to be a viable target for aerial attack. Only when the Air Force views this mission from a systems perspective, integrating existing capabilities and techniques with developing technologies will real increases in efficiency materialize.

Notes

[1]Col John Warden, USAF (retired), lecture, Air Command and Staff College, Maxwell Air Base, Ala. 12 December 2000.

[2]For purposes of this discussion Serbia and Serbian will be used to refer to those forces from the Federal Republic of Yugoslav. Likewise Macedonia will be used to refer to the Former Yugoslav Republic of Macedonia.

[3]*Air War Over Serbia Initial Report*, (United States Air Forces In Europe Studies and Analysis Directorate, April 2000), 8.

[4] Lieutenant General Mike Short, USAF (retired), lecture, School for Advanced Airpower Studies, Maxwell Air Base, Ala., 21 November 2000.

[5]*AWOS Initial Report*, 9.

[6]Ibid., 11.

[7] R. Jeffrey Smith and William Drozdiak, *Anatomy of a Purge*, Washington Post, April 11, 1999, A1.

[8]The Yugoslavian built M-84 is a version of the Soviet T-72 and theM-80 is a version of the Soviet BRDM.

[9]NAEW looks similar to a US AWACS, however NAEW does not have the manning, communications suite, or train to control mass strike packages as does AWACS.

[10]Major Phil M. Haun, A-10 unpublished war diary. FACAs would eventually expand to include US Navy F-14s and Marine F/A-18D Hornets.

[11] Commercial purchased space-stabilized binoculars were used for visual identification. Made by Canon these 12x and 15x binoculars remove much of the jitter associated with using binoculars in the cockpit and were a monumental improvement over using regular binoculars.

[12] Short.

[13] General Wesley Clark as SACEUR was not technically the Combined Forces Commander (CFC), as Admiral Ellis held this position in charge of NATO forces in the southern region. However for practical purposes General Clark performed the functions of the CFC.

[14]Major Phil M. Haun, A-10 unpublished war diary. Later the ROE was further modified to allow strike aircraft to fly as low as 8,000 ft. AGL during diving weapons deliveries. This altitude restriction was further reduced to 5,000' AGL after the bombing of a Kosovar refugee column by F-16CGs FACAs on 14 April, 1999.

[15] This safe haven was implemented by Admiral Ellis as a precaution to prevent Serbs thinking NATO ground troops in Macedonia were actually attacking their positions.

[16] Due to poor weather over Kosovo, the first strikes against mobile targets did not take place until 6 April.

[17] Unlike Air Force intelligence, Army intelligence spends its effort in assessing enemy army capabilities. Army intelligence is therefore more familiar with the ISR assets best suited for observing enemy ground forces and adds a wealth of expertise to the CAOC in this area.

Notes

[18]Discussions with author and Lt Steven Smith, Intelligence officer 81st Fighter Squadron, April 1999.

[19]JSTARS is a long range, air to ground surveillance system aboard the E-8C, a modified Boeing 707, consisting of a Synthetic Aperture Radar (SAR) capable of producing an image of a selected area and a Moving Target Indicator (MTI) designed to locate slow-moving ground targets.

[20] Wesley Clark, General (USA) and John Corley, Brig General (USAF) at NATO press conference, Brussels, 16 Sep 1999. www.eucom.mil/operations/af/nato/1999/meabriefing.html

[21]Secretary of Defense William Cohen and Chairman of the Joint Chiefs of Staff General Henry Shelton provided an initial BDA assessment in a 10 June 1999 briefing. Henry H. Shelton, Chairman Joint Chief of Staff briefing, Washington, DC: 10 June, 1999. www.defenselink.mil/news/Jun1999/t06101999_t0610asd.html. These numbers were refuted by a much lower total given on 16 June 1999 by Serb Army Lieutenant General Nebojsa Pavkovic. Rebecca Grant, "True Blue: The Real Story Behind the Kosovo Numbers Game," AFA Issue Brief, 1 June 2000. www.afa.org/library/issues/trueblue.html. By mid-July General Clark ordered an Air Force Mission Effectiveness Analysis (MEA) team to go see what was on the ground. General Clark then gave NATO's BDA assessment on 16 Sep, which was similar to Cohen and Shelton's assessment with slightly lower numbers based on multiple strikes, which had previously been double counted. Wesley Clark, General (USA) and John Corley, Brig General (USAF) at NATO press conference, Brussels Belgium, 16 Sep 1999. www.eucom.mil/operations/af/nato/1999/meabriefing.html. Nearly a year after the air operations on May 15, 2000, a Newsweek article entitled "Kosovo Cover-up" claimed that the Air Force had inflated the MEA teams findings. Newsweek numbers included only those vehicles located at the sites searched by the MEA team and did not account for other sources of BDA or that the Serbs removed vehicles from the battlefield.

