AIR LAND SEA BULLETIN




Issue No. 2015-3 Air Land Sea Application (ALSA) Center *July 2015*

The Evolution of Close Air Support






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Purpose: The ALSA Center publishes the ALSB three times a year. ALSA is a multi-Service Department of Defense field agency sponsored by the US Army Training and Doctrine Command (TRADOC), Marine Corps Combat Development Command (MCCDC), Navy Warfare Development Command (NWDC), and Curtis E. LeMay Center for Doctrine Development and Education (LeMay Center). The ALSB is a vehicle to "spread the word" on recent developments in warfighting concepts, issues, and Service interoperability. The intent is to provide a cross-Service flow of information among readers around the globe. This periodical is governed by Army Regulation 25-30.

Disclaimer: The ALSB is an open forum. The articles, letters, and opinions expressed or implied herein should not be construed as the official position of TRADOC, MCCDC, NWDC, the LeMay Center, or ALSA Center.

Next issue: November 2015. The theme of this issue is **"Open Warfighter Forum".**

Submissions: Get published-ALSA solicits articles and reader's comments and is currently accepting submissions for the February 2016 edition: Urban Operations (Mega Cities). Contributions of 1,500 words or less are ideal. Submit contributions, double-spaced in MS Word. Include the author's name, title, complete unit address, telephone number, and email address. Graphics can appear in an article, but a **separate computer file for each graphic and photograph (photos must be 300 dpi) must be provided.** Send email submissions to **alsadirector@us.af.mil**. The ALSA Center reserves the right to edit content to meet space limitations and conform to the ALSB style and format.

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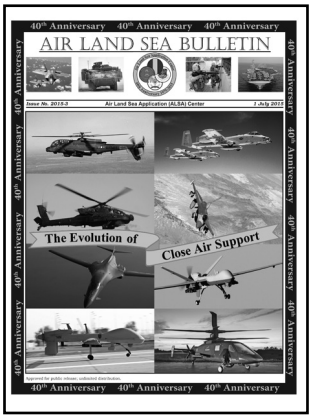
Articles in this ALSB contain unedited text. Therefore, the language may not reflect that used by today's Services.



The cover shows the evolution of aircraft developed or modified to deliver aerial fires in direct support of ground forces since the 1970s. From top to bottom: AH-56 Cheyenne (experimental), A-10 Warthog, AH-64 Apache, F-16 Viper, B-1 Lancer, MQ-9 Reaper, MQ-1 Gray Eagle, and S-97 Raider (experimental).

DIRECTOR'S COMMENTS

This edition of the Air Land Sea Bulletin (ALSB) commemorates the Air Land Sea Application Center's (ALSA's) 40th anniversary of service to the warfighter. On July 1, 1975, the United States (US) Air Force Tactical Air Command (TAC) and US Army Training and Doctrine Command (TRADOC) established the Air-Land Forces Application (ALFA) directorate "to coordinate, integrate, and direct TAC and TRADOC programs for development of joint concepts, doctrine, and procedures for the conduct of the Air-Land Battle."

ALFA distributed the first Air-Land Bulletin in January 1977. It was conceived to "provide a means of communicating ideas, concepts, joint initiatives, and developments associated with [the] air-land battle."

In 40 years, ALFA grew beyond providing Army-Air Force Air-Land Battle doctrine and transformed into ALSA with additional representatives from the US Navy and US Marine Corps. The organizational focus, appropriately, shifted to provide tactics, techniques, and procedures to solve multi-Service interface problems at the tactical level.

Although the topics contained in these bulletins have changed over time, the intent has remained resolute: the ALSB is a media platform for the joint force to exchange ideas. Our submitting authors have made it successful. Many unfiltered, bottom-up ideas have come from the field suggesting ways to improve how we fight as an integrated, joint team. Some ideas have led to new capabilities, tactics, techniques, or procedures.

It is impossible to capture every idea or major topic in one special edition, so we have chosen to focus on an enduring topic: close air support (CAS). CAS was one of the ALFA charter topics embedded in the Air-Land Battle doctrine and the collection of selected articles showcases how ALSA's open forum exchange of ideas has been a catalyst to refine CAS doctrine through the years. Note these articles contain dated ideas and doctrinal concepts and are republished here to show an evolution; they do not necessarily reflect current doctrine or Service positions.

In an attempt to recount ALSA's history, its role in Army-Air Force doctrine, and the challenges our leaders faced in the 1970s; we begin with a retrospective view of the early days of ALSA based on GEN Robert Dixon's 1978 account of the TAC-TRADOC Dialog. As one of ALFA's charter Steering Committee members, GEN Dixon's first-hand account sets the stage for this special edition and our lineup of CAS articles.

The second article, "Fight Early: an A-10 Pilot's Perspective", comes from 1983 and describes the need for attack aircraft to be employed in the linear battle, "close" fight.

