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**Joint Fires as They Were Meant to Be:
V Corps and the 4th Air Support
Operations Group During
Operation Iraqi Freedom**

Charles E. Kirkpatrick

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ASSOCIATION OF THE UNITED STATES ARMY**

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LAND WARFARE PAPER NO. 48, OCTOBER 2004

Joint Fires as They Were Meant to Be: V Corps and the 4th Air Support Operations Group During Operation Iraqi Freedom

by Charles E. Kirkpatrick

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Foreword

This paper discusses the development and employment within V Corps of a concept known as “corps shaping” during Operation Iraqi Freedom. Corps shaping was the use of close air support aircraft, directed by 4th Air Support Operations Group (ASOG) controllers, in response to target selections made by the V Corps Fire Effects Coordination Center (FECC) (targeting) to attack Iraqi forces within the V Corps zone to shape the battlefield for subsequent divisional maneuver. This innovative and flexible use of airpower to supplement corps artillery fires was uniquely successful in terms of munitions delivered on valid targets, as opposed merely to tons of munitions dropped, and in terms of avoidance of fratricide.

The concept, developed jointly by the 4th ASOG and the V Corps Fire Support Coordination Element of V Corps Artillery, represents an ideal employment of joint fires in which the Air Force did not care who nominated the target so long as it was valid, and the Army did not care who attacked the target as long as the effect appropriately shaped the battlefield for subsequent maneuver operations.

The V Corps and 4th ASOG experience in OIF offers neither a panacea nor the definitive answer to how close air support should be directed as an element of joint fire support because future battlefield conditions can easily change the dynamic.

It is, however, a fine example of teamwork that serves as a benchmark for future joint operations, offers scope for more development and improvement, and points the way toward further and even more fruitful collaboration among warriors of all armed services.



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October 2004

Joint Fires as They Were Meant to Be: V Corps and the 4th Air Support Operations Group During Operation Iraqi Freedom

V Corps' Operation Cobra II drive to Baghdad during Operation Iraqi Freedom (OIF) broke fresh ground in a number of areas, but perhaps none so important as the conduct of joint operations. For years, the services have talked about joint operations and have issued joint publications that define the way such operations should be carried out. In 2003, V Corps and its U.S. Air Force (USAF) component, the 4th Air Support Operations Group, turned those concepts into reality. It was not merely the parallel functioning of two armed services; it was the almost flawless operation of a thoroughly integrated combined-arms team. Army officers of the V Corps staff described the result in superlatives: it was the best, most efficient, most effective and most responsive air support the Air Force has ever provided any U.S. Army unit. In their judgment, the integrated "corps shaping" that V Corps received—what Soldiers normally refer to as "corps close air support" (CAS)—represented joint operations as envisioned by the visionaries who wrote the publications but never before accomplished by forces in the battlespace.

Air support operations of V Corps demonstrated combined-arms thinking applied at the next tactical level because the two forces not only used joint fires to establish the conditions that enabled ground maneuver, they used maneuver to establish the conditions that enabled joint fires to have dramatic battlefield effects. Within V Corps, this was accomplished by the total integration of Army and Air Force intelligence and targeting, plus the complete trust each service reposed in the other. Most crucially, joint fires during Operation Cobra II demonstrated an important new departure: thinking in terms of the *effects* of fires rather than the *kinds* of fires delivered.

Ways and Means

In the early fall of 2002, V Corps had no intimation it would be the beneficiary of close air support that was much different from the CAS delivered during the first Persian Gulf War. In fact, Air Force doctrine for air support to shape the battlespace had not changed significantly in two decades and was familiar to everyone involved. The process on the Army side was equally well understood. The corps G-2 and field artillery intelligence officer developed and passed targets to the fires effects coordination cell (FECC) for analysis. If the FECC determined the best attack method was air, then the joint warfare officer (JWO), an Army officer in the FECC, nominated the target through the coalition Forces Land Component Command (CFLCC) to the daily targeting board at the Combined Air Operations Center (CAOC). At some point, usually one to three days later, squadrons would be directed to fly missions against those targets.¹

Obviously, such a process required close management because any target other than a structure might reasonably be expected to move between detection and the appearance of an airplane overhead. Thus, the corps intelligence section was obliged to use intelligence assets to constantly track and update the nominated target's position and report those updates to the CAOC, up to five updates in two days. The process was inefficient, involved a lot of man-hours and was fraught with the possibility of losing contact with the enemy target. Beyond that, the process did not offer any opportunity to direct air support strikes on targets in the corps area of operations on short notice. When fleeting targets appeared, the only option was to strike with corps artillery, presuming the targets were within range of the artillery available.

This doctrinal air support process current in October 2002 left little of real consequence for the corps Air Support Operations Group (ASOG) to do. Its operations typically became little more than stationing four or five officers and radios in the corps main command post to act as traffic managers. As aircraft entered the corps area to execute planned missions, the Air Force's Air Support Operations Center (ASOC), passed those CAS sorties to the forward air controllers at division and below. The existing tactics, techniques and procedures for close air support did not give the ASOC the ability to look deep into the corps area of operations—15 to 30 nautical miles out—to strike targets as they were found. Moreover, the corps characteristically had more targets—or developed more targets through the course of an operational day—than the CAOC could accommodate.

The upshot was that available air support offered the corps no capability to shape the battlefield by using air power, despite the fact the corps G-2 and the FECC would know that piece of ground and the enemy operating on it far better than anyone else in the theater of operations.

The Obvious Question and a New Design

Shortly after arriving as the new deputy commander of the 4th ASOG in the fall of 2002, Lieutenant Colonel Michael McGee began to question the existing close air support doctrine, which he saw as inefficient, and related his concerns to his commander, Colonel Bruce L. Curry. Although he had not served in an air support operations group before, McGee was a pilot who had spent his entire career in tactical aviation and had considerable experience with the problems involved in delivering effective air support. He asked the crucial—and obvious—question: “When you find the target, why not kill it right now?”²

The answer was equally obvious. No mechanism existed that allowed the ASOC to find, clear and kill a target as soon as it was identified. To achieve that would require organization and equipment the 4th ASOG did not possess, not to mention a fundamental change in operating philosophy. At the most basic level, it required an integration of the Air Force and Army that the CAOC, under its doctrine, had never before contemplated.

As McGee began to consider solutions, he discussed the matter with his Army colleagues in the corps battle staff: Major E. J. Degen and Major Lou Rago in G-3 Plans, and Major Bradford Lord and Lieutenant Colonel Trent Cuthbert in the fire support element of the V Corps Artillery. They worked out a proposal that, if put into effect, could give V Corps more

immediate corps-level shaping ability. The idea was to build an ASOC command post with its intelligence and targeting elements fully integrated with the corps G-2, the fire support coordinator and the rest of the FECC. Within the G-2, the ASOC placed a team in the All-Source Collection Element to enhance air power responsiveness. Armed with up-to-the-minute target data, ASOC could then direct available sorties to targets not just in direct support of divisions but throughout the corps area of operations to shape the battlefield. In such a scheme, the JWO would shift his focus to nominating targets beyond the Fire Support Coordination Line (FSCL) to the CAOC for prosecution.³ The JWO still would have certain duties within the FSCL, assisting the ASOG in obtaining the sorties of aircraft used for corps shaping. His requests were essential to obtaining the corps's CAS allocation from the CAOC.

Though new as practical application, the concept already existed for which McGee, Degen and their collaborators were designing procedures, and they focused on that concept as they worked out the practical details. Joint publications of 1988 specified that

Joint fire support is usually executed within the boundaries of the land, maritime, or amphibious force. *Therefore, joint fire support is conducted in accordance with the priority, timing, and effects established by the supported commander* [emphasis added]. Typically, joint fire support has an immediate or near term effect on the conduct of friendly operations.⁴

It was that integration of joint fires with fire and maneuver of the supported force, producing what the joint publication called “synergistic results in combat power,” the planners sought. The technique they were developing would accomplish the corps commander's targeting priorities with rapidity and effectiveness. In so doing, ASOG had to maintain a focus on two critical tasks and balance resources to accomplish both: delivering timely close air support to the divisions in support of the immediate tactical battle, and delivering operational fires to shape the corps battle space, which affected future battles.

McGee and Degen briefed their emerging concept to the V Corps chief of staff, Brigadier General Daniel A. Hahn, in November. Both Hahn and the corps commander were, as McGee recalled, “an easy sell” because the air support concept he outlined was exactly what any maneuver commander wanted to hear.⁵ Hahn was concerned only that the corps might not have enough time to put the concept together, test it and exercise it adequately. His reservations notwithstanding, Hahn authorized them to proceed. With corps approval in hand, ASOG turned to building an organization and operation to make the idea work.