Chapter 4

Architecture for Attacking Fielded Forces

"In essence, Air Power is targeting, targeting is intelligence, and intelligence is analyzing the effects of air operations."

—Meilinger 4th Proposition Regarding Air Power

Allied Force, like Desert Storm, demonstrated that target location and identification are two of the most important and challenging aspects of applying airpower. During Allied Force, NATO quickly achieved air superiority and was able to overfly Serbia and Kosovo at will. Having achieved control of the high ground, NATO's air commanders discovered that the fixed target sets they could easily locate and identify were politically sensitive. Unfortunately, the targets most politically acceptable for attack, namely the Serbian 3rd Army in Kosovo, were much more difficult to locate and identify. To properly understand the lessons of Allied Force one must first recognize this irony: an air force trained, prepared and organized to attack a set of predominantly off-limit, fixed targets was relatively untrained and ill-prepared to attack a mobile army in the field. However, the challenge of attacking fielded forces from the air is not limited to the Air Force, but requires a joint/combined approach. The USAF has no monopoly on the requisite ISR assets and intelligence expertise. Also, given the realities of the joint/combined command structure, key airpower decisions may not be made by an airman.

The argument presented here does not call for the USAF to abandon its capabilities for strategic attack based on the politically sensitive nature of its target set. Rather, it is to

acknowledge and accept that enemy fielded forces will not only continue to be viable target arrays, but that the Air Force will continue to be required to engage these forces prior to or in lieu of friendly ground force activity. In addition, both Desert Storm and Allied Force provide insight into the unique intelligence, target identification and BDA requirements of an air campaign versus a fielded army. Attacking an army from the air without the clarifying presence of friendly ground forces is a unique mission with special requirements. Fighting an organized mobile and reactive enemy condenses the time available from target identification to destruction. Without a friendly ground force to locate, identify, and fix enemy forces as well as organize and prioritize air attacks, these heavy responsibilities fall back to the Joint Forces Air Component Commander (JFACC).

This focused discussion on the targeting of an enemy's army does not imply that an enemy's air-to-air or surface-to-air capabilities are inconsequential. On the contrary, air superiority is prerequisite for any successful air operation. In the case of attacking fielded forces, an air force must be free to occupy the battlespace above the enemy in order to successfully monitor enemy movement, locate and identify specific enemy positions, attack valid targets and verify BDA. This freedom involves removing or diminishing the threat from enemy aircraft and SAMs. Air supremacy will probably remain illusive and the adaptation of medium altitude tactics and integrated SEAD and air-to-air assets will significantly reduce the threat, leaving air operations relatively immune from enemy air defenses.

Air superiority and SEAD assets remain high on the JFACC's list of essential capabilities. These air assets are required no matter what targets the JFACC plans to attack. However, when attacking fielded forces, a unique set of capabilities must be integrated into a system designed for the rigorous, fast-paced nature of war against a reactive and mobile enemy. At the operational

level, the JFACC must have a JAOC with a J2 intelligence shop capable of maintaining an up-to-date ground order of battle while simultaneously processing applicable ISR products for real or near real time use by combat operations; a monumental task. Once strikes have begun, intelligence must also be able to receive and integrate accurate BDA to continuously update the overall battlespace picture for the JFACC. Likewise, J3 combat operations must be able to control its tactical assets overhead the enemy to translate intelligence products into quickly and efficiently prosecuted attacks within the bounds of ROE. At the tactical level, the right mixture of ISR assets must be able to locate, identify and track fielded forces in real or near real time. Joint assets such as US Navy tactical reconnaissance (TAC RECCE) pods or US Army counter battery radar may be required to provide capabilities not available with Air Force assets. Terminal attack control assets capable of final target identification and collateral damage assessment will remain critical as will strikers trained to attack mobile targets and able to accurately deliver a variety of munitions.