The third article, "The Army/Air Force Close Air Support Debate: A FAC's Perspective", comes from 1987 and could be mistaken for an article written in 2015.

The fourth article, "Preplanned CAS", from 1989, describes the challenges of asset allocation and requesting CAS.

The fifth article, "The Effectiveness of F-16 CAS/BAI at the National Training Center", from 1991, compares F-16 and A-10 CAS effectiveness.

The sixth article, "Close Air Support: Who Should Do It?", from 1993, questions whether the Army should be responsible for the CAS mission.

The seventh article, "Kasserine Pass and the Proper Application of Airpower" from the autumn 1998 Joint Forces Quarterly periodical, provides a counterpoint to the previous article on the control of airpower.

The eighth article, "Controlling CAS with the Predator: Is it Feasible?" from 2006, suggests that certain unmanned platforms can perform forward air controller duties and control CAS.

This is my final ALSB as the ALSA Director. I take this opportunity to welcome our new Director, Col Michael Kensick (USAF), and Deputy Director, COL David Applegate (USA), as they take the helm. I am confident they are committed to the ALSA mission and are prepared to take this organization into a successful future. Lastly, to our dedicated staff and all the working group participants that continue to meet the immediate needs of the warfighter, thank you.

John L. Smith, Colonel, USA

Director

THE AIR LAND SEA APPLICATION CENTER COMMEMORATES 40 YEARS

Air Land Sea Application Center, Joint Base Langley-Eustis, VA, 12 November 2008.

By LTC Dana Smith, USA

The United States (US) Army and US Air Force have a long, tangled history and with a shared sibling rivalry of sorts. Historians have documented the tense relationship between Airmen and Soldiers through the pioneer days of Army Aviation, exploits of the Army Air Corps, and birth of the US Air Force. Debates raged for decades over the most effective use of airpower with neither Service achieving consensus among its leadership or with each other. It was not until the Vietnam War that operational necessity underscored the importance of integrated air and land power in joint operations. The Vietnam experience proved Army and Air Force cooperation and integration are possible and, in 1975, the Air-Land Forces Application directorate got its start in an effort to bring doctrine writers from both Services to one table.

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In 1973, Chiefs of Staff US Army General Creighton W. Abrams and US Air Force General George S. Brown, having fought together in Vietnam, achieved an understanding and common outlook about roles and missions. They believed it was possible to carry their wartime cooperation forward in peacetime, institutionalize it, and expand it into a continual working relationship.

On October 1, 1973, they directed General William E. DePuy the Commander of the US Army Training and Doctrine Command (TRADOC), located at Fort Monroe, Virginia; and General Robert J. Dixon, Commander of the Tactical Air Command (TAC), located at Langley Air Force Base, Virginia, to begin the TAC-TRADOC Dialog. (It is interesting to note the seemingly convenient proximity of the two commands dates back to 1946 when General Dwight D. Eisenhower intentionally placed the newly formed TAC and Army Ground Forces, predecessor to TRADOC, in the Norfolk, Virginia area to facilitate cooperation like the TAC-TRADOC Dialog.[1]) General Abrams described the situation to General DePuy as follows:

I have long believed that, since there exists, in the Army and Air Force, a unique complementary relationship to conduct warfare on the land mass, it is absolutely essential that a close relationship exists, at all levels, between the two Services. The Army's recent experience in Southeast Asia has further reinforced my belief in the essentiality of close working ties with the Air Force. I am certain you fully recognize, as I do, the timely use of air power, with its superb capability to quickly mass firepower during critical phases of the war, played a vital role in defeating the enemy in Southwest Asia. The problem that George Brown and I both face, is how to carry over this commonality of purpose which existed so clearly in Vietnam, as it was in other operational settings, into the entire fabric of relationships between the two Services.[2]

The two commanders held their first TAC-TRADOC Dialog meeting on October 17, 1973 and quickly agreed to focus efforts on improving joint combat capability by emphasizing procedures to win the air-land battle. General Dixon, years later, described the initial partnership as having been built on the facts of life.[3]

We built the partnership between TAC and TRADOC on facts of life. The first fact of life was that neither the Army nor the Air Force alone can win a significant conflict; they can only win as a team. Second, the complex technology, speed, catastrophic violence, and decisive outcome that can be expected in a modern war do not permit the necessary teamwork to develop after hostilities begin: the partnership has to be developed and nurtured in peacetime. Third, the Services have a professional obligation to muster the most capability from the resources available. Fourth, the essential partnership cannot be concluded simply between the two principals: the same spirit of cooperation has to be reflected in the staffs and in the troops themselves.[4]

... since there exists, in the Army and Air Force, a unique complementary relationship ... it is absolutely essential that a close relationship exists ...