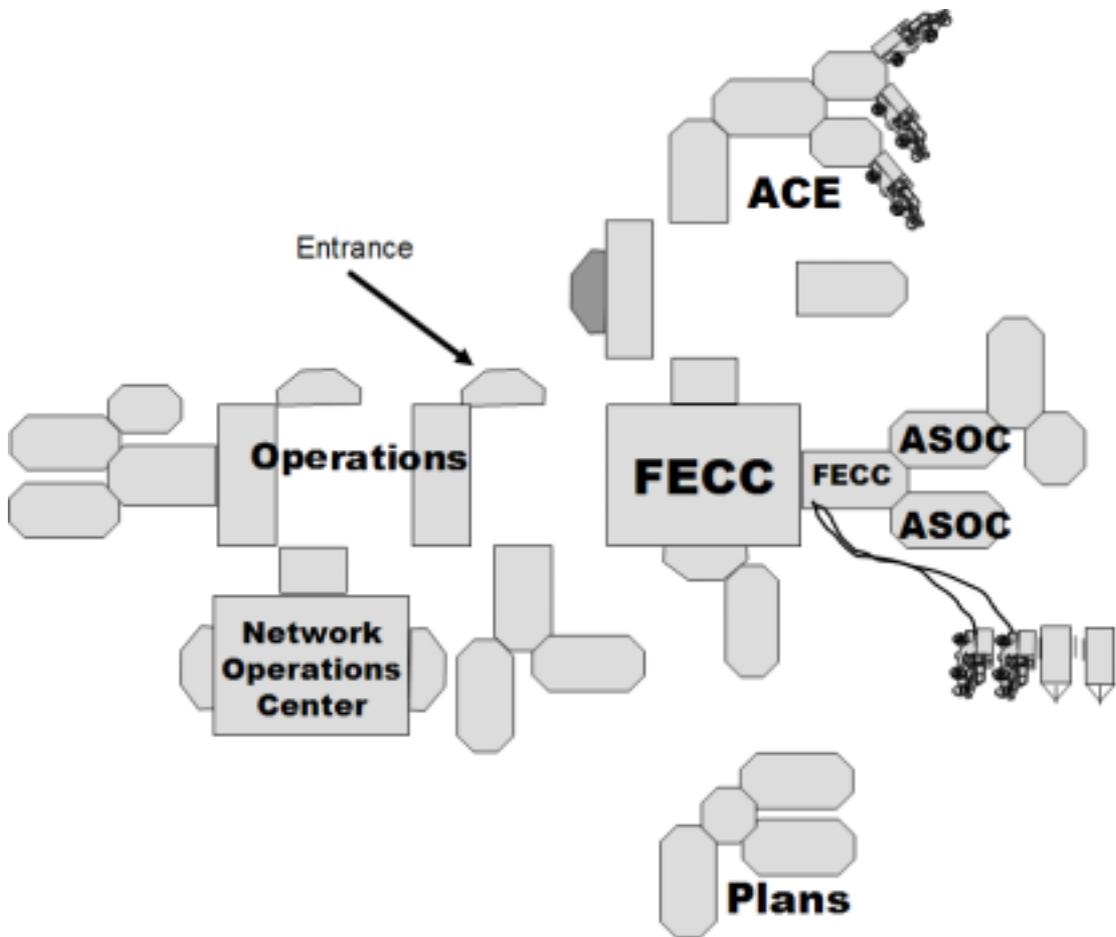
Between November 2002 and February 2003 the ASOG staff reexamined its command post organization and created both a main and a tactical command post, each capable of exploiting corps tactical inputs and directing aircraft to immediate targets in the corps area of operations. The ASOG main command post remained colocated with the V Corps main command post, while the ASOG tactical command post (Tac) displaced with the corps Tac. The idea was that the Tac could take over the functions of the ASOC in the corps main command post when the corps main command post displaced. Simultaneously, the Air Force tactical command post managed the operations of the long-range communications teams—high-mobility multipurpose wheeled vehicles (HMMWVs) with radios and international

maritime satellite (INMARSAT) phones—created by ASOG to serve as communications relay units intended to overcome difficulties imposed by the distance between the Kuwaiti border and Baghdad.⁶

The ASOC was not merely colocated with the V Corps main but integrated with the FECC. The all-important intelligence function—the means by which targets were identified—was conducted both at the ASOC tent and at the All-Source Collection Element (ACE) of the corps G-2. That positioning opened the way to exploiting many sources of information, including corps long-range reconnaissance teams, the Army’s airspace command and control (A2C2) element that directed helicopter missions, Hunter and Predator unmanned aerial vehicles (UAVs), Joint Surveillance Target Attack Radar System (JSTARS) aircraft and other external sources. The ACE (Rear), a fixed facility in Al Jaber Air Base, Kuwait, was responsible for linking into all theater and national feeds. Targetable intelligence was passed forward to the ACE for prosecution. Crucial to avoiding fratricide was clearing targets through the ground commander. The ASOC was well placed to do that at corps level, while its subordinate tactical air control parties (TACPs) of the Air Support Operations Squadrons were placed to do the same thing at division and brigade levels. The ASOC placement also allowed it to clear prospective targets easily and quickly through U.S. Central Command’s Collateral Damage Estimation process through which proscribed attacks or weapons effects—on mosques, hospitals or schools, for example—were to be avoided. The critical ingredient in successful focusing of joint fires, as corps commander Lieutenant General William S. Wallace later commented, lay in the organization of the main command post to place the ACE, the FECC and the ASOC in close proximity for current operations.⁷

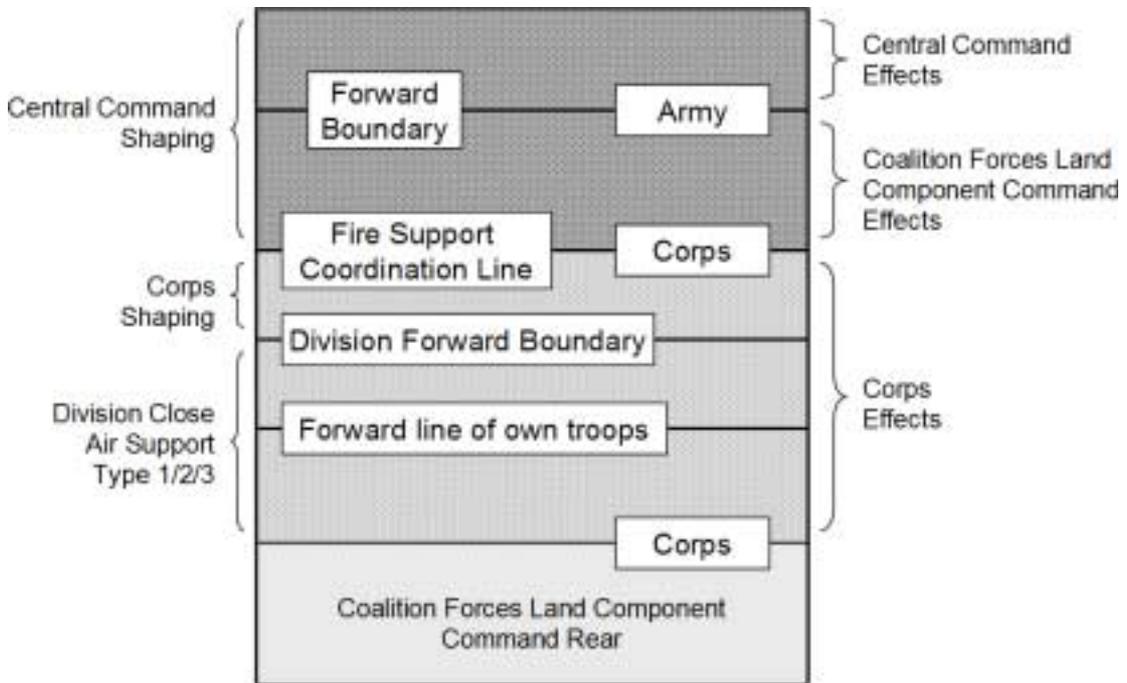
The two priorities remained as briefed to Hahn in November 2002: CAS in support of divisions and ASOC-directed killbox interdiction in “open” ground space, and “corps shaping,” as it came to be known. Corps shaping operations extended from the corps rear boundary to the FSCL, a control feature established not by V Corps but by Central Command with input from the CFLCC. During OIF, the FSCL typically was placed 25 to 30 nautical miles in front of the forward line of own troops (FLOT).⁸ Prosecution of targets in that area was normally carried out in accordance with corps direction, and targets were found through the ACE of the corps G-2, which consolidated inputs from the long-range surveillance teams of the corps’ 51st Infantry, Hunter UAVs, JSTARS aircraft, All-Source Intelligence, Strike Coordination and Reconnaissance Aircraft, and teams of the 5th Special Forces Group. The ASOC then matched the target with the best available aircraft and bomb combination from the flow of CAS aircraft.

