

Aviation ordnanceman applies final wiring to GBU-24 laser-guided bomb attached to F-14 "Tomcat" fighter aircraft on board USS *Theodore Roosevelt* during *Allied Force*, Adriatic Sea, May 4, 1999 (U.S. Navy/Dennis Taylor)



Attacking Fielded Forces

An Airman's Perspective from Kosovo

By Phil Haun

The Dayton Peace Accords in 1996 settled the Bosnian civil war but left unresolved the ethnic conflict in Kosovo, the semi-autonomous region in southern Serbia. By 1998, clashes between Serbian police and ethnic Kosovar Albanians produced a humanitarian crisis only temporarily resolved by a U.S.-brokered peace agreement that quickly unraveled over the winter. Reinigorated efforts at a peace deal

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failed at Rambouillet, France, in February 1999, however, and frustrated U.S. and North Atlantic Treaty Organization (NATO) leaders ultimately authorized three nights of restricted airstrikes to bring the Serbs back to the negotiating table. Serbia responded instead by launching an ethnic cleansing campaign that displaced hundreds of thousands of Kosovar Albanians. As a result, the air-only campaign, Operation *Allied Force* (OAF), extended for 78 days. A truly joint and multinational coalition effort, OAF involved hundreds of aircraft and thousands of

Airmen and intelligence officers from the U.S. Army, Marine Corps, Navy, and Air Force, alongside those from other NATO nations.¹ The air tasking included strikes against leadership, economic, and infrastructure targets in Serbia and military forces in Kosovo. Ultimately, the strikes against fielded forces failed to convince Serbian president Slobodan Milosevic to withdraw his forces. Rather, his desire to remain in power and the threat posed by a continuation of airstrikes, which held hostage Serbia's stagnated economy, along with diplomatic pressure by

the Russians, compelled Milosevic to concede Kosovo.²

Controversy over the effectiveness of NATO air attacks against Serbian fielded forces was fueled in the final days of the war when U.S. military leaders claimed that half of the 300 Serbian tanks deployed to Kosovo had been destroyed.³ General Wesley Clark, Supreme Allied Commander Europe, soon scaled back the battle damage assessment (BDA) to 110 tanks as NATO officials observed Serbian forces withdrawing with their armor in tow.⁴ In response, Clark ordered a reassessment that, when released in September 1999, further reduced the count to 93 tanks hit, of which 26 were catastrophic losses and 67 were severely damaged.⁵

Yet the revision came too late. At the time, and to this day, it remains widely believed that the actual number killed was closer to the 13 tanks declared by the commander of the Serbian forces shortly after the withdrawal.⁶ The final narrative from Kosovo depicted NATO airmen as incapable of identifying enemy ground forces as the Serbs hid and camouflaged their military vehicles, tricking pilots into attacking decoys and then making spurious claims.⁷ Lost in this controversy was an understanding that the effectiveness of air operations against fielded forces should be measured not by the number of tanks destroyed, but rather by the degree to which airpower denied ground forces the ability to execute their preferred strategy and achieve their desired military and political objectives.

In May 2010, a decade after the NATO bombing of Yugoslavia during the Kosovo War, I had the opportunity to travel to Kosovo to investigate the accuracy of my mission reports. From March 31 to June 7, 1999, I flew 28 combat missions in Kosovo where I conducted 73 airstrikes as an A-10 airborne forward air controller (AFAC). I experienced firsthand the challenge of locating Serbian armor, particularly as the conflict extended and as the Serbs adapted to U.S. tactics. Flying above 10,000 feet above ground level to avoid Serbian anti-aircraft artillery and infrared-guided shoulder-launched missiles, I observed Serbian

troops appropriating civilian vehicles, which were off limits to airstrikes due to NATO rules of engagement (ROEs), and driving them from village to village to conduct ethnic cleansing. As the war progressed, I further observed the proliferation of decoys designed to absorb the attention and bombs of NATO airmen.