By October 23, the TAC Deputy Chief of Staff for Plans and the TRADOC Deputy Chief of Staff for Combat Development were designated as the integration focal point within each command. At their first meeting, they established joint working groups for airspace management; reconnaissance and surveillance; electronic warfare; and remotely piloted vehicles. By 1975, they realized this ad hoc relationship between staffs lacked the necessary structure for continuous and detailed analysis. General Dixon's 1978 recollection describes the early days:

To solve the management problem, a joint agency, the ALFA directorate, was formed to assist in

dealing with problems related closely to joint combat capability. The questions addressed were: What are the elements of the air-land battle? Why should the air-land force operate in a given fashion? Who should attack which targets? How should the efforts be coordinated? How much is needed? ALFA is product-orientated. During the past four years, many working groups have developed concepts and practical procedures which have been published in manual form. As an example, the Airspace Management Working Group was formed to consider the problem of traffic over the battlefield. The group developed procedures whereby all traffic below a given altitude operates under procedural control, and all traffic above the altitude, under positive control. The Air Commander is given the responsibilities of both the area air defense commander and area airspace control authority … The manual does more than provide for airspace management; it also extends tangible proof that the joint air-land problems, which need to be solved, can be solved.[5]

For the first ten years, ALFA almost exclusively worked on Air-Land Battle doctrine …

The joint TAC-TRADOC directive establishing ALFA was effective on July 1, 1975 and stated ALFA's mission: to coordinate, integrate and direct TAC-TRADOC programs for development of joint concepts, doctrine, and procedures for the conduct of air-land battle. The directorate consisted of ten officers: five Army and five Air Force. The leadership was to rotate between Director and Deputy Director each year. The Director's effectiveness report would be written by the other Service's commander: an Army Director's report was written by the TAC Commander and an Air Force Director's was written by the TRADOC Commander. Because ALFA was small, it did not have the range of technical skills to deal with all the problems confronting it. Therefore, it was given authority to form joint working groups from within the TAC and TRADOC staffs, and subordinate units. These working groups included representatives from other major Army and Air Force Commands.

Today, it is easy to take for granted joint warfighting doctrine. For most warfighters, a coordination altitude has always existed and, of course, the air commander is the airspace control authority and area defense commander. It is easy to forget these procedures, and many more, were formalized through ALFA's work on Air-Land Battle. The fact these joint concepts have endured is a testament to the first ALFA officers and the vision of the Service's senior leaders.

For the first ten years, ALFA almost exclusively worked on Air-Land Battle doctrine; providing input to TAC-TRADOC publications like the Army's Field Manual 100-5, Operations. Early publications were indistinguishable from other Service publications. In 1984, the Joint Actions Steering Committee (JASC), ALFA's governing officers, tasked the organization to address integrating airpower deficiencies identified in Operation URGENT FURY, in Grenada. Today warfighters know and accept the joint, single format used to coordinate close air support, but in 1984 there were multiple formats, which caused confusion. A year later, the first Joint Application of Firepower (JFIRE) handbook was published under the ALFA logo.

Even though many of the early ALFA projects incorporated input

from the US Navy and US Marine Corps, it was not until 1987 that these Services added permanent billets to ALFA and the organization truly became joint and gained a new name: the Air Land Sea Application (ALSA) Center.

Although a lot has happened in 40 years, ALSA's core essence is reminiscent of the early ALFA. The Center's leadership still rotates each year and the joint rating scheme is still in place. Joint working groups are used, still, to get experts together to tackle tough integration problems.

To get a good picture of ALSA, visualize the four Services as silos not touching each other, arranged in a square-like configuration. The space between them, the diamond in the middle, is where ALSA exists. It is a validated joint organization, not part of the joint staff, reporting directly to three Generals and one Admiral. Also, ALSA is formally integrated with the Joint Staff (J7) and US Special Operations Command doctrine efforts and maintains informal contact with numerous other commands, agencies, and centers.

Aside from the obvious tangible products like JFIRE, the Air Land Sea Bulletin, or the 35 other publications ALSA maintains, it is the intangible second and third order effects that make ALSA special. Because of ALSA, the general and flag officers responsible for their Service's doctrine meet three times a year to provide guidance on ALSA projects. During their executive sessions, they share their Service's challenges and initiatives. This helps create trust and understanding. Dr. Richard Davis from the Office of Air Force History described it in 1987:

For ten years, the TAC-TRADOC dialogue not only stimulated Air Force-Army cross fertilization of ideas, it provided a high-level forum for open and frank discussion … Hundreds of officers were associated with ALFA or its issues groups and teams … The intangible products of the dialogue, whatever its day-to-day nature, should not be discounted. The bonds of mutual faith and respect formed by Air Force and Army officers examining the same issues and learning each other's views on them fostered a positive spirit that spread far beyond the Virginia Peninsula.[6]

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ALSA looks to the future in pursuit of new challenges, yet realizes the importance of pausing and reflecting on implications of what the Center represents. It exists because the Army and Air Force Service Chiefs believed the future necessitated joint integration and cooperation—13 years before the Goldwater-Nichols Act. They planted an idea which, over time, permeated every aspect of joint and Service doctrine which feed training, and ultimately shape how the Services fight.