CAS’s primary effort remained support of the divisions and was delivered between the FLOT and the division forward boundary. The TACPs located at the division command posts mirrored the ASOC execution and for the first time executed division shaping fires for the division commander, just as the ASOC did for the corps commander. The ASOC planned to push aircraft from the CAS flow to divisions and brigades where TACPs would direct them to targets. The ASOC used the Joint Air Request Net to pull CAS aircraft for support



V Corps Main Command Post layout at Camp Virginia in Kuwait, showing relative locations of the Fire Effects Coordination Center (FECC), the All-Source Collection Element (ACE) of the corps G-2, and the Air Support Operations Center (ASOC).

of the divisions and remained in direct communication with all of the divisional tactical command posts, all the fielded TACPs and all the fielded Special Operations Forces teams so it could react immediately to short-notice requirements. The Air Force recognized three types of close air support missions (each air support mission consisted of either two or four sorties), and the divisional forward air controllers were prepared to carry out all three. In Type 1 CAS, the controller could see both the target and the aircraft and directed the pilot's attack. In Type 2 CAS, the controller could see neither the target nor the aircraft but directed the aircraft on the basis of intelligence inputs. Type 3 CAS was similar to Type 2 CAS and involved situations in which the tactical risk assessment indicated that CAS attacks would impose low risk of fratricide.⁹ The Joint Terminal Attack Controller (JTAC), working with one of the many sources of targeting data, directed the engagement. The Type 1 CAS was the least used during OIF, accounting for only about 6 percent of the controlled missions.



“Corps CAS,” as the Army called it, shaped the V Corps battle space between the Corps rear boundary and the Fire Support Coordination Line.

More Than Just Nice to Have

High-level decisions that altered the planned movement of Army forces into the theater forced V Corps to change the conceptual basis on which it would operate, particularly how it meant to fight the deep battle. The shift from deployment according to the planned Time-Phased Force and Deployment Data (TPFDD) to deployment by force packages changed the order in which divisions and their supporting elements arrived in Kuwait. As battle neared, V Corps had only two complete divisions under its command, with many other units still en route. The battle commenced with a shortage of general support and general support reinforcing artillery, with the V Corps Artillery commanding only two Multiple Launch Rocket System (MLRS) battalions in its two brigades.¹⁰ The plan, by contrast, anticipated six field artillery brigades with 18 field artillery battalions to support the maneuver units and deliver general support fires. Conceptually, each division was to have the support of one field artillery brigade.¹¹ Following the final operations order briefing, Wallace—who had been briefed on the ASOG’s new close air support concept and enthusiastically approved it—turned to Curry and said, “Kid, I hope your guys are good, because we damned sure don’t have enough artillery to do it by ourselves.”¹²

From the beginning of combat operations, and more obviously as V Corps approached Baghdad, all understood that the corps did not have sufficient maneuver forces to achieve all of its tasks. In particular, it could not secure its own lines of communications, and no corps-level reserve was available to give the commander maneuver flexibility. While

UAVs were excellent intelligence-gathering tools, the corps did not have enough to keep up with the maneuver forces. The shortage of artillery meant that Wallace could not shape the battlefield in support of the divisions using corps artillery. While aircraft of the 11th Aviation Regiment had suffered battle damage after their initial attack, V Corps still had four battalions of Apaches available to put into the fight. Nevertheless, commanders needed to assess and adapt to the enemy's reactions to that deep attack, adjusting tactics and the use of attack helicopters to the circumstances on the battlefield. Those circumstances compelled V Corps, for the moment, to rely on joint capabilities to get the job done. One of the key decisions in making up the deficiency was Central Command's agreement to distribute Air Force sorties through CFLCC to be used by V Corps for corps battlefield shaping.¹³

The corps went into battle with attack helicopters at both corps and division levels. Corps aviation was optimized for deep attack, while division aviation was optimized for "over the shoulder" support of the brigade combat teams. Attacks to a depth of up to 150 kilometers by corps attack helicopters could be supported by MLRS fires to suppress enemy air defenses and by UAVs to build target sets. Divisions, by contrast, did not have organic UAV or Army Tactical Missile System (ATACMS) missiles in their battalions, and unless such support were provided by corps, the division attack helicopter battalions could operate only to depths at which the division could support them, about 30 kilometers in front of the brigades.

The prewar paradigm was a simple one. Theater aviation—that is, aerial interdiction—attacked both long and short of the FSCL to shape the battlefield for future corps operations. The corps nominated effects—although not really targets—based on its planning; the Air Force controlled the aerial interdiction that delivered those attacks. Meanwhile, corps general support artillery suppressed enemy air defense to enable deep attacks by corps aviation that shaped the corps battlespace. Such attacks, which customarily ranged out to between 125 and 150 kilometers from the aviation's forward operating base, were intended to destroy enemy forces and thereby enable maneuver by corps forces while preventing interdiction of those corps forces. As the OIF battle developed, however, V Corps lacked a good target set for attack aviation, encountered the worst of flying weather for helicopters and suffered extensive battle damage to two of its six battalions of AH-64 Apaches. At that point the 4th ASOG's innovations in delivering close air support, especially with immediately available collateral damage estimates and direct tie-in with corps intelligence, became even more important as a way to replace the traditional artillery and attack aviation approach to shaping the corps battlespace.¹⁴

Additionally, two other unplanned factors influenced the authors of U.S. Central Command Air Forces' (CENTAF) killbox interdiction construct. First, the battlefield was non-linear. The majority of the killboxes short of the FSCL were closed due to friendly locations all over the battlefield. These closed killboxes required close air support execution. The second unplanned factor was the enemy execution. The enemy did not deploy in defensive positions in open terrain, as they had done during Operation Desert Storm. In OIF the enemy dispersed into small units that moved continuously and hid in areas of dense vegetation. Effective air strikes against the enemy required a direct intelligence tie to point

pilots to current enemy positions and a direct collateral damage estimation aid to allow for attacks in urban areas.

The Test of Battle

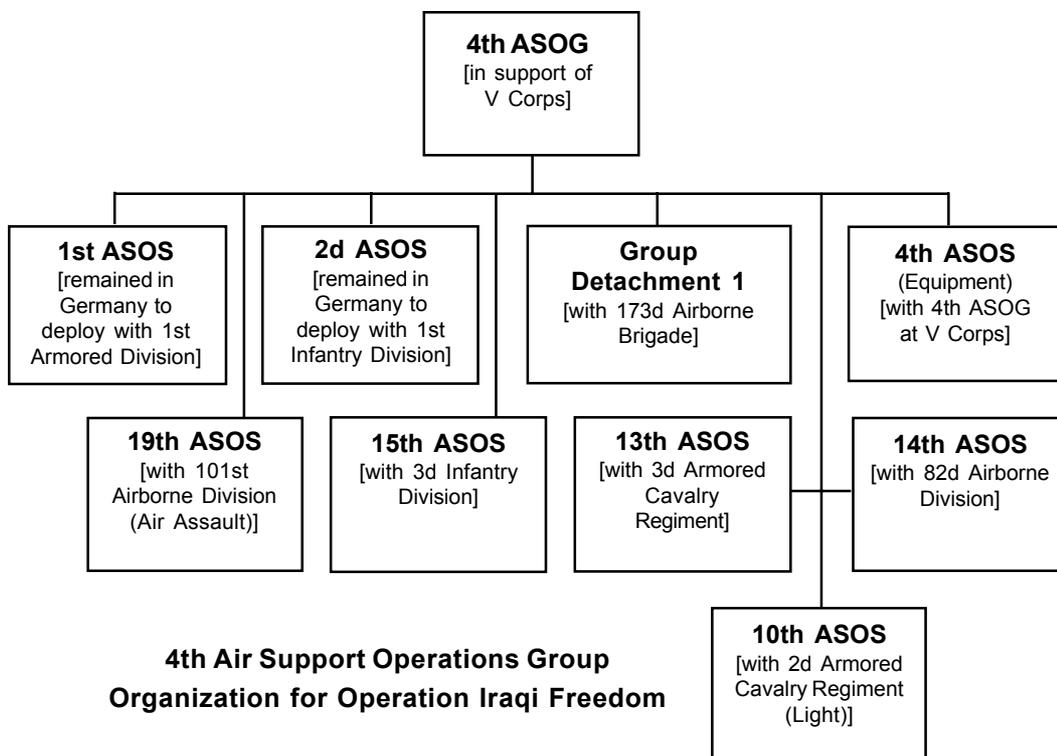
As V Corps readied itself for battle, the 4th ASOG prepared its squadrons to direct the new construct of corps shaping. Decisions about which Army divisions would be assigned to V Corps and when they would deploy required changes to the internal organization of 4th ASOG. During peacetime operations in Germany, the ASOG assigned one squadron habitually to the 1st Infantry Division (Mechanized), the 1st Armored Division and U.S. Army Europe's (USAREUR's) 173d Airborne Brigade in Vicenza, Italy. However, the 1st Infantry Division was not slated to take part in OIF, and the 1st Armored Division's deployment was changed at the last minute to arrive in theater later. Thus, the Air Force attached to the 4th ASOG those Air Support Operations Squadrons from the continental United States that were accustomed to operating with the divisions and armored cavalry regiments already in theater or immediately deploying.