Right after the war, with the BDA controversy mounting, the U.S. Munitions Effectiveness Assessment Team was dispatched to Spangdahlem Air Base, Germany, in preparation for its deployment to Kosovo. There I provided the team with a detailed description of the tanks, armored personnel carriers (APCs), and artillery pieces I had attacked. Later, in September 1999, I was summoned to Brussels to be among a handful of NATO pilots to stand alongside General Clark when he released an updated BDA based on the team's findings.⁸

Eleven years later, while conducting research, I had the opportunity to travel to Kosovo where, aided by a Kosovar Albanian driver and translator, I visited six of my strike sites.⁹ The number of sites was limited due to time constraints and safety concerns. Given these restrictions, several targets were selected near major roads and where target areas could be identified utilizing imagery available from Google Earth. At all target locations, local Kosovar Albanians were found who claimed to either have witnessed or have knowledge of the strikes. In eyewitness accounts, individuals recounted their memories of the target, attack, and battle damage. These accounts were then compared to my submitted mission reports. Overall, on airstrikes where I could visually identify targets, what was reported from the air was corroborated by witnesses on the ground. Unfortunately, this was not the case for the one strike where I had inferred target identification from other visual cues.

This article does not dispute the general claim of the ineffectiveness of NATO airstrikes against Serbian fielded forces in Kosovo.¹⁰ A variety of factors made the systematic execution of such attacks problematic. Poor weather and rugged terrain are environmental factors

that have and will continue to challenge air forces in prosecuting attacks. The lack of friendly ground forces to provide target identification and to prevent the Serbs from dispersing their forces would later lead to innovations by embedding joint tactical air controllers alongside indigenous friendly ground forces in Afghanistan and Libya. Challenges with untimely intelligence, surveillance, and reconnaissance (ISR) to conduct strikes on mobile targets would further spur investment in the near real-time intelligence provided by Predator and other remotely piloted aircraft. Similarly, onboard sensors on tactical aircraft proved inadequate for inflight target identification, which led to the development and widespread deployment of advanced targeting pods to most U.S. tactical aircraft. The lack of adequate doctrine and training for conducting direct strikes without coordination with friendly ground forces also limited airpower's effectiveness against fielded forces, a shortcoming that unfortunately has yet to be adequately resolved.

Instead of simply critiquing airpower's shortcomings in attacking fielded forces, this article draws on the author's experience in Kosovo to extract 11 generalizable lessons as to the challenges and requirements that remain for executing and assessing effective airstrikes against fielded forces. To do so, two of my airstrikes—one successful and one unsuccessful—are analyzed. These are first described based on the notes and mission reports I made immediately after the attacks in April and May 1999. Each strike is then reexamined from the ground perspective on the basis of interviews conducted in Kosovo in May 2010. As with the majority of the A-10 strikes during the war, both of the air attacks examined were conducted against Serbian military vehicles from medium altitude, during daylight, and under visual flight conditions.

The evidence is admittedly anecdotal and biased. Due to unexploded ordnance concerns, it proved impossible to examine strike sites away from major roads in the areas where the Serbs had deployed many of their decoys. In addition, the A-10 was designed, and its pilots specifically

trained, for attacking ground forces. If any combat aviator should have been able to identify valid ground targets, it was an A-10 pilot. At the time, I was a highly experienced weapons instructor with 2,000 hours flying the A-10 in close air support and AFAC missions. Even so, experience goes only so far, and there were clear limits as to what could be observed from the air. Furthermore, target coordinates were imprecise as the A-10 did not yet have global positioning systems (GPS), and pilots relied instead on plotting targets in the cockpit from a stack of dated 1:50,000-scale maps designed for the Army. Moreover, the electro-optic (TV) and infrared LITENING targeting pods I would later employ in Afghanistan were not yet available. Instead, A-10 pilots relied on visual searches, augmented by commercially available 20-power, image-stabilized binoculars.