Intelligence at the JAOC is the logical point of departure to begin this discussion on the tailored requirements for successfully targeting an enemy's fielded forces. The two key areas to be addressed by intelligence are manning and organization. Intelligence manning requirements increase significantly when the JAOC assumes responsibility for maintaining the ground order of battle. Under joint doctrine the Fire Support Coordination Line (FSCL) is not only the chief mechanism for determining who controls strikes, but also indirectly divides targeting responsibility.[1] While a bit simplistic, this line drawn on a map and in the sand has long been the method for the division of labor, with Army intelligence assets being primarily responsible for the detailed targeting associated with the close fight and Air Force intelligence focusing on deeper target sets. Air assets allocated to attack targets short of the FSCL receive their targeting

information within the construct of the Theater Air-Ground System (TAGS).[2] However, when a FSCL does not exist, the responsibility for all enemy targeting by air reverts defacto to the JAOC. In this case, the JAOC must have additional manning to assume the tactical targeting responsibilities against enemy fielded forces normally conducted by the Army.

Besides having additional manning, the JAOC's J2 intelligence requires an injection of Army intelligence expertise. USAF intelligence personnel are trained primarily within a targeting process focused on fixed targets. Intelligence expertise against enemy armies resides within the US Army. Army intel is not only trained at templating enemy ground activity, but is also intimately familiar with the various ISR assets with specialized capabilities against fielded forces.[3]

Once properly manned in numbers and expertise, the J2 must be organized to handle the additional responsibility of targeting fielded forces. A "flex targeting" cell, as developed during Allied Force, should be the theater's clearing house for intelligence information on the enemy's army. The flex targeting cell has four main tasks. First, it takes inputs from all available intelligence sources to build the most complete picture of the enemy force structure and movements. Flex targeting should have the theater's best and most up-to-date assessment of the ground order of battle. Second, it provides current operations (J3) the latest changes to the battlefield. This is an important consideration. Knowledge of the enemy's precise location and intentions are of no use unless they can be translated into successful attacks. In particular, this requires the production of time sensitive targeting material, including processed imagery. Third, flex targeting maintains responsibility for the central filtering and processing of national and TAC RECCE products and distributing them within theater. The goal is to make up-to-the-minute processed imagery available on secure networks with joint and combined access down to

the squadron level. The two critical attributes of good tactical imagery are quality and timeliness; can an aircrew actually find the target based on the picture provided and will the target still be there once the aircrew reaches the target area? The fourth task of flex targeting is the processing and validation of BDA. Without the ability to observe what is transpiring on the battlefield, the necessary adjustments cannot be made to counter the moves of the thinking and reacting enemy.

While the flex targeting cell is the brain of air intelligence activity, its eyes and ears are its ISR assets. Although all sources of intelligence are important in providing an overall assessment of an enemy's activities, some sources are more important than others when translating an intelligence assessment into armor destroyed on the battlefield. The importance of tactical imagery was underscored by an A-10 FACA during Allied Force who recoined a familiar phrase: "a picture is worth a thousand coordinates." Imagery must not only be able to identify targets, but also provide enough terrain features to make it usable for terminal attack control assets to easily locate the position.[4] Coordinates must also be accurate and the aspect of the image clearly defined. This quality of imagery is available from a wide variety of sources including both national assets and TAC RECCE.[5]

While national assets provide excellent tactical imagery, these assets are not under the direct control of the Joint Force Commander (JFC). Other non-DOD agencies such as the State Department and the CIA compete for priority over the use of national level intelligence. Currently the time cycle for collection and distribution of national products is too lengthy for theater-wide real and near real time target engagement. Recent exercises such as Joint Expeditionary Forces exercise (JEFX) 1999 and 2000 have focused on reducing this time from sensor to shooter.[6] Such exercises have demonstrated the potential integration of existing ISR

and data-link technologies to decrease the time required for getting the right information to the right cockpit. While such technologies are important in reducing the time from target ID to target destroyed, they are not a replacement for, but an enhancement to an integrated intelligence-operations system, designed to push imagery to terminal control assets as quickly and efficiently as possible.