One of the intangible factors that affected operations was that the 4th ASOG had never, save within corps exercises, directed close air support aircraft before. As a consequence, the ASOC spent several days of actual operations smoothing out the inevitable bumps of unforeseen difficulties before it functioned to the complete satisfaction of its commander. Whatever the difficulties, no one doubted that efficient close air support and corps shaping were needed from the beginning of the war because the deployment plan called for a continuous flow of forces into the theater after hostilities began rather than having all forces in place when the attack was launched. Moreover, little air preparation of the battlespace from the theater level was planned before ground operations were launched. As the ASOG prepared for battle, Wallace set the V Corps targeting priority, which never changed in its constituent parts through the war, although the ranking of targets occasionally fluctuated:

- time-sensitive targets, such as surface-to-surface missiles and elements of Saddam Hussein's regime;
- air defense artillery systems;
- artillery;
- command and control facilities; and
- armored vehicles.¹⁵

Maintaining a focus on that priority was the role of the FECC, which operated under the direction of the V Corps chief of staff from the corps main command post at Camp Virginia. Throughout operations, the close coordination between the FECC and the ASOC made corps shaping successful. As time-sensitive targets were identified, the FECC analyzed them, handled the targeting and passed them to the ASOC for prosecution.

Other challenges stemmed from the lessons Iraqi forces had learned since the previous Persian Gulf War about the American style of battle and use of air power. The enemy carefully dispersed his forces and left few targets in the open. Iraqi units—whether Regular



Army, Republican Guard or irregular forces—were mobile and relocated frequently, using bad weather to mask their movements. The Iraqis also quickly adopted unconventional tactics, including using civilian vehicles in their attacks and hiding military forces in the midst of the civilian populace. Individual Iraqi commanders hid and dispersed their forces and equipment, taking them out only to shoot and then quickly returning them to hidden positions. Those hide sites changed frequently—as often as every four or eight hours, normally during darkness or in bad weather—and were most often located in urban areas, in wooded areas or in or near coalition no-strike targets such as religious sites and hospitals.

The enemy forces within the V Corps sector were the Iraqi Army’s 11th Infantry Division, the Medina Republican Guard Division, the Hammurabi Republican Guard Division, the Nebuchadnezzar Republican Guard Division, reinforcements from the Adnan Republican Guard Division and various forces in and around Baghdad. American estimates placed the 11th Infantry Division at 84 percent strength immediately before the war, the Medina Division at 96 percent, the Hammurabi Division at 97 percent and the Nebuchadnezzar Division at almost full strength.¹⁶ In addition, substantial irregular forces of the Al Quds, Ba’ath Party Militia and Fedayeen Saddam, for which no reliable or conventional assessment of fighting quality was available, operated throughout the corps sector. The regular forces in the initial corps area of operations were deployed in bands and echeloned from the Kuwaiti border back to the vicinity of Al Hillah and Karbala in two Iraqi corps sectors.

Coalition air forces delivered the initial air attacks on the Iraqi regime in the early morning hours of 19 March 2003. V Corps launched its ground attack through the frontier

berm that separated Kuwait from Iraq at 1500Z the next day. Theater aerial interdiction directed by the CAOC struck Iraqi 11th Infantry Division targets for a day and a half, reducing that division's strength from 84 percent to 81 percent.¹⁷ When V Corps attacked with its 3d Infantry Division, most of the forces skirted to the west of the Iraqi 11th Division, which was dispersed in the vicinity of An Nasariyah. Both the 3d ID's brigade combat teams and their supporting CAS found relatively few enemy forces, and those they did find were dispersed in small groups. Hence, few targets were available for the CAS aircraft during the first three days of operations. Therefore, the "shakedown" the ASOG needed took place during relatively slow-paced aerial operations, and the staff rapidly resolved its remaining issues, which primarily involved communications techniques and procedures. In that opening phase of the fighting, the ASOC directed corps shaping operations that later assessments determined reduced the 11th Division to 63 percent strength at the end of three days of strikes involving 220 aircraft sorties.¹⁸ Meanwhile, the ASOC Tac command post moved forward with the 3d Infantry Division.

Over the succeeding 11 days, V Corps attacked the Medina Republican Guard Division, subsequently reinforced by elements of the Hammurabi Republican Guard Division, as corps units maneuvered past An Najaf and approached the critical Karbala Gap. The Medina was not only a better fighting organization than the 11th Division, it was also stronger, starting the war at 96 percent strength. The Medina followed tactical practices of dispersion and concealment that had become familiar to the Americans, and the four and one-half days of theater air interdiction had only reduced the division to an estimated 92 percent of its total combat power. This second phase of the fighting saw the maturation of the corps shaping concept planned in Heidelberg, Germany. Poor weather slowed the ground maneuver elements and markedly decreased the efficacy of UAV and strike coordination and reconnaissance (SCAR) observation. Elements of the Medina also moved frequently, at least daily. Nonetheless, after 10 days of combat operations, corps and division shaping of the battlefield had reduced the Medina to 29 percent assessed strength, with heavy losses to the division's T-72 tanks, artillery and air defense artillery. Later evaluations determined that 191 of the Medina's 215 tanks, 203 of its 401 artillery pieces and 40 of its 41 air defense systems were destroyed during corps shaping operations in which the 4th ASOG directed 1,817 aircraft sorties in support of corps maneuver.¹⁹ By that point, the ASOG tactical command post and its long-range communications teams had collocated with the V Corps tactical command post at Objective Rams.

Between 3 and 8 April, V Corps fought the third major phase of its attack toward Baghdad, which was defended by the Hammurabi, Adnan and Baghdad Divisions of the Republican Guard and undetermined numbers of irregular forces. The Hammurabi Division began the war at 97 percent combat effectiveness. After 13 days of attacks by theater-directed aerial interdiction, it had only been reduced to 73 percent strength. By the time V Corps units were nearing Baghdad, the Hammurabi, reinforced by elements of the Adnan Division, had been moved to survivability positions in the vicinity of its garrison and dispersed into small elements. Meanwhile, the Baghdad Division was at 69 percent strength and had been repositioned to inner Baghdad to backfill locations the Hammurabi had vacated and to

block the approach of coalition forces to Baghdad from the southwest. Iraqi artillery units were deployed within Baghdad, and most were in firing positions as the 3d Infantry Division approached the city. The Medina and Hammurabi Divisions both positioned units to the north, between the 3d Infantry Division and the approaching U. S. Marines. There was thus considerable military power in and around the city. Continuing its close collaboration with the corps FECC, the 4th ASOG directed 861 sorties against Iraqi military units in that third phase of the battle, and later assessments showed that their strikes reduced the Hammurabi and Adnan Divisions from a cumulative 73 percent strength to 23 percent combat effectiveness, including a subsequent 618 “cleanup” sorties between the 19th and 23rd days after commencement of operations.

During missions flown against Iraqi forces in and around Baghdad, the ASOC learned that Joint Direct Attack Munitions (JDAMs) with delayed fusing could be used effectively in urban operations and, properly placed, cause little collateral damage. Similarly, aircraft used laser-guided bombs and their gun systems with great effectiveness. At that point the ASOC controllers made particularly good use of the information passed on from UAVs, along with other real-time or near-real-time intelligence feeds. The “pilots” of the drone aircraft could see when a tank, for example, moved from a hide position near a building and out onto a broad boulevard in the city, where it could be attacked without causing undesirable damage to infrastructure or casualties to civilians. Because the capital was heavily defended by antiaircraft missiles, suppression of air defense by Army ATACMS was essential before fighter-bombers ventured into that air space. Such missions proved to be effective in clearing the missile engagement zone around Baghdad. The FECC closely controlled ASOC attacks on time-sensitive targets in the corps area of operations and handled an additional 18 missions handed off from the theater, each prosecuted within an average time of 18 minutes.