While these two airstrikes may not be representative of the overall experience of NATO airmen in Kosovo, when combined the strikes do provide a useful point of departure to consider the key attributes of effective air operations against fielded forces.

A Successful Mission: The Convoy

April 8, 1999: From the Air. My first AFAC mission over Kosovo was on March 30, but due to cloud cover, a condition typical of the Balkans in early spring, I could not conduct any airstrikes until April 8. I was the flight lead for a two-ship of A-10s assigned for AFAC duty. In the first of two assigned vulnerability periods, I controlled strikes on several military trucks parked in a compound in southwest Kosovo. During aerial refueling between vulnerability periods, I received a report from the Joint Surveillance Target Attack Radar System of a 50-vehicle convoy moving 8 miles west of Pristina. Upon returning to western Kosovo, I identified the convoy as a column of refugees. The radar system then relayed that a Predator unmanned aerial vehicle had spotted two APCs and a tank moving east near my position. Rolling the jet over, I visually identified beneath me

a small convoy with one large and two small armored vehicles approaching a T-intersection in a little village. Extending to the north, I selected an infrared-guided air-to-surface Maverick missile and rolled in and locked up what I identified in the cockpit video to be a self-propelled artillery piece, a Russian 2S1 Gvozdika. Upon receiving indication of a valid lock, I launched the missile, then pulled up and rolled over to observe the weapon's impact. Once the rocket motor burned out, I lost sight of the missile and waited. Finally, the 2S1 burst into flames just before it reached the T-intersection. Sparks flew, and black smoke billowed, indicating a secondary explosion. My wingman then attacked one of the APCs, and before departing, I observed and strafed several tanks just north of the village. Debrief video review of the Maverick seeker confirmed the target likely to be self-propelled artillery.

May 18, 2010: From the Ground. My driver and interpreter, Zeka, drove west out of Pristina while I acted as navigator with a handheld GPS, an old flying map, and an aerial photo I had previously printed from Google Earth. We located the village and the T-intersection where I had plotted the strike. We parked in front of a nearby house, and two men in their mid-thirties approached us as we got out of the car. Zeka explained why we were there, and Ruzhdi and his brother Shkelza introduced themselves and motioned that we follow. As we walked, the men identified themselves as former Kosovo Liberation Army fighters who had been forced from their homes during the war, along with 8,100 Kosovar Albanians who had taken to the nearby forests while 2,000 Serbian troops had encamped in their village.¹¹

We walked down a narrow lane where shrapnel had left pockmarks in the walls of several houses. We entered a large yard with a farmhouse and a raised building with three parking spots underneath. Ruzhdi described how Serbian forces had quartered in the yard, using an upper room in the building for meals and storing their two APCs and a tracked artillery piece beneath.

When asked about the attack, Shkelza stated he had witnessed the strike from a field 3 kilometers to the southeast. He pointed up and to the north and recounted how an A-10 had shot a missile at the self-propelled artillery piece just as the vehicle was pulling out to follow the APCs. The large vehicle had been hit as it passed the back of the building, and secondary explosions had caused the damage to the walls of the houses we had just observed.

Ruzhdi added that 16 Serbs, including an infantry platoon catching a ride on top of the 2S1, had been instantly killed in the strike. A further 55 Serbs had been either killed or wounded from the secondary explosion.¹² The two brothers showed us the upper room, which had since been renovated, where they maintained soldiers had been eating at the time of the attack. In addition, Ruzhdi claimed that over the ridge a few kilometers to the north, the A-10s had also destroyed a tank, an armored vehicle, and three heavy trucks.

When asked what happened to the damaged vehicles, Ruzhdi stated that the self-propelled artillery piece had burned to the ground, leaving nothing to remove. The other vehicles had either been towed away by the Serbs or by KFOR, the NATO-led Kosovo Force, after the war. Before I left, Ruzhdi thanked me and related that after the strike that day, the Serbian forces had departed and the villagers were able to return to their homes.