END NOTES

[1] Richard G. Davis, "The 31 Initiatives", Office of Air Force History, USAF, 1987
[2] General Creighton W. Abrams, USA, in a letter to General William E. DePuy, USA, October 1973
[3] General Robert J. Dixon, USAF, "TAC-TRADOC Dialog", Strategic Review, 1978 Winter
[4] General Robert J. Dixon, USAF, "TAC-TRADOC Dialog", Strategic Review, 1978 Winter
[5] General Robert J. Dixon, USAF, "TAC-TRADOC Dialog", Strategic Review, 1978 Winter
[6] Richard G. Davis, "The 31 Initiatives", Office of Air Force History, USAF, 1987

FIGHT EARLY: AN A-10 PILOT'S PERSPECTIVE

By Capt Edward Houle, USAF
(Originally published 13 May 1983; Air Land Bulletin 83-1)

Modern day tactical fighter aircraft provide the ground commander with a very valuable fire support potential. Specifically, they provide friendly ground forces with two significant advantages: flexibility and the ability to mass tremendous firepower. This great potential was recognized as far back as WWI. Air Vice Marshall J. E. Johnson, in his book *Full Circle*, writes:

"As a secondary duty, two-seaters... were permitted to bomb or strafe targets of opportunity... To give them more striking power in their new role, a few small bombs were carried on the lower mainplane, which gave the pilot a choice of weapons – machineguns or bombs – against different targets."

"...one can probably feel safe in stating that fighters will never 'conquer' anyone. However, they will certainly make huge contributions to the armies who will..."

"These low flying attacks fell into two categories. Those which gave immediate support to our troops required careful planning and coordination between the troops and the pilots if the best results were to be obtained... In I9I7, this type of air support was simply known as ground strafing; today similar missions are known as close air support operations..."

These operations have expanded significantly since WWI. During the war in Southeast Asia, friendly ground forces were supported by everything from the A-1 Skyraider to massive B-52 bomber attacks, with various levels of success. However, tactical planners and operators soon discovered that the integration of airpower into the land battle, particularly in the close air support role, was often very difficult. This article introduces some views on tactical air support for Army operations, including the role of the A-10 Thunderbolt II close support aircraft, and suggests that ground commanders consider using the A-10 early in the battle.

Mission planners have developed a variety of options based on the nature of airpower over the modern battlefield. One small group believes that tactical fighters are destined to engage in nothing but air-to-air combat. Some believe that long-range interdiction attacks against production, logistics, and transportation centers will provide the deciding blow during the next war. Still others contend that first- and second-echelon targets such as tanks, other combat vehicles, and troops actively engaged in battle should be the real priority. Certainly, these missions are not mutually exclusive and contributions in all these areas are vital. However, the key point is that, when the trumpeting is over, the ultimate outcome of any conventional conflict will depend on how well the Army ground forces fight the land battle. Captain Jock Williams put it clearly in his Fighter Forum article: "... one can probably feel safe in stating that fighters will never 'conquer' anyone. However, they will certainly make huge contributions to the armies who will..."

In any conflict the name-of-the-game is real estate, and the immediate objective for gaining ground is to destroy the enemy. Tactical fighters are unable to occupy and hold terrain. However, they can assist those who will by helping to destroy the opposing force. It is important for tactical aviators to realize that if the United States Army does not win, tactical fighters alone are unlikely to save the day. We have matured in this understanding over the years. Tactical aviation is no longer limited to aircraft performing a "secondary duty" by using a "few small bombs" to attack "targets of opportunity."

With the introduction of the A-10, the ground commander has been provided with a tactical fighter aircraft specifically designed to support him; not only as its "primary duty" but, in fact, as its only mission. Further, the A-10 pilot is, and must be, personally dedicated and specifically trained for that mission. We who fly the A-10 are keenly aware of the realities that face all of us on the modern battlefield. We do not entertain any inflated illusions concerning our particular

role in that battlefield scheme. We are a mobile and flexible supporting fire for the ground commander, pure and simple. If we cannot effectively support him by having a positive impact on the battle, then it is time for that A-10 flight to exit the area.

However, we are not artillery. A-10 capabilities and limitations in terms of range of operations, onboard ordnance, and station-keeping time must be considered whenever A-10s are requested. We offer a point-kill capability but do not saturate an area with a continuous barrage of ordnance. We continue to strive for ways to enhance our overall effectiveness. One innovative employment concept for doing this is the Joint Air Attack Team (JAAT) —A-10s and Army helicopters working together in concert to defeat the enemy. These efforts must continue. As the art of warfare becomes more sophisticated, we will be required to adjust our operation to accommodate these advances.