While the JFC and JFACC must compete for national assets, TAC RECCE assets are under the JFC's control and can be more flexibly employed. A disadvantage of the majority of current TAC RECCE assets is the difficulty in quickly transmitting the information. Current systems, including the US Navy TARPS and NATO TAC RECCE pods, are wet film systems. Developed prior to the digital age, these systems require processing the imagery and then translating it to a digital medium in order to be transported on the same networks as other imagery products. Although this processing takes time, it is somewhat offset by the fact that these assets reside in theater.[7]

Along with imagery, intelligence should continue to use other sources such as human intelligence (HUMINT) and signals intelligence (SIGINT) to develop the best all source picture of the battlespace. As ISR assets have matured over the last decade, they have begun to bridge the gap between the ISR and operational worlds. While no single asset provides the silver bullet for attacking fielded forces, these systems do provide additional capability that, when integrated into an overall system, increase efficiency. For example, JSTARS has all weather capability to locate and track mobile vehicles.[8] Other assets, such as UAVs, provide real time overhead target identification capability. Being unmanned, UAVs can typically accept higher levels of risk, allowing for longer duration and lower altitude operations over enemy positions.[9] Joint assets may also be available. The Army has a full suite of ISR assets capable of identifying enemy

positions, but their limitation lies in the coordination and integration of US Army assets into the JAOC during operations.[10]

Once ISR assets have located and identified mobile targets, intelligence through the flex targeting process, distributes this information in a timely fashion. Operations must now prosecute swift attacks on these targets. The Battle Staff Director is the JAOC's agent responsible for the daily operational conduct of the area of responsibility (AOR). Airborne Command and Control platforms such as Airborne Warning and Control system (AWACS) and ABCCC are responsible for the flow of assets in and out of the AOR and act as the conduit to the JAOC.

However, a well functioning command and control system still does not insure that the correct target is attacked. It is at the tactical level that the targets are physically destroyed and the JFACC influences these attacks by his designation of terminal control authority.[11] This delegation of terminal control authority is dependent on the nature of the conflict and the type of mission being conducted. During CAS missions, when air attacks on fielded forces are in close proximity and in coordination with friendly ground forces, terminal control authority resides with a terminal attack controller.[12] Likewise, when attacking fielded forces without friendly ground forces, the JFACC may assign terminal control authority to an airborne terminal attack controller.

The combination of a high potential for collateral damage and the difficulty of locating and identifying the Serbian 3rd Army was the primary reason FACAs were used for terminal control over Kosovo in Allied Force. There are three characteristics required for a terminal attack controller. First, the controller must be able to develop and maintain situational awareness in order to orchestrate successful attacks. Controllers must be survivable within the battlespace in order to observe and maneuver to identify not only targets, but also threats and collateral damage

potential. Second, the controller must have on board target identification capability. Third, the controller must be trained in attacking fielded forces. The tactical controller must be familiar with enemy armor recognition and understand how to control strikers onto targets. Controllers must also be familiar with striker's capabilities and limitations as well as tactics used. The controller is the key tactician who determines what and how targets will be attacked.

Terminal air controllers are responsible for final identification and prioritization of targets, but it is the striker that delivers the firepower.[13] There are three critical characteristics that require consideration when determining the suitability of a striker: the training of the aircrews, the platform, and the munitions available. During Vietnam, the entire USAF fighter community was well-versed in CAS procedures. With the introduction of the A-10 in the late 1970's, however, the CAS role became the specialty of one airframe, while the remainder of the USAF fighter force gravitated toward interdiction, strategic attack, and air superiority missions. Today the majority of fighter aircrew is no longer trained in CAS. Although attacking fielded forces without the presence of friendly ground troops is, by definition, not CAS, the fundamental skills remain the same.[14] These skills include an understanding of terminology and coordination procedures, target marking and talk-on procedures, restrictions, and final control procedures. Aircrew performing the striker mission must also be proficient at weapons delivery. Direct hits are required to kill armor, particularly armor that is dug in or on the move. Collateral damage potential may further restrict attack headings or delivery options, increasing the challenge of successful attack.