Overall, ASOC-directed close air support missions were stunningly effective in the course of the war. The ASOC was assigned a total of 2,117 air missions, of which 625 were subsequently reassigned to other controlling agencies. Thus the 4th ASOG directed 1,492 missions specifically within the V Corps area of operations: a total of 886 missions were corps shaping while 606 missions were divisional CAS. Not every sortie delivered ordnance. If a target could not be cleared or, more rarely, was not found, or had already been struck by artillery or other aircraft, the pilot did not merely jettison his bombs. Thus, the eventual statistical summary of targets killed by the air power component of V Corps joint fires during Operation Cobra II was all the more impressive.

Additionally, urban CAS destroyed more than 105 bunkers, 225 buildings and 226 targets of other kinds, including aircraft, command posts and mobile command and control equipment. Much of the battle damage assessment that went into providing such figures came from direct viewing of the target via UAV feeds. Having used UAVs to direct the aircraft to the target, the ASOC was also able to use UAVs to make its poststrike assessments. The video feeds characteristically showed not only clear strikes on the targets but also secondary explosions and other persuasive indications of target destruction.²⁰

Meanwhile, the V Corps commander had another component of joint fires at his use: V Corps Artillery comprising the 41st Field Artillery Brigade and the 214th Field Artillery Brigade, with a combined total of three MLRS battalions and one 155mm towed howitzer battalion.²¹ Conventional artillery support to the maneuvering brigades was characteristically lavish and included MLRS units, which fired 857 rockets. The longer-range ATACMS engagements were somewhat fewer in number and more discrete, amounting to a total of 414 missiles fired. Both were steadily engaged throughout the war but fired the greater number of their missions against planned targets rather than against immediate targets.²²

The majority of all ATACMS missiles fired were in support of V Corps missions, although V Corps Artillery also delivered fires in support of CFLCC and Marine operations. Among the V Corps fire missions, 109 rounds were fired to suppress enemy air defenses, thereby enabling close air support missions directed by the ASOC at targets in and around Baghdad.²³ Those missions resulted from collaborative planning between the ASOC and the fire support staff in the FECC. In its post-battle analysis, the 4th ASOG concluded that Army ATACMS were an effective and responsive suppression of enemy air defenses (SEAD) asset. The two massive V Corps/ASOC planned volleys significantly degraded the Baghdad missile engagement zone, thereby allowing efficient CAS operations in and around the city.²⁴

Key Target	Prewar On Hand	Destroyed by Air	Percentage Destroyed
Surface-to-Surface Missiles	153	46	30%
Artillery Pieces	843	424	50%
Tanks	660	421	64%
Other Armored Vehicles	859	107	12%
Air Defense Artillery Systems	159	76	48%
Vehicles	2000+	1,144	N/A

Iraqi targets struck by the 4th Air Support Operations Group-directed close air support sorties in the V Corps area of operations

Joint Fires at a Higher Level

Much more was involved than just the destruction of enemy targets. More significant were the effects of that destruction on the enemy and the influence of joint fires on mission accomplishment. In V Corps' experience, joint fires not only enabled the corps to conduct operational maneuver, but operational maneuver in turn set the conditions that allowed joint fires to have dramatic battlefield effects. This was seen most clearly after the great sandstorm at the end of March when V Corps conducted what has come to be known as the "five simultaneous attacks" on Iraqi forces in and near the Karbala Gap.

The "Five Simultaneous Attacks"

After the weather cleared, V Corps began its attacks on 31 March to encircle Baghdad. An attack by the 2d Brigade, 3d Infantry Division toward Objective Murray at Hindiyah and

a reconnaissance into the Karbala Gap constituted the main effort, but it was expanded and supported by four other simultaneous attacks that applied pressure on the Iraqis across the entire corps frontage. The 2d Battalion, 101st Aviation, 101st Airborne Division (Air Assault) conducted an armed reconnaissance west of Muhl Lake across Phase Line Dover, along which the 3d Infantry Division's 3d Squadron, 7th Cavalry, was screening. The 1st Brigade of the 101st continued its battle to contain enemy forces in An Najaf to the south of the 3d Infantry Division zone, and the air assault division's 2d Brigade conducted a feint toward Al Hillah. Finally, the 82d Airborne Division's 2d Brigade launched an attack to contain enemy forces at As Samawah, further to the south on the Euphrates River.

Category of Target	ATACMS Missiles Fired
Planned Fires	305
Immediate Targets	109

**V Corps Artillery:
Planned versus immediate fires missions**

Although it was not Wallace's original intention to deceive the Iraqi command about V Corps' plans for subsequent operations, the five attacks caused the enemy to reposition forces south of Objective Murray, resulting in the first appearance on the battlefield of the much-vaunted Republican Guard. Simultaneously, Iraqi forces made their first large-scale use of artillery, positioning most of it in built-up areas while the irregular forces of the Fedayeen Saddam continued fanatical, although piecemeal and fruitless, assaults against V

Corps units. Wallace surmised that the Iraqi Republican Guard commanders thought those five attacks constituted the American main effort, attacking from west to east across the Euphrates to gain Highway 8 and

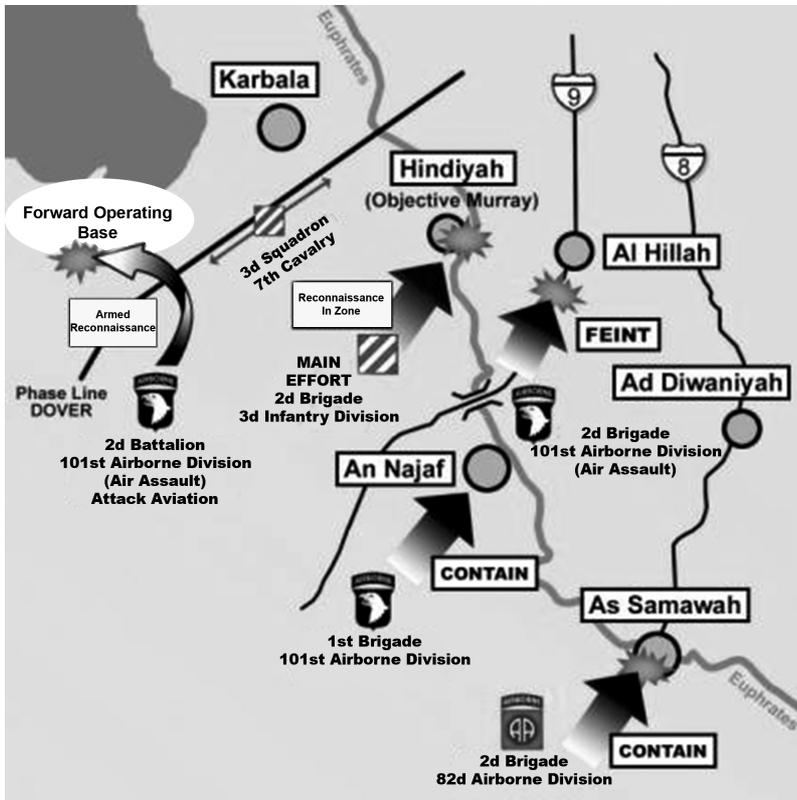
Support Unit	ATACMS Missiles Fired
CFLCC	24
I Marine Expeditionary Force	77
V Corps	313
Total	414

**V Corps Artillery:
Fire missions in support of the entire coalition force**

then turn north into Baghdad. He recalled that in the afternoon of the day the attacks began, "we started getting reports of the Republican Guard repositioning to what we believed to be their final defensive setup . . . in broad daylight, under the eyes of the U.S. Air Force."²⁵

Fighter-bombers directed by the 4th ASOG immediately streaked in to attack those targets, predominantly tanks on heavy equipment transporters, artillery, armored vehicles and supporting wheeled vehicles in columns on the roads. Control of the attacks was a joint proposition. Corps G-2 concentrated its UAVs in that area and used them to track individual Iraqi weapon systems, which ASOC controllers then vectored in air strikes to destroy. A particular virtue of that style of battle was that the G-2 and the ASOC obtained an immediate battle damage assessment (BDA) and could confidently order follow-on air strikes against other targets. Such an immediate BDA was not usually available when firing MLRS missions at such targets, nor was it available to assess the results of theater-directed air interdiction missions.