Assessment of the Convoy. The April 8 airstrike was the only time in the war when I attacked a moving vehicle. The Serbian forces adjusted to having NATO aircraft overhead by operating at night or under cloud cover or by driving civilian vehicles. It was also the only time I received real-time target description and coordinates from a Predator. In this case, the eyewitness account from the ground matched what I had observed from the air, except for the additional information of the battle damage sustained from the secondary explosions. The only reasonable explanation for such a large blast would have been the detonation of artillery rounds the 2S1 stores internally.



Sailors review manual tracking procedures of target using plot board in Combat Direction Center at sea aboard USS *Theodore Roosevelt* in support of *Allied Force*, Adriatic Sea, June 3, 1999 (U.S. Navy/William L. Vandermate)

This attack highlights several lessons on the employment of airpower against fielded forces. First is a general reminder that when tactics prove successful, the enemy will quickly adapt. Rarely in Kosovo did the same tactics work for more than a few days. The enemy will address exposed vulnerabilities and adopt countermeasures as quickly as possible. Interaction with the enemy is dynamic, and tactics and doctrine must be flexible to evolve quickly in the battlespace where Darwin rules.

Second, when faced with the threat of credible airstrikes, ground forces disperse and hide. While such a response increases their survivability, such tactics may leave ground forces vulnerable to ground attack. In the case of Kosovo, however, Serbian forces did not face the credible threat of NATO ground troops. As a result, the Serbian army could continue conducting ethnic cleansing by

abandoning their tanks and APCs, and by picking up their AK-47s and driving in confiscated Kosovar automobiles. The Serbian army was never forced to choose between concentrating against enemy ground forces and dispersing to avoid air attacks.¹³

Third, persistent ISR is critical for targeting fielded forces, and the Predator set the standard for ISR in Kosovo.¹⁴ Its image-stabilized, magnified video camera provided an unmatched capability to locate and identify Serbian forces, and its feed to the Combined Air Operations Center at Vicenza, Italy, sped up the target approval process. The Predator flew lower, slower, and loitered longer over targets than any manned aircraft. As a result, it could visually identify targets where other ISR sensors could not. On one occasion, when I witnessed a Predator flying well below me, straight and level through a heavy volley of

antiaircraft activity, I thought, “There goes the bravest pilot I’ve ever seen.” Its relatively low cost and ability to operate without aircrew in the cockpit allowed the Predator to assume much greater risk.¹⁵ Unfortunately, due to the high demand for Predator video, higher authority tasking, such as monitoring refugees, frequently superseded the targeting of fielded forces. The Predator was valuable but rarely available, and at the time it had not been fully integrated into tactical air operations.¹⁶

Fourth, as to BDA, after the war the tank count became the most important metric for measuring airpower effectiveness against the Serbian fielded forces. This measure, however, proved problematic. Theoretically, a highly effective air campaign against armor *should* have caused the Serbs to hide their tanks, which is in fact what occurred. The enemy’s expectation of lethal airstrikes



Two U.S. Air Force A-10A Warthogs, from 52nd Fighter Wing, 81st Fighter Squadron, Spangdahlem Air Base, Germany, in flight during NATO Operation *Allied Force* combat mission, April 22, 1999 (U.S. Air Force/Greg L. Davis)

should deter them from risking their forces whenever it is not absolutely necessary. It is therefore impossible to determine by the number of vehicles destroyed whether airstrikes were effective. A low tank kill rate might indicate that the ground forces were deterred from using their armor, while a high tank kill rate might indicate that ground forces were more highly resolved to achieve their objective and undeterred by airstrikes.

To be clear, this article is not claiming that NATO airstrikes were effective against Serbian fielded forces in Kosovo but that the tank count was not an adequate measure. Airpower was ultimately ineffective against fielded forces because

it did not stop Serbian ethnic cleansing operations, nor did the threat to fielded forces convince Serbia to withdraw from Kosovo.¹⁷ Without the threat of a ground invasion, Serbs were free to conduct operations without risking their tanks, APCs, or artillery. The attrition rate of enemy armor, just like the body counts from Vietnam, is an inadequate measure of combat effectiveness. It is far more informative to ascertain whether military and political objectives are being achieved.