A major question arises concerning how to best integrate A-10s into the ground commander's battle, particularly as it pertains to the active defense. The A-10 can be of service just about anywhere on the battlefield. However, we A-10 pilots feel that we can best support the ground commander if employed early in the fight, specifically in the covering force area (CFA). If called early, we can be more responsive to the needs of the ground commander. Additionally, due to the A-10s flexibility, maneuverability, and firepower, we can work very effectively to deploy, direct, "funnel," and attrit the enemy force before he reaches the main battle area (MBA). In this capacity we can work well with the cavalry to "develop the situation." While this does apply to the armored cavalry, it is particularly applicable to the air cavalry. Many of the helicopter/A-10 mutual support concepts, which have become a foundation of the JAAT scheme, can be used in the covering force battle by the air cavalry and A-10s. In addition, if an attack helicopter unit has also been committed to the battle, classic JAAT concepts can be employed to inflict maximum destruction on the enemy before he gets to the main defensive positions.

We A-10 pilots have some selfish reasons for wanting to get into the covering force fight. The problem of integrating tactical fighters is greatly reduced here compared to the MBA where the ground commander could find himself "up to his elbows in alligators." Furthermore, the enemy will probably be more concentrated with more clearly defined armor formations, therefore target acquisition and the selection of priority targets is easier. This "pre-FEBA" situation is in contrast to the MBA where the fighting may be very intense and the armor defenses should be more distinguishable in their doctrinal locations early in the battle.

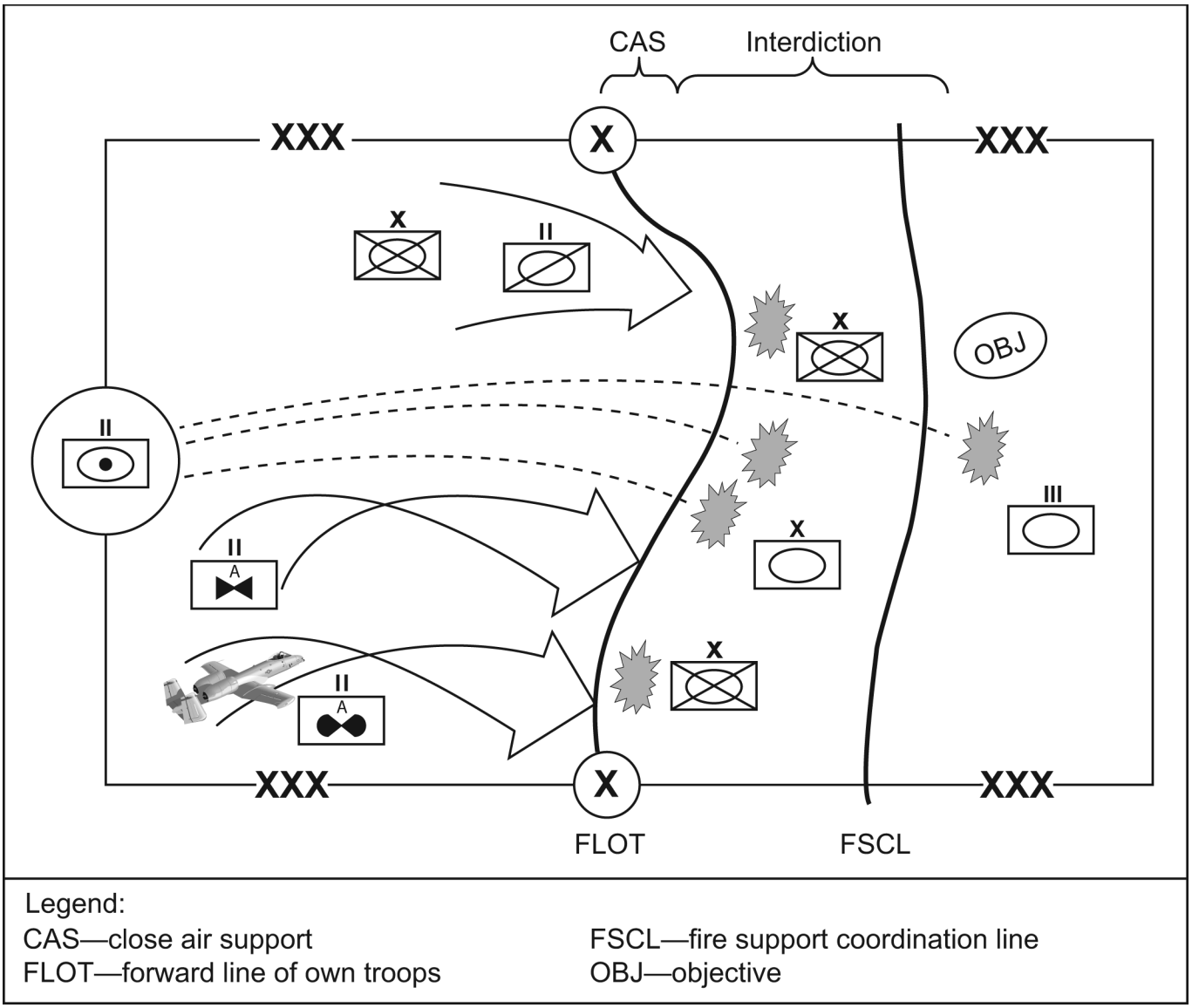
One innovative employment concept for doing this is the Joint Air Attack Team (JAAT) –A-10s and Army helicopters working together in concert to defeat the enemy.