The joint fires quickly reduced the Republican Guard Division's strength from 92 percent to 29 percent—to a combat-ineffective organization. As a result, the 3d Infantry Division moved forward to attack positions that allowed it to proceed through the Karbala Gap, the



101st Airborne Division secured An Najaf airfield and controlled the lines of communication around that city, and the 82d Airborne Division secured and contained As Samawah. In the process, American ground maneuver and ASOC-controlled air attacks severed the Iraqi lines of communication and prevented further reinforcement or resupply of Iraqi forces to the south, particularly those in As Samawah, An Nasiriah and Al Hillah. Once completed, the five attacks had set the conditions for the 3d Brigade Combat Team,

3d Infantry Division to seize the Karbala Gap and for the 1st Brigade Combat Team to attack Objective Peach. The road to Baghdad was open.

Wallace called the action an especially good example of the power of joint operations and the reciprocal relationship between ground maneuver and joint fires:

I believe it was one of those classic cases of a maneuver action setting up operational fires, which in turn set up for a successful decisive maneuver, which took place the following day and over the following 48 hours. Because 48 hours later, we owned Baghdad International Airport and Objective Saints. We had begun the encirclement of Baghdad. From my perch, my perspective, my retrospection, that was a tipping point in the campaign.²⁶

The battle damage assessment V Corps' main command post gleaned from the cooperation between the Hunter UAV controllers and ASOC controllers was an important element in the corps commander's decisions about what to do next. When he learned those attacks had almost destroyed the Medina Division in a 36-hour period, Wallace knew he could proceed with operations against Baghdad.²⁷

Integrating Joint Fires in a Single Fight

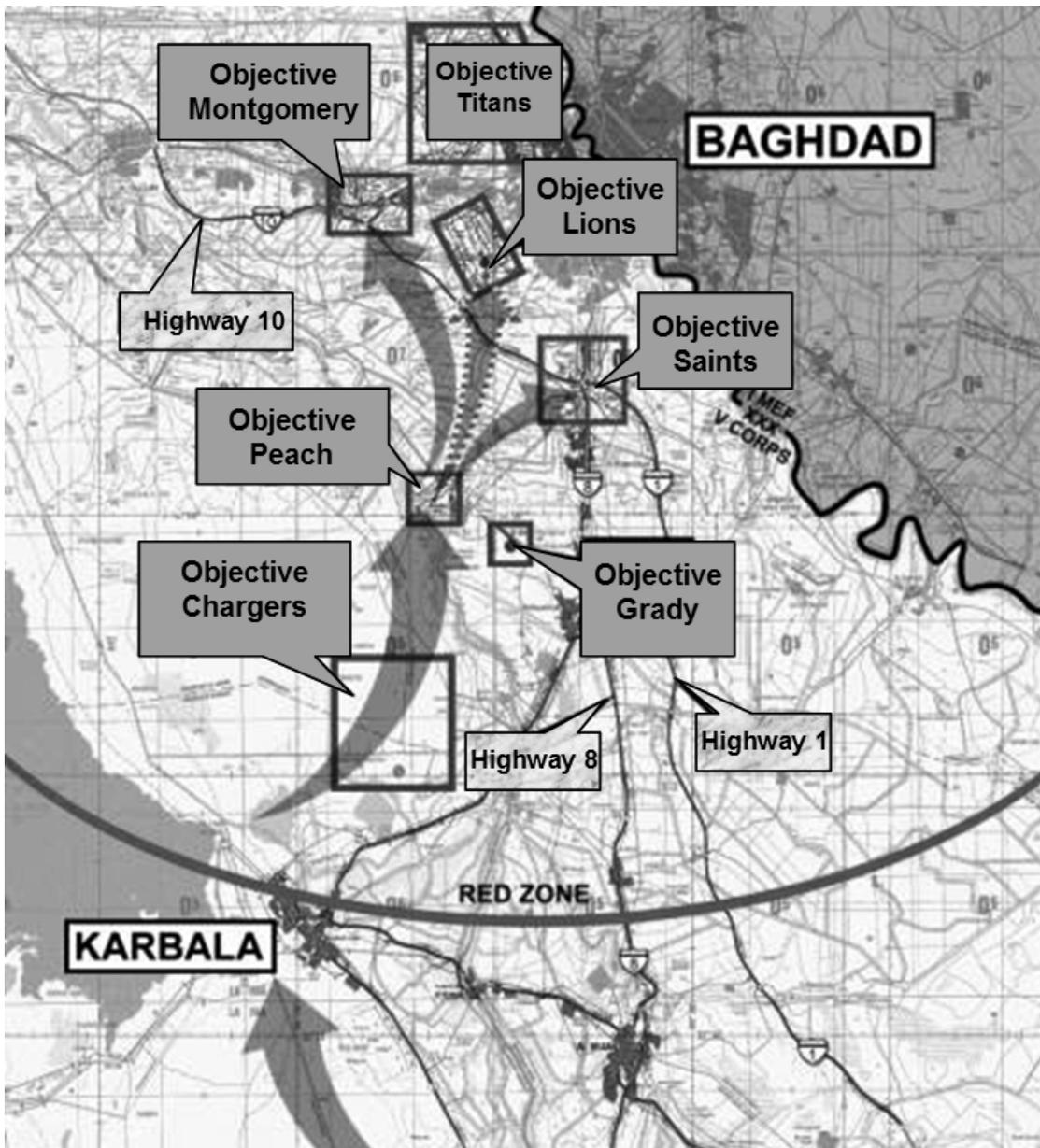
With the 3d Infantry Division advancing from the Karbala Gap through Objective Chargers to seize Objective Peach, a bridge V Corps needed to continue the attack to Baghdad, Wallace determined that movement needed to be both rapid and fluid. His decision was based in part on coalition fears that Saddam Hussein might decide to use chemical weapons as forces approached Baghdad, and in part on the need to erect a cordon around Baghdad to contain the regime. Sufficient Iraqi forces were in the area to defend the bridge and to counterattack any coalition forces able to force a river crossing.

Terrain in the area lent itself to use of fire support, although there were restricted fields of fire. Consequently, the scheme of maneuver to secure Objective Peach on 2 April relied on a brigade of the 3d Infantry Division supported by CAS on call, a battalion of 155mm Paladin artillery in direct support, the use of battalion mortars, and a company of AH-64 Apache attack helicopters to give “over the shoulder” support to the ground force. To facilitate use of air power, two killboxes were opened adjacent to the objective. When the American forces attacked and secured the bridge, close air support, fully ASOC-integrated and directed killbox interdiction, linear artillery fire and direct fire from the tank battalions destroyed two resulting Iraqi counterattacks, in one of which the commander of the 10th Armor Brigade, Medina Division was killed.

Operations at Objective Peach

This was an extremely sophisticated fire-support plan that involved both services. Thus, the attack at Objective Peach effectively illustrated one of the basic principles of joint warfare—that joint warfare is team warfare.²⁸ Properly done, joint battle exposes no weak points or seams to the enemy but rapidly and efficiently finds and engages enemy weak points and vulnerabilities. To do this, the commander selects the best means and most appropriate forces at his disposal. In the case of Objective Peach, that meant a sophisticated combination of all the elements of joint fires to help the ground maneuver succeed.

The next two days saw one of the most dramatic uses of joint fires result in the destruction of Iraqi forces south of Baghdad. Iraqi units tried to go east from Ah Hillah and Iskandariyah and escape across the Tigris back into Baghdad on Highway 6 under pressure from the I Marine Expeditionary Force (MEF), which was advancing toward the bridge over the Tigris at Sarabadi. During the night of 3–4 April, the corps G-3 and the rest of the corps tactical command post watched multiple UAV feeds that provided the data to direct close air support from stacked Navy, Marine and Air Force aircraft to engage hundreds of vehicles, sometimes up to five and six towed artillery pieces simultaneously. As one target was struck, the Hunter and Predator UAVs shifted to the next. By morning, the highway between Ah Hillah and Sarabadi was littered along its length with burning hulks of Iraqi military equipment. Meanwhile, the 2d Brigade Combat Team, 3d Infantry Division had cut the enemy’s escape routes on Highway 8 and Highway 1 into Baghdad at Objective Saints. Large elements of the Medina Division tried, and failed, to escape through that night and succeeding morning.



The morning of 4 April, the 2d Brigade Combat Team attacked southward to clean out the remaining enemy trapped in that pocket. Many Iraqi troops at that point simply changed into civilian clothes and left their vehicles. The maneuver to cut the enemy lines of communication at Objective Saints—the intersection of Highway 8 and Highway 1—set up the single most destructive day of the war and created the circumstances in which close air support missions destroyed major units of the Medina and Adnan Divisions.