Along with the proficiency of the aircrew, the platform employed is also critical. The platform must be survivable. The JFACC needs to weigh the survivability of the striker's platform against the risk of shootdown. The platform must also have a comparable

communications suite able to conduct secure communications. Otherwise, strikers may degrade communication security, allowing the enemy an opportunity to gain insight into operational procedures and increase the speed at which they can react to attack. Further, the platform should be able to accurately delivery a variety of munitions. This may mean precision-guided munitions or free fall munitions accurately delivered from medium altitude if the ROE or threat so dictate. It does not matter how proficient the aircrew is if the platform cannot deliver the munition with the requisite accuracy.[15]

Finally, strikers must not only be able to accurately deliver munitions, but also have munitions that destroy the target to an acceptable degree without causing undue collateral damage. Large warheads may provide the killing power desired, but at the expense of excessive collateral damage. There is no perfect solution for the type of munition to use since it is situational dependent. A combination of precision and non-precision munitions provides the flexibility for the striker to prosecute the attack.[16]

This architecture for attacking fielded forces is a systems approach. Relying on the existing Joint Air Operations Center (JAOC) structure, modifications at the operational and tactical level allow for the time critical targeting required to successfully attack mobile targets. The flex targeting cell is the central location for processing ISR inputs and for developing and distributing targeting products, as well as maintaining the enemy order of battle. J3 operations is then responsible for the command and control of assets, ensuring the commander's intent is translated into appropriate action. At the tactical level, terminal air controllers are responsible for target identification and prioritization, as well as determining attack restrictions based on such criteria as collateral damage potential or ROE. Finally, with inputs and guidance from the terminal air controller, the striker completes the attack.

Notes

[1]Joint Pub 3-0, *Doctrine for Joint Operations,* 1 February 1995, GL-7. The FSCL is a line established by the appropriate land or amphibious force commander to ensure coordination of fire not under the commander's control but which may affect current tactical operations. While the FSCL does not directly discuss targeting, it is the targeting process that determines fires. Historically fielded forces are those forces inside of the FSCL and therefore the responsibility of land or amphibious forces for intelligence and targeting.

[2]Air Force Doctrine Document 2-1.3, *Counterland*, (August 27, 1999), 49.

[3] Examples of such systems include RC-12s, Hunter UAVs, and counter-battery radars.

[4]Unpublished lessons learned from the 81 Expeditionary Fighter Squadron at the 15 June 1999 A-10 Hot Wash at Gioia Del Colle Air Base, Italy. Fielded forces under attack by air will remain static only as long as they are under direct attack. Once the threat has departed, whether due to poor weather, darkness, or simply the departure of strike forces the enemy will reposition their forces. During Allied Force imagery over 12 hours old resulted in very few successful attacks. Inside 6-8 hours resulted in an improved chance of successful attack.

[5] During Allied Force national systems were available, as were TAC RECCE forces from the US Navy with its Tactical Air Reconnaissance Pod (TARPs), and coalition assets of the French, British, and Germans.

[6] Lt Col Richard P. Stafford, intelligence officer who helped set up the flex targeting cell during Allied Force, and A-2 for Time Critical Targeting (TCT) for JEFX 2000, e-mail interview with author, 5 March 2001.

[7]Unpublished lessons learned from the 81 Expeditionary Fighter Squadron at the 15 June 1999 A-10 Hot Wash at Gioia Del Colle Air Base, Italy. A successful example of sensor to shooter processing of TAC RECCE imagery during Allied Force occurred when British GR-7 Harriers carrying TAC RECCE pods were collocated with A-10 FACAs. The GR-7s were able to process morning reconnaissance runs for afternoon missions. This imagery was made available to FACAs in some cases less than 3 hours and proved incredibly valuable.

[8]JSTARS limitations include a lack of on board target identification capability, restrictions to use in mountainous terrain, and the limited number of platforms available.

[9]Current limitations being worked include limited communication and Identification Friend or Foe (IFF) capability as well as a limited operational training with target marking or talk-on procedures when working with either FACAs or directly with strikers.