In the CFA the A-10 pilot has the advantage of working with the cavalry. The cavalry's mission of enemy reconnaissance and identification is similar to the Air Force's forward air controllers. Additionally, the cavalry uses terminology we are familiar with, which makes coordination easier. While there will be armored cavalry units on the ground, the problem of sorting friendly and enemy forces should be simplified here. Lastly, due to the design of the active defense, the A-10 pilot in the CFA is not normally faced with a situation where the main friendly force is in immediate peril requiring him to engage in "last ditch" operations. For the A-10 pilot, these are all advantages that will make his job of supporting the ground force easier while increasing his effectiveness.

This discussion should not be construed to mean that the only place to employ A-10s is in the CFA. The ground commanders should use tactical fighter assets wherever he deems necessary, assuming that they are available. We simply feel that if he requests them early and incorporates the A-10s into the covering force battle, we can optimize the advantages that the A-10 provides. A key point to remember is that the ground commander must ask for those assets; it is his party and we cannot attend unless we are invited.

A key point to remember is that the ground commander must ask for those assets; it is his party and we cannot attend unless we are invited.

So what is the conclusion? The A-10 can aid the ground commander. The integration of the A-10 flight is easier if conducted through Army avia-



This is a depiction of air-land battle integration of A-10s (TACAIR) with helicopters attacking in the covering force area.

tion channels, either air cavalry, or attack helicopters. Additionally, the overall effectiveness of the A-10s and helicopters can be enhanced if they are employed together.

In the covering force battle, the ground commander can effectively employ the A-10 with its flexibility and firepower in concert with his cavalry units to disrupt and destroy the enemy as a cohesive fighting force, or at least adversely impact on the enemy's ability to execute his attack plan. In this way, the A-10 flight can help set up the enemy for the "death blow" dealt by the ground forces in the MBA.

The foregoing offers just one brief look at how the A-10 can support the ground commander. There are many other applications and scenarios that could be reviewed. Admittedly, this is one A-10 pilot's perspective. It is important that our ground forces, from the tank gunner to the higher command echelons, understand that in the A-10 they have in aircraft and pilot dedicated solely to the support of the ground battle. We also know that it is the ground battle that will ultimately decide who is the victor or the conquered. We who fly A-10s have an old saying: "You can shoot down all the Migs you want; however, when you return to base, if the lead tank commander of an advancing enemy motorized rifle division is eating lunch in your squadron snackbar, Jack, you just lost the war!"

We also know that it is the ground battle that will ultimately decide who is the victor or the conquered.

THE ARMY/AIR FORCE CAS DEBATE: A FAC'S PERSPECTIVE

An AH-64 Apache helicopter from the 1st Attack/Reconnaissance Battalion, 10th Combat Aviation Brigade, Task Force Tigershark, prepares to depart Forward Operating Base Fenty, Afghanistan, 11 November 2013 to conduct a security and reconnaissance mission over eastern Afghanistan. (Photo by Capt. Peter Smedberg, USA)

By Capt Mark A. Barrett, USAF
(Originally published 31 December 1987; Air Land Bulletin 87-4)

The continuing debate between the Army and Air Force over the future of Close Air Support (CAS) raises a number of questions. Can the Army provide its own CAS? If not, how can the Air Force increase the quality of CAS for the person that needs it most, the United States (US) infantryman? With the A-10 aging and the Apache coming on line, what is the future of CAS?

This article will attempt to address these questions from the view of an Air Force Liaison Officer (ALO)/ Forward Air Controller (FAC) in central Europe. As an Air Force pilot experienced in A-10s, F-16s, and F-4s; an ALO is in the unique position to see both sides of the CAS issue. He knows the capabilities of the Air Force aircraft and he works closely with the Brigade Commander, attempting to effectively integrate CAS into the fact-changing battlefield.

Close Air Support evolved to its present form through the development and fielding of the A-10 in the 1970s. With a dedicated Air Force asset for use against tanks, a marriage of sorts was made with the Army helicopter assets to form Joint Air Attack Teams (JAATs). Attack helicopters and A-10s, combining their attacks to enhance individual survivability, increased the effective firepower available to the field commander. This partnership resulted in today's CAS concept: close coordination with ground troops, survivability,

With the A-10 aging and the Apache coming on line, what is the future of CAS?

and tank-killer power. The environment of the today's high tech battlefield is extremely hostile to slow moving aircraft. Add to that the need for all-weather, day or night capabilities and a replacement for the aging A-10, the crux of the problem for future CAS is laid out.