While the feints at Objective Murray, Al Hillah and As Samarah reinforced the Iraqi belief that V Corps intended to move up Highways 8 and 1, those feints actually were a

modification of guidance from Wallace in late January that the 3d Infantry Division would put forces east of the Euphrates to keep Iraq's Medina and Adnan forces from repositioning west. The feints were a modification to fix the enemy divisions south of Objective Saints and compel them to reinforce that area instead of Karbala. Those feints, as well as a deep attack that followed the same route up the middle, were the maneuvers that set up operational fires as the enemy moved into positions and reinforced the areas south of Saints. In many ways, however, the more significant maneuver was the surprise blocking of Highways 8 and 1 on 3 April. It was a huge surprise to the Iraqis, who believed they were holding V Corps off at Al Hillah and Iskandariyah. That maneuver, which resulted in the destruction of Medina and Adnan units trapped south of Objective Saints, became the destruction mechanism for the whole Iraqi army because the loss of those units made the 2d Brigade Combat Team's "thunder run" on 5 April much easier. Because of that battle south of Baghdad, and a similar battle that the 3d Squadron, 7th Cavalry fought to cut Highway 10 between Ar Ramadi and Baghdad late on the afternoon of 3 April, the enemy never made it back into the capital city.²⁹

"All the brothers were gallant . . ."

Almost embarrassingly lavish praise heaped upon all the participants, none of whom ever seems to have been tainted by the least suspicion of error, too often characterizes after-action reports. In the case of joint fires as conducted during OIF by V Corps and the Air Force 4th ASOG, such lavish praise was justified. The V Corps argument is persuasive: as they fought the war, the two services worked together in ways not seen before, with results not achieved before. Traditional means of summarizing combat effectiveness, and particularly the recitation of gross tonnages of ordnance dropped, are meaningless as a way to measure combat effectiveness. A far more useful tool than *ordnance delivered* is *ordnance delivered on valid targets*. Measured according to that criterion, aircraft directed by the 4th ASOG set new standards of effectiveness, and it is the Army's evaluation of that effectiveness—rather than the Air Force's evaluation—that is most striking.

Wallace, persuaded by UAV feeds of the accuracy of the battle damage assessments of the corps shaping strikes, concluded that joint fires beyond the division forward boundary by V Corps and the 4th ASOG were effective.³⁰ That substantial effectiveness was a striking fact about the campaign and was a product of an unusually well-developed relationship between the corps FECC, which determined the method of attack for targets, and the ASOG, which made decisions about the execution of tactical air support within the commander's guidance and in accordance with his priority list. Perhaps even more striking was that, in the delivery of those joint fires, no coalition lives were lost in the V Corps sector throughout the ground campaign due to the effects of an Iraqi main weapon system—artillery, tank or infantry fighting vehicle. Moreover, no fratricide incidents occurred in the entire V Corps area of operations by any aircraft cleared or controlled by the 4th ASOG—the only offensive command and control organization in the theater that can make such a claim.

Such successes were attained not as the result of the operations of one service or the other but by the skillful melding of the capabilities of both to deliver fires where and when

they were needed with precision accuracy. Wallace summarized that “Army intelligence made the USAF better, and the USAF made the Army commander on the ground better.”³¹ The 4th ASOG echoed that conclusion when it evaluated its wartime operations, pointing out that ASOC’s colocation and full integration with the corps FECC, A2C2 and intelligence analysts gave it tools close air support direction had never used before. Integrated real-time intelligence was critical for target detection and resulted in unprecedented shaping of the battlefield in accordance with the supported commander’s intent. The integration of the ASOC with the corps deep fires enormously increased the efficiency of tactical air power against a highly mobile and elusive enemy. Both services concluded that using UAV feeds to find the target and tactical airpower to kill the target was the single most successful way to prosecute joint fires, and they viewed the technique as essential for corps and highly desirable at division.³²

During OIF, air power became the primary means of executing joint fires to shape the corps battlespace. Artillery was comparatively underutilized, especially for counterfire missions, for several reasons.³³ One was the early shortage of artillery. Another was a general reluctance to fire dual-purpose conventional improved munitions because of the possibility of collateral damage and the probability that dud bomblets would hinder friendly maneuver or endanger civilian populations.³⁴ At the same time, a growing realization emerged of the ease, effectiveness and rapid responsiveness with which air power could be used under the direction techniques the 4th ASOG had evolved. Having the ability to strike a target immediately by drawing continuously on the target-seeking capability of the corps G-2 vastly increased the FECC’s effectiveness. After early, successful demonstrations of the technique, when the corps G-3, chief of staff or commanding general wanted a target hit they turned directly to the ASOC. Ultimately, the corps delegated all decisionmaking for the execution of tactical air support to the ASOC. The team was that solid, the trust was that great; but it was a trust earned by performance on the battlefield.

One of the elements of success was that V Corps warfighting exercises fully integrated realistic play for the ASOC into the maneuver events, so the 4th ASOG thoroughly understood the way the corps meant to conduct ground maneuver. The ASOG staff was fully integrated into the corps battle staff and into all planning and operations, which meant they were accustomed to the Army’s battle rhythm and decisionmaking process. The ASOC staff had an ardent desire to support the corps maneuver and were prepared to do so because they understood Army doctrine. Most crucially, according to Hahn,

They understood the commander’s priorities and the commander’s intent. Not a day went by that they did not come and talk to me to make certain that they had the priorities right for the boss. They were integrated at every level . . . [and] . . . would get on the horn and talk with the squadrons themselves to make sure they understood the packages and what the squadrons were going to support.³⁵

Finally, one of the most important lessons to be drawn from the experience of the 4th ASOG and V Corps in 2003 is the reiteration of something the services have long understood: battlefield innovations cannot always—or perhaps ever—be top-driven. A far better idea is

to encourage creativity at the unit level, recognizing that the best new procedures, and those that work most successfully, often are those devised by the people doing the fighting. That was a lesson the Army and Air Force learned in North Africa in 1942–1943³⁶ and again in Western Europe in 1944–1945,³⁷ and one that V Corps and the 4th ASOG reaffirmed during Operation Iraqi Freedom.

Some Broader Questions

However successful, the V Corps and 4th ASOG experience in OIF does not offer a panacea or the definitive answer to how close air support should be directed as an element of joint fire support because future battlefield conditions can easily change the dynamic. Conditions of mission, enemy, time, terrain and troops will always shape the decisions that determine how a combat organization will give battle. In the case of OIF, the 4th ASOG's innovative control of airplanes to create corps shaping, or "corps CAS" as the Army preferred to call it, was the right answer and fulfilled the existing tactical need. In another set of circumstances, against another enemy and with a different set of requirements, a different fire support technique might be required. It is possible to imagine a tactical situation where Army attack helicopters would be the dominant weapon, or where non-weather-dependent artillery would be the system of choice, or where some other combination of the two services' weapons would best fit the requirements. In this case, considering the limited number of available artillery units when Operation Cobra II was launched and the severe restrictions on collateral damage under which V Corps was obliged to fight, corps shaping was the right answer, and a creative, innovative and integrated corps and ASOG staff provided it.

At the immediate root of the matter is a question both Air Force and Army doctrine have long acknowledged: the tension between effectiveness of fire support and efficiency of fire support. An air force can launch only a finite number of CAS sorties, just as a land force has a finite number of ATACMS missiles. If the corps controls a substantial number of those sorties, then they are not available to the joint force commander to accomplish the broader objectives under his purview. Hence, allocation of sorties is always a judgment call, and one that must be informed by circumstances. The Army has always held that fire support is most *efficient* when centralized at the highest practical level. By contrast, fire support is most *effective* when it is decentralized. Direct support artillery is the most decentralized tactical mission and gives the supported commander the most effective fires.³⁸ But decentralized control robs the senior commander of the ability to mass fires, another desirable capability. Thus, trade-offs will always occur, not only in artillery but also in allocation of close air support aircraft. A sortie spent today to shape the battlefield at the moment is a future sortie not spent to shape a future battlefield. There are no hard and fast answers, but there are pointers. Rigorous analysis of the data—in this case based on the immediate and persuasive battle damage assessment provided by Hunter UAV feeds—leads to a conclusion that the corps shaping technique was stunningly more effective than air interdiction during the war in Iraq. Furthermore, the techniques used by the 4th ASOG-directed sorties on valid targets prevented the waste of both sorties and ordnance. In a world of limited resources, such an achievement demands attention.