Fifth, an additional challenge to conducting BDA is in validating strikes. I reported most of my strikes as hits rather than kills, as I was reluctant to call a strike a kill unless I had observed a direct hit

and secondary explosions.¹⁸ Without the onboard sensors or confirmation from a ground-based joint tactical air controller capable of conducting precise post-strike BDA, a mission report was at best an informed guess.¹⁹ After the war, the absence of destroyed heavy weaponry at strike locations was taken as evidence that pilot claims were exaggerated. As evidenced by the attack on the convoy, some damaged APCs, tanks, and trucks had been removed. It should not come as a surprise that the Serbs removed damaged equipment from the battlefield, as this is common army practice. There was ample opportunity to remove the equipment attacked early in the war. From an assessment of all the strikes I

conducted throughout the war, only the vehicles and artillery attacked in the final days were abandoned by the Serbs.²⁰ Unfortunately, KFOR did not conduct adequate BDA forensics on the destroyed and abandoned vehicles hauled away. It is critical in future conflicts that BDA teams are prepared to gather data during the conflict from intelligence reports and then accompany ground forces into the combat zone to conduct the appropriate forensics as soon as possible.

This last lesson regarding BDA may now have been at least partially resolved by the development of more sophisticated sensors on tactical aircraft. In Afghanistan in 2004, I flew A-10s modified to carry the LITENING II targeting pod, which included enhanced electro-optics and infrared imaging. The optics on this sensor were so refined that, even from medium altitude, I could often distinguish an individual walking along a trail as being either a woman or a man just by their gait. Continued improvements in sensors will allow for more opportunities to validate BDA by strike aircraft.

The Unsuccessful Mission: The Barn

May 12, 1999. On May 11, a Predator had spotted 20 Serbian military vehicles as they were being moved into a large L-shaped building. A two-ship of A-10s from my squadron had subsequently strafed the building and reported secondary explosions accompanied by an unidentified pale yellowish-green smoke. That evening I discussed the specifics of the attack with the pilots and made a mental note to look for similar buildings where there might also be armor. During the next day's intelligence briefing, I noted the villages where Serbian tanks had recently been reported.

While searching a small village in southeast Kosovo, I identified a 200-foot-long metal building, which I judged to be a barn, near the village of Viti. Mud tracks made by heavy equipment led from a group of freshly dug, large earthen berms to the barn. The empty berms resembled the revetments the Serbian tanks used in prepared defensive positions

along the border. I radioed a description of the building, the berms, and the accompanying muddy tracks before departing for the tanker. While aerial refueling, I received permission from the CAOC to attack the building. I then coordinated for strike aircraft.

Returning to the area, two Turkish F-16s checked in. I talked them onto my position and when they called visual, I rolled in and marked the barn with two 500-pound bombs, one of which was a direct hit. Climbing off target, my wingman called "break" and as I jinked, I could see the distinctive tiny red muzzle flashes of small-arms fire and the white-gray airbursts from antiaircraft activity as it popped off below my jet. The F-16s followed my attack, dropping their ordnance, after which I noted the barn on fire with an accompanying pale yellowish-green smoke.

May 17, 2010. Eleven years later, the "barn" was the last stop on the first day visiting strike sites. As the car turned into the driveway of an older two-story farmhouse, I noticed the house was attached to a long single-story building with a new red roof. A man greeted us, introducing himself as Sherife, the son of the owner of the farm, Habib. Sherife explained that during the war, Serbian forces had been deployed in their village. When asked about the airstrike on May 12, 1999, he confirmed the earthen berms to have been military and the tracks were made by Serbian tanks kept in the barn. The local Serbian troops, however, had left the farm the day prior to the attack.