Present-day limitations on CAS center on the A-10 and the ability of the Army to fund and field sufficient numbers of attack helicopters. The A-10, built for survivability and sheer tank-killing power (30mm gun) will spread across a large front in central Europe. With the few number of A-10s in theater (six squadrons), the quantity of CAS available from the Air Force is of primary concern. Joint Air Attack Team tactics work well, but JAAT at this time is a US unilateral concept. Our NATO allies do not provide for, nor practice JAAT. Couple that with the scarcity of airborne FACs, and the ability to close-control and hit specific targets is limited. With no airborne FAC assets in central Europe, a FAC's ability to advise his ground commander and get bombs on target can be severely limited.

Present-day limitations on CAS center on the A-10 and the ability of the Army to fund and field sufficient numbers of attack helicopters.

F-16s can not only provide all-weather weapons delivery, but are available now for the CAS role.

When a FAC must use indirect control because of his inability to get in a position to actually observe enemy positions, A-10s or any other CAS aircraft must be in the target location longer to locate, identify and then attack targets. This increased exposure severely cuts into the survivability of the CAS aircraft. The use of a JAAT orchestrated by an Aviation Commander helps this problem, but the limited number of helicopter assets and the coordination necessary to employ a JAAT is not always there.

This leads to the second problem with present day CAS: the funding and fielding of sufficient numbers of Army attack helicopters. The FY 88 budget cuts in defense spending allow for only 77 of 120 requested Apache helicopters. The money requested to develop the next line of Army attack helicopters (LHX) was cut considerably and the full-scale engineering development for LHX was delayed until 1989. This would further delay the development of the LHX, due to come on line in the mid 1990's. This span of time until the next Apache attack helicopter arrives, and the limited acquisition of Apaches, does not help support those who would want the Army to provide its own CAS. Even Brigadier General John C. Bahnsen, USA-Retired, a proponent of Army CAS, concedes that "space, personnel, and money to support this should be moved to the Army budget, certainly a touchy issue at best" (Armed Forces Journal, October 86).

Several suggestions to meet the interim shortfalls are being discussed now by the Air Force and Army. The Air Force has several programs under consideration that include procuring F-16s to fulfill the CAS role, or upgrading and producing new A-7s. F-16s can not only provide all-weather weapons delivery, but are available now for the CAS role. LTV's Aircraft Products Group was recently awarded a contract to upgrade two A-7Ds for the US Air Force to conduct feasibility flight testing. The US Air Force could conceivably upgrade as many as 335 A-7Ds for the CAS role. The F-16's multirole capabilities might make the F-16 a better choice.

Other suggestions to fulfill the CAS mission include the Navy's V-22 Osprey tilt-rotor aircraft, armed with 20mm gun, Maverick missiles and Sidewinder air-to-air missiles. Other candidates for CAS include the F-18, Harrier, and Tornados. The Army needs more money and quicker LHX development to provide its interim needs. Many more Apaches are necessary now to fill the gap until LHX comes on line. The problem of FAC maneuverability is being discussed, with the proposal to transition the A-10 to the FAC mission. The US Air Force wants to make the A-10 the OA-10 and provide airborne FACs to support the CAS mission. Used in a FAC role with the ability to still kill armor with 30mm and Maverick

missiles, the OA-10 can be used in the mid-threat environment. The A-10's loiter time and survivability in a lower threat environment make it an excellent choice for this role and it allows for a better observation position for the FAC to call in fast-movers (F-16s, ect.) on the target quite accurately.

The use of fast-movers for CAS brings up the point of Battlefield Air Interdiction (BAI) assets and the attack on enemy rear echelons. The Brigade Commander is expected to defend successfully against an attacking enemy regiment. In a prepared defense with artillery support, the Brigade Commander can do this. His main concern, however, is the follow-on forces; second and third echelons. The BAI mission is to disrupt and delay those follow-on forces to allow the ground commander time between waves to rearm, resupply, and reinforce. An effective and timely BAI campaign on these follow-on forces can greatly reduce the need for CAS missions.

But the BAI mission is costly. It involves many assets to get strike aircraft behind the forward edge of the battle area (FEBA) with strike protection (F-15s), jamming support (EF-111, EC-130), and SAM neutralization (F-4G Wild Weasels). These assets are limited and the ground commander will find himself stacked up against several regiments at a time or in rapid succession. He needs the concentrated firepower of CAS.

The firepower of CAS also faces technological limitations. The advent and fielding of Soviet reactive armor is a cause of concern for all tank-killing systems. Can tomorrow's aircraft (fixed- and rotary-wing) still be effective against a T-80 with reactive armor?