[10]An example of how US Army ISR assets can be successfully integrated was in the final days of Allied Force when US Army counter-battery radars successfully located active Serbian artillery positions and passed those coordinates to FACAs overhead.

[11]Air Force Doctrine Document 2-1.3, *Counterland*, (August 27, 1999), 98. Terminal control is the authority to direct the maneuver of aircraft, which are delivering ordnance to a specific target. Terminal control is a type of air control. Air Force Doctrine Document 2-1.3, *Counterland*, (August 27, 1999), 98.

[12]Air Force Doctrine Document 2-1.3, *Counterland*, (August 27, 1999), 98. A qualified officer or enlisted member who, from a forward ground or airborne position, provides terminal control to aircraft performing close air support to ground forces.

[13] This does not mean that controllers with inherent kill capability may not perform both controller and striker functions.

Notes

[14]Air Force Doctrine Document 2-1.3, *Counterland*, (August 27, 1999), 92. CAS is air action by fixed and rotary wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces. Air Force Doctrine Document 2-1.3, *Counterland*, (August 27, 1999), 92.

[15]An excellent example is the British GR-7 during Allied Force. The RAF pilots were some of the most professional and well-trained pilots available. However, at medium altitude the GR-7 was extremely inaccurate delivering the BL-755 cluster bomb unit. This was due to a lack of a computed delivery solution for the BL-755, requiring a modified manual delivery from medium altitude with the aid of an Electro-Optic targeting pod. First canister impacts were recorded as far as 1-2 km from target. Major Phil M. Haun, A-10 unpublished war diary.

[16]A common misunderstanding is that precision munitions results in lower collateral damage potential. While precision munitions such as laser guided bombs or maverick missiles are more accurate than free-fall munitions, when a precision munition does not guide the resulting miss distance may be measured in miles. Compare this with a free-fall general purpose bomb delivered from a diving delivery. While this bomb may miss by meters, it is physically impossible for it to be miles off target.

Chapter 5

Conclusion

Debate over the effective use of airpower will continue. Advocates for attacking leadership and infrastructure draw from Desert Storm and Allied Force to demonstrate how airpower can best be used to produce decisive results. Ironically, those who believe attacking an enemy's fielded military strength as the key to achieving military objectives also use Desert Storm and Allied Force to fortify their case. The purpose of this paper has not been to settle this argument, but rather to focus on the reality of how US airpower has been used over the last decade. In both Desert Storm and Allied Force, airpower was called upon to directly attack an enemy's army without the benefit of friendly ground forces to locate, identify, and fix the enemy's position. Given the propensity for US policy makers to use airpower first in crisis situations, the United States military should prepare to support such an air first strategy, and its services need to organize, train, and equip for such operations.

Airpower can now destroy what it finds, however an enemy under air attack quickly adapts, using dispersal and deception to conceal its location. Based on the experience of Desert Storm and Allied Force, a systems approach is required to efficiently locate and attack such an enemy. At the operational level the JAOC's J2 requires a flex targeting cell, manned by Air Force and Army intelligence personnel to build and maintain situational awareness on enemy ground forces, as well as process ISR products for near real time targeting and BDA. Intelligence must

have immediate access to a variety of ISR assets and be able to process the information quickly. This not only includes USAF and national assets, but joint and combined assets such as Army and coalition UAVs, counter-battery radar, and Navy and coalition tactical reconnaissance platforms.

This systems approach will only be effective if the targeting information provided can be prosecuted at the tactical level. Terminal air controllers, such as FACAs, must have the capability to locate and identify targets on the battlefield. Advances in optics and infrared targeting systems continue to increase the capability of medium altitude target identification during day and night operations. Likewise, more fully integrating UAVs into operations by developing tactics, techniques and procedures during peacetime, will improve their ability for target marking or talk-ons. Finally, strikers must train with FACAs to attack mobile targets and become familiar with the unique and flexible nature of attacking fielded forces.