Sherife appeared happy to talk with us and invited us into the farmhouse to meet his mother. Habib was also in the house but we were told he was on his deathbed. Sherife's mother insisted on making coffee while explaining how she had sent Sherife out of Kosovo the week before the strike, after he had been severely beaten by local Serbian troops. She and Habib had remained behind to care for the farm and, once the Serbs had removed their tanks, the two had moved their tractor and car, along with 60 head of sheep into their barn for safekeeping.

She and Habib were in the house attached to the barn when the first bomb

hit. They ran into the woods and watched as the barn burned with everything inside destroyed. Fortunately, the house had been spared. As she spoke, Sherife reappeared with Habib, who insisted on greeting me. Though unable to speak, Habib sat next to me and held my hand as his wife continued the story.

The family held no grudge against the destruction of their property as NATO had been fighting the Serbs for Kosovo's freedom. Instead, every year the family celebrates May 12 as the day NATO bombed their farm. For many years, the U.S. Army commanding officer from nearby Camp Bondsteel visited the house on the anniversary of the strike out of respect for the family. She pulled out a certificate presented on one such occasion. When asked about the yellowish-green smoke, she just shrugged.

Assessment of the Barn. For over a decade, I believed the barn to be a successful attack. I was surprised to find that instead of destroying Serbian armor, I had caused collateral damage and endangered the lives of two civilians. From this unfortunate strike, five additional lessons can be distilled.

Sixth, there is no substitute for direct target identification. In this case, I had relied on indirect visual indications. The fact that the Serbs had been observed hiding their vehicles in similar buildings had motivated the search, request, and approval for the strike. In addition, intelligence had indicated Serbian armor in the village, which is why I searched in that particular location. The earthen berms further indicated military vehicles were being used at the location, and the muddy tracks leading to the barn indicated the Serbs were utilizing the barn to hide their armor. None of these indications was wrong. As this strike demonstrates, however, there is no substitute for real-time, direct target identification. The greater the reliance on indirect measures for target identification, the more chance a strike goes wrong.

Seventh, realize that there are no fixed targets. Aircrew and intelligence officers have long distinguished between fixed and mobile targets. This is a mistake; although structures may not move



Supreme Allied Commander Europe General Wesley Clark meets with members of 510th Fighter Squadron and 555th Fighter Squadron deployed to Aviano Air Base, Italy, on May 9, 1999, in support of Operation *Allied Force* (U.S. Air Force)

in the three spatial dimensions, their function can change rapidly in the fourth dimension of time. The timeliness of intelligence for structures is as important as it is for fielded forces. In this case, the building transformed overnight from a Serbian armor vehicle storage facility to a sheep barn. Those who continue to distinguish between fixed versus mobile targets ignore the fact that targets can maneuver within both time and space.²¹

Eighth, the validity of intelligence is based on its timeliness, origin, and form. Intelligence reports older than 6 hours were unlikely to result in a successful airstrike. Intelligence was most effective when delivered quickly and in a medium closest to how it was intended to be employed. For daylight operations, this meant timely photos with sufficient detail of the surrounding area for the pilot to be able to locate the target from the air. If a photograph was taken the previous day, the vehicle may have long since been moved or the function of a building may have changed. While intelligence might be useful for building situational awareness, information without accompanying recent photographs would not directly lead to a strike, and it still remained up to Airmen to locate and identify valid targets.²²

Ninth, it was the threat from Serbian air defenses, not ROEs, that restricted operations to above 10,000 feet above ground level. Combat effectiveness depended on the ability to attack enemy forces, which required the time to be able to locate and validate targets. The threat of Serbian air defenses, however, compelled operations to medium altitude. When operating at lower altitudes, I had to maneuver constantly to avoid ground fire, which in turn prevented time spent searching for targets. As the war progressed, I circled higher and higher, well above the ROE hard deck, which allowed more heads-down time to search for new targets and less time spent worried about Serbian air defenses. The ROE reflected the desire by senior air commanders to limit exposure. In Kosovo, it was not ROE restrictions but the enemy threat that limited combat effectiveness.