Another major issue refers to Wallace's contention that V Corps' and the 4th ASOG's successes arose from the decision to integrate intelligence and targeting. In fact, as one V Corps planner pointed out, "information, not fires or effects, is the coin of the realm" because "you can only kill what you know is out there."³⁹ The larger issue is not how joint fires should be distributed, but how joint intelligence collection and analysis is synchronized, which a Department of the Army study has concluded must presume "direct C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) linkages among combined arms headquarters and between them and supporting theater and national information and attack resources."⁴⁰ The experience of OIF showed that not all those links have been forged. The joint team in V Corps fought its battle using Hunter UAV inputs, which meant it relied on a sensor that had a three-kilometer range and gave, as Wallace called it, a "soda straw" view of the battlefield. The obvious future task is to synchronize all those other, more sophisticated and longer-range sensors to deliver better information to the people who do the targeting.⁴¹

The final point is that the intelligence collection, synchronization and analysis and the production of target sets require considerable manpower. Neither V Corps nor the 4th ASOG was adequately staffed in peacetime operations to conduct the kinds of missions they handled during the war. They prevailed only because both received substantial personnel "plugs" prior to deployment. Finding the personnel resources for proper training and preparation and for effective combat operations is a real priority. One of the intellectual tasks for both services is to consider carefully how they operate and what units and manning they really need to handle the battle tasks demanded of the future.

In retrospect and when viewed from the perspective of the ground maneuver forces, the conduct of joint fires in the V Corps area of operations during the war was an unqualified success, one that offered scope for more development and improvement. It was an outstanding example of integrated joint warfare that points the way toward further and even more fruitful collaboration among warriors of all armed services.

Endnotes

- ¹ Air Force Doctrine Document 2-1.3, *Counterland* (27 August 1999). Like Army fires support doctrine, Air Force doctrine emphasizes centralized control and decentralized execution as the preferred method of delivering air power support to ground forces. Chapter 2 details procedures for air interdiction. Chapter 3 outlines the close air support concepts current as V Corps went to war in 2003. See also Joint Publication 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)*, 3 September 2003.
- ² Lieutenant Colonel Michael McGee, Deputy Commander, 4th Air Support Operations Group, USAF, interview by author at Campbell Barracks, Heidelberg, Germany, 26 November 2003.
- ³ *Ibid.*
- ⁴ Joint Publication 3-09, *Doctrine for Joint Fire Support*, 12 May 1998.

- ⁵ For background on the Army's long-standing preferences about close air support, see C. E. Kirkpatrick, *The Army and the A-10: The Army's Role in Developing Close Air Support Aircraft, 1961–1971* (Washington, D.C.: U.S. Army Center of Military History Analysis Branch Study, 1988).
- ⁶ Lieutenant Colonel Michael McGee, USAF, Deputy Commander, 4th Air Support Operations Group, V Corps, interview by Major Robert G. Smith, Baghdad International Airport, Iraq, 9 June 2003.
- ⁷ Lieutenant General William S. Wallace, Commander, U.S. Army Combined Arms Center, Fort Leavenworth, Kansas, "Joint Fires in OIF: What Worked for the Vth (US) Corps," briefing, November 2003.
- ⁸ This point remained in contention after the war. V Corps Artillery contended the FSCL was no more than 25 nautical miles out and often less than that. Colonel Theodore Janosko, V Corps Artillery Memorandum, "Consolidated Comments for the Historical Article 'Joint Fires,'" n.d., e-mail to author, 6 May 2004.
- ⁹ Joint Publication 3-09.3, 3 September 2003.
- ¹⁰ Colonel Theodore J. Janosko, Commander, V Corps Artillery, interview by Major Robert G. Smith, conducted at Baghdad International Airport, Iraq, 5 June 2003.
- ¹¹ V Corps Artillery, "The Sound of Thunder: V Corps Artillery in Operation Iraqi Freedom" (draft article, July 2003).
- ¹² Major Kevin Marcus, V Corps Assistant Chief of Staff, G-3 (Plans), e-mail to author, 10 December 2003.
- ¹³ Major Kevin Marcus, "Thoughts on Joint Fires and Corps CAS," memorandum for V Corps Historian, 10 December 2003.
- ¹⁴ *Ibid.*
- ¹⁵ 4th ASOG briefing, "OIF Operations," 2 October 2003. These priorities have been placed in their "primary" rank order in accordance with comments from Colonel Janosko, V Corps Artillery Memorandum e-mail, 6 May 2004.
- ¹⁶ Wallace Briefing. Percentages were based on a CENTCOM C-2 assessment. All subsequent estimations of the strength and combat power of Iraqi formations are based on CENTCOM analysis.
- ¹⁷ Wallace briefing.
- ¹⁸ *Ibid.*
- ¹⁹ 4th ASOG briefing. These figures include the fruits of post-battle analysis, including surveys of the battlefield.
- ²⁰ 4th ASOG briefing. The briefing also included sample video frames of various strikes. Other video records of the attacks and their effects are retained on file by the 4th ASOG.
- ²¹ The Corps Artillery organization changed steadily throughout the war. The 41st and 214th FA Brigades were in theater, each with one MLRS battalion, when the war started. The 17th FA Brigade, with three MLRS battalions and one 155mm battalion, was still arriving and conducting reception, staging, onward movement and integration (RSOI) in Kuwait as major unit combat ended and was not able to introduce its battalions into the fighting until 18 April 2003. The 41st FA Brigade eventually received a second MLRS battalion, but it was not available for combat until 9 April 2003. In general, the 214th FA Brigade fired general support reinforcing fires for the 101st Airborne Division. See *V Corps Order of Battle, 2003, Second Persian Gulf War, 1 January–15 June 2003* and *Combined Forces Land Component Command (April 2003)*, both in V Corps Historian Research Files.
- ²² "The Sound of Thunder."
- ²³ Wallace briefing.

- ²⁴ 4th ASOG briefing.
- ²⁵ Lieutenant General William S. Wallace, Commanding General, V Corps, interview by Colonel French MacLean, V Corps Headquarters at Baghdad, Iraq, 15 April 2003.
- ²⁶ *Ibid.*
- ²⁷ Lieutenant General William S. Wallace, designated Commanding General, U.S. Army Combined Arms Center, Fort Leavenworth, Kansas, interview by author, Campbell Barracks, Heidelberg, Germany, 16 June 2003.
- ²⁸ Joint Publication 1, *Joint Warfare of the Armed Forces of the United States*, 14 November 2000.
- ²⁹ Colonel Stephen A. Hicks (V Corps Assistant Chief of Staff, G-3), e-mail message to author, 7 April 2004.
- ³⁰ Wallace briefing.
- ³¹ *Ibid.*
- ³² 4th ASOG briefing.
- ³³ In its post-battle analysis the V Corps Artillery maintained that the MLRS battalions could have provided counterfire as responsive as that delivered by close air support. See “The Sound of Thunder.”
- ³⁴ The Janosko interview touches on these issues.
- ³⁵ Brigadier General Daniel A. Hahn, Chief of Staff, V Corps, interview by Colonel French MacLean at V Corps Headquarters, Baghdad Presidential Palace, Iraq, 30 April 2003.
- ³⁶ For a summary of the steps taken in 1943, see Daniel R. Mortenson, *A Pattern for Joint Operations: World War II Close Air Support North Africa* (Washington, D.C.: Office of Air Force History and U.S. Army Center of Military History Analysis Branch study, 1988).
- ³⁷ For the official Air Force view, see chapters 3–6 of Benjamin Franklin Cooling (ed.), *Case Studies in the Development of Close Air Support* (Washington, D.C.: Office of Air Force History, 1990). A superb, although unabashedly *ex parte*, view is Thomas Alexander Hughes, *Overlord: General Pete Quesada and the Triumph of Tactical Air Power in World War II* (New York: The Free Press, 1995). The conclusions of the Ninth (Tactical) Air Force about air-ground operations, as drawn in 1946, are in *Condensed Analysis of the Ninth Air Force in the European Theater of Operations* (Washington, D.C.: Office of Air Force History reprint, 1984). The language of Chapter V, “Conclusions and Recommendations: Internal,” shows why the Ninth Air Force report had little impact on a service that had made strategic bombardment the cornerstone of its drive for independent status. In discussing the Tactical Air Command-Army Team, the report concluded that “The principle of establishing a separate, autonomous air command to operate in an indissoluble operational partnership with each army proved sound and successful in combat” (105).
- ³⁸ Field Manual 6-20, *Fire Support in the AirLand Battle*, 17 May 1988.
- ³⁹ Marcus memorandum.
- ⁴⁰ Department of the Army Headquarters, *Future Fires and Effects for Advanced Full Dimension Operations*, Washington, D.C., 2000.
- ⁴¹ Marcus memorandum.