Historically, air strikes against fielded forces have been in support of the land battle. The air attack against the Republican Guard during Desert Storm had the objective of preparing the battlefield for land operations. In contrast, the direct attack of the Serbian 3rd Army in Allied Force was neither in preparation for nor in support of ground forces. Instead, Army assets performed supporting roles, providing UAV, counter-battery radar, and intelligence assets to assist in air strikes.[1] Currently, the Army does not train and equip for such a supporting role as in providing specific ISR and intelligence assets from its force structure to support Air Force operations. Though this may seem a simple change, particularly for airmen used to providing specific capabilities to support ongoing operations, it requires a shift in Army doctrine.

Likewise, Joint and Air Force doctrine needs to adapt to the realities of how air forces are being employed. Current doctrine acknowledges only two Counterland missions: Air

Interdiction and Close Air Support, both of which are defined by their relationship to friendly forces.[2] This leaves the mission of attacking fielded forces in the absence of friendly forces undefined.[3] Joint and Air Force doctrine must acknowledge attacking fielded forces as a separate mission before it can organize, equip, and train for it. Along with this acknowledgement, Air Force Doctrine needs to redefine two key functions: Terminal Attack Controllers (TAC) and Forward Air Controllers Airborne (FACA). Currently, both are defined only within the close air support construct. Their definitions should expand beyond the confines of CAS as they were used during Desert Storm and Allied Force.[4]

Along with doctrinal change, the Air Force needs to adjust its training and tactics. The adage of "fight the way you train" is true from two perspectives. First, it makes sense to take those time-tested tactics and techniques honed during peacetime training into combat. A more subtle implication is that military forces have no other option but to fight the way they train. It is training that develops the tactical skills and mindset that defines a combat force's capabilities. Major exercises such as Red Flag and Air Warrior should incorporate the attack of fielded forces without friendly ground forces as a primary mission. The Conventional Air Forces (CAF) need to be exposed to the mission and be familiar with the challenges of attacking a mobile army. An Air Force that does not train or develop such tactics will not have the requisite skills when confronted with combat. The Air Force should address the shortfall in tactics by adjusting its Air Force Tactics Techniques and Procedures (AFTTP) 3-1 series publications to better address the systems approach to attacking fielded forces, as opposed to how the tactical publications are now divided among platforms. A separate volume on attacking fielded forces should focus on the system approach, addressing ISR, intelligence, command and control, Terminal Air Controller, striker capabilities, and integration requirements.

This adjustment of doctrine, training, and tactics is critical to maintaining a military capable of successfully accomplishing all the objectives that it is given. Desert Storm and Allied Force demonstrated that an air force could be given the mission of attacking a fielded army from the air. The lessons generated from this conflict are the basis for an architecture that should be developed in times of peace, for use in future conflict.

Notes

[1] The availability of Army intelligence and ISR assets were for the most part not planned, but due to Task Force Able Sentry and Task Force Hawk operating in Macedonia and Albania respectively.

[2]Air Interdiction are operations conducted to destroy, neutralize, or delay enemy's military potential before it can be brought to bear against friendly forces. Close Air Support are actions by aircraft against hostile targets in close proximity to friendly forces requiring detailed integration. Joint Publication 3-0, *Doctrine for Joint Operations*, (February 1, 1995), GL 3-4.

[3] This has not gone unnoticed in the latest issue of Air Force Doctrine Document 2-1.3. This document makes a reference to such attacks. "In those unusual circumstance in which aerospace forces conduct AI in the absence of friendly surface forces, enemy forces are able to disperse and seek cover in a way that complicates the problem for the airman." This statement misses the mark in two ways. First is that attack of field forces in the absence of friendly surface forces is unusual. Desert Storm and Allied Force demonstrate that this form of attack is now the norm and not simply an unusual occurrence. Second is the mistaken assumption that AI can be conducted in the absence of friendly forces. By definition AI cannot occur unless there are friendly forces. Air Force Doctrine Document 2-1.3, *Counterland*, (August 27, 1999), 8.

[4] A benefit of the expansion of the role of TAC and FACA would be the removal of the Killer Scout from Air Force doctrine. The Killer Scout role has two key weaknesses, which limit its effectiveness. Killer Scouts do not limit the potential of collateral damage, being untrained in positive control strikes. Killer Scouts also become ineffective once friendly forces become involved, since they are untrained in Close Air Support. By expanding the role of the FACA to that of how it was used in Allied Force removes the requirement of the Killer Scout role.

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