Tenth, air operations are dramatically affected by lighting and weather conditions more so than typically acknowledged. Nighttime operations were far less effective than daytime operations as sensors were not capable of target identification at night, a limitation the F-16 AFACs encountered with their LANTIRN (low-altitude navigation and targeting infrared for night) targeting

pods.²³ Furthermore, cloud cover through mid-April prevented medium altitude operations. The inability to validate targets without visual identification, coupled with concerns over collateral damage, precluded dropping bombs through clouds. Often ignored in general discussions on airpower effectiveness is the impact weather can have, a point largely overlooked in the recent air campaigns in the desert climates of Iraq, Afghanistan, Libya, and Syria. Weather had, however, significantly restricted airpower operations over Germany, Japan, Korea, Vietnam, and Bosnia, as it did in Kosovo, and should be taken into account as a primary consideration for employing airpower in future conflicts.

Eleventh is the issue of decoys. The Serbs, like many armies, deployed decoys as part of their tactics. The use of decoys did not make the Serbian army exceptional, nor were NATO airmen necessarily naive for striking them. At medium altitude, it is difficult to discern a decoy from a valid target. The method often employed was not to be overly concerned about differentiating between the two, but to strike any targets located. If the target disappeared when struck, it was likely a decoy. The point is that when targets are rare and weapons plentiful, it is preferable to waste some bombs on decoys rather than allow valid targets to escape. At the end of the war, the fact that destroyed decoys were found or that derelict hulks in the open had been struck multiple times proved neither the brilliance of Serbian tactics nor the naiveté of NATO airmen. It instead revealed the shortcomings of some analysts who reached broad conclusions over the ineffectiveness of airpower based on the anecdotal evidence of these individually ineffective airstrikes.

This is not to say that decoys do not provide challenges for air operations. Given the increased reliance on a limited number of relatively costly precision-guided weapons, along with lessons from the recent air campaign against the so-called Islamic State, where weapons availability became an issue, the impact of decoys on the efficient utilization of ordnance may be a concern in future operations.

The Kosovo War was a unique conflict fought two decades ago. It would be easy to ignore its lessons as specific to that war or nullified by new technologies and doctrines or contradicted by lessons from other conflicts. That would be a mistake. Airmen have now largely solved the problem of how to place a weapon on a target, but challenges remain of first being able to locate and identify targets as valid and then being able to determine the effect of strikes on the targets that are attacked. This article has identified enduring challenges of attacking fielded forces that will likely be present in the next conflict and are therefore worthy of consideration now.

In combat, the enemy will continue to adapt, and the joint force must be prepared for this eventuality with the organizations and doctrine to respond quickly to the inevitable changes required to succeed. Target identification will continue to be the major challenge for attacking fielded forces, which requires continual investment in real-time ISR systems not only to provide target identification but also to conduct high-quality battle damage assessment. Air forces can be potent but, just like land, sea, space, and cyber forces, each military instrument of power has its limitations. Airpower remains constrained by environmental factors of bad weather, poor lighting, and rugged and urban terrain as well as operational factors of enemy threat level and the absence of friendly ground forces. Finally, military commanders must be prepared to respond to misinformed measures of military effectiveness such as tank counts and destroyed decoys and instead redirect the discussion toward measures that more closely link military operations to the achievement of strategic objectives. JFQ

Notes

¹The U.S. Army deployed Task Force Hawk consisting of attack helicopters and the Army Tactical Missile System (ATACMs) to Tirana, Albania. Though Task Force Hawk never employed its helicopters or ATACMs in combat, its AN/TPQ-36 and -37 Fire Finder radars were deployed along the border to locate

Serbian artillery positions.

²Phil Haun, *Coercion, Survival, and War: Why Weak States Resist the United States* (Palo Alto: Stanford University Press, 2015), 114–133; and Daniel Lake, “The Limits of Coercive Airpower: NATO’s ‘Victory’ in Kosovo Revisited,” *International Security* 34, no. 1 (Summer 2009), 83–112.

³Steven Myers, “Damage to Serb Military Less than Expected,” *New York Times*, June 28, 1999.

⁴William Arkin, “Operation Allied Force: ‘The Most Precise Application of Air Power in History,’” in *War Over Kosovo: Politics and Strategy in a Global Age*, ed. Andrew Bacevich and Eliot Cohen (New York: Columbia University Press, 2001), 25.

⁵James Diehl and Charles Sloan, “Battle Damage Assessment: The Ground Truth,” *Joint Force Quarterly* 37 (2nd Quarter 2005), 59–64.

⁶Rebecca Grant, “True Blue: Behind the Kosovo Numbers Game,” *Air Force Magazine* (August 2000), 74–78.

⁷Richard Norton-Taylor, “How the Serb Army Escaped NATO,” *The Guardian*, March 8, 2000.

⁸General Wesley K. Clark and Brigadier General John Corley, press conference on the Kosovo Strike Assessment, North Atlantic Treaty Organization (NATO) Headquarters, September 20, 1999, available at <www.nato.int/kosovo/press/p990916a.htm>.

⁹Haun, *Coercion, Survival, and War*.

¹⁰Stephen Hosmer, *The Conflict Over Kosovo: Why Milosevic Decided to Settle When He Did* (Santa Monica, CA: RAND, 2001), 77–90.

¹¹I cannot vouch for the accuracy of the information. Every man I spoke to in Kosovo told me they were in the Kosovo Liberation Army. The small village did not appear to hold 8,100, but there were several villages in the area that combined could have housed that many. I also cannot vouch for 2,000 Serbian forces, which would have been too many for the one village, but could have been spread throughout the region.

¹²The author remains skeptical of the reported casualty figures. Though these were the numbers provided, they may have been inflated, particularly based on the relatively low level of observable damage to the building.

¹³The only exception was a brief period near Mount Pastrik in southwest Kosovo at the end of May.

¹⁴The Predator had not yet been armed with Hellfire missiles. By contrast, other intelligence, surveillance, and reconnaissance platforms that relied on synthetic aperture radars or moving target indicators did not prove to be effective as they could not provide positive target identification.

¹⁵NATO lost 25 unmanned aerial vehicles during the war. See Benjamin Lambeth, *NATO’s Air War for Kosovo: A Strategic and Operational Assessment* (Santa Monica, CA:

RAND, 2001), 97.

¹⁶I also found this to be the case in combat operations in Afghanistan in 2004. Efforts to coordinate tactics between A-10s and Predators in theater were continuously disrupted by higher headquarters tasking. As a result, combined tactics, such as the Predator providing laser designation for a laser-guided bomb dropped from an A-10, could not be exercised. This was particularly important since the first time such a combined tactic would have been employed would have been for a high-value target.

¹⁷Haun, *Coercion, Survival, and War*, 125–131.

¹⁸This only occurred three times: the strike just described, on an April 16 attack against a T-72, and on a June 7 attack on a T-54.

¹⁹The problem with the Maverick was that video was severed once the missile departed the aircraft. The problem with targeting pods is that the video is taken at aircraft altitude. There are some weapons, such as the GBU-15, that transmit weapons video to the cockpit up until weapons impact.

²⁰I was able to validate battle damage for strikes on June 7 from photographs taken by NATO helicopters.

²¹A more infamous example was the attack on the Al Firdos bunker outside Baghdad on February 13, 1991, which at night served as an air raid shelter.

²²Once I began flying with GPS and advanced targeting pods, accurate coordinates became more useful but were still not a substitute for a photograph.

²³The challenges of night operations have been somewhat offset by the development of advanced targeting pods, which make clear-weather night tactics much more effective.