Self-defense is another question future CAS aircraft must answer: Soviet HIND helicopters are armed with air-to-air missiles and are numerous at the front. Tomorrow's CAS aircraft must be able to kill these enemy helicopters. Money and budget restraints limit the systems coming on line to answer these questions, but help is on the way. Improved Tube-launched, Optically-tracked, Wire-guided missiles (TOW) are being fielded. Low-Altitude Navigation and Targeting Infra-Red for Night (LANTIRN) system and IR Maverick missiles provide the all-weather night capability so CAS aircraft can use the relative safety of night and bad weather. Adding self-protection air-to-air missiles to Cobras, Apaches and A-10s is also being discussed. Future budget managers must take a close look at the technological problems and help field the systems necessary to combat these problems.

The issues and questions have been raised but what are the recommendations? From a FAC's point of view, several points are of prime interest. First, the limited FAC resources require survivability and maneuverability. Second, everyone should understand that the FAC wants to support his Army commander with as much CAS as possible. And third, he wants to put bombs on target with minimum risk to the aircraft. The OA-10 proposal is an excellent one that would provide a FAC with survivability and maneuverability. An airborne FAC in an OA-10 would have 30mm and Maverick missiles to help out when needed, and the capability to coordinate the JAAT and advise the maneuver units. These enhancements could greatly increase the FACs worth to his Army commander.

... everyone should understand that the FAC wants to support his Army commander with as much CAS as possible.

In lieu of the OA-10, the FAC needs to be airborne using Army helicopter support. The addition to the Tactical Air Control Party (TACP) of the enlisted FAC (EFAC) would greatly increase the FAC's ability to coordinate CAS with the commander on the ground and also control airstrikes from a helicopter or OA-10.

Can tomorrow's aircraft (fixed- and rotary-wing) still be effective against a T-80 with reactive armor?

The new CAS aircraft should be the F-16. With its speed, maneuverability, self-defense capability and LANTRIN system, the F-16 is an excellent CAS aircraft. F-16 units in place in Europe should involve themselves

in the CAS mission now and evaluate the effectiveness of JAAT. Other evaluations of JAAT with aircraft such as F-18, Harriers and Tornadoes should also be conducted to provide a basis of information for future decisions.

... better training, better coordination and better equipment are what can make CAS work.

BAI assets also need to be increased with emphasis on using the family of air-scatterable mines (FASCM). According to Lieutenant Colonel Price Bingham, UASF (AF Journal, October 1986), "The growing potential of FASCM provides NATO air forces with the opportunity to overcome current air interdiction handicaps." The ability to delay and disrupt the follow-on forces can only help the CAS battle. Army helicopter assets must also increase to better quality of CAS for the ground commander. An increased production of Apaches with added money for development of LHX is needed now.

The final conclusion is there still is a need for both fixed-wing CAS and rotor-wing CAS. Each can compliment the other but better training, better coordination and better equipment are what can make CAS work. Increasing the FAC's ability to manipulate and coordinate the air battle in conjunction with the Army commander's objectives can only increase the quality of CAS. Upgraded equipment (VHF/UHF radios), F-16s and more Apaches integrated by the FAC in concentrated firepower can provide the quality support necessary to the US infantryman when the Warsaw Pact Forces attack in mass.

END NOTES

Supporting information for this article came from the following publications:

Armed Forces Journal June 1987
Armed Forces Journal October 1987
Aviation Week & Space Technology February 9, 1987
Aviation Week & Space Technology February 2, 1987
Air Force Times September 14, 1987

PREPLANNED CAS

By Maj Larry C. Erwine, USAF
(Originally published 31 March 1989; Air Land Bulletin 89-1)

The extent to which the commander is willing to risk his forces must be on a firm foundation of available fire support.

How can you possibly consider preplanned CAS a viable management tool on a fluid battlefield when the ATO dictates a 36 to 48 hour frag cycle in which target priorities and positions are changing on an hourly basis?

lf you only consider the target coordinates as the determining factor in selecting a management tool you're right, it is not viable. But if you consider the scheme of maneuver and the use of CAS in support of that scheme, you get a whole new viewpoint. Let me give you the Army perspective on this subject. The maneuver commander must consider and evaluate the opposition forces, as well as his own. Part of that consideration is the fire support plan which includes the use of CAS assets. The extent to which the commander is willing to risk his forces must be on a firm foundation of available fire support. He limits or eliminates as many variables as he can, and then determines if his forces are sufficiently strong to accomplish the mission. The brigade, division, and corps commanders are not going to ask a maneuver commander to attempt a mission without providing support, and once that support is committed it will not be removed until it is no longer needed or the mission is complete. The point of this being: the maneuver commander requests preplanned CAS not to hit a specific target (although one is required by the request format) but to support his scheme of maneuver. His fire power is a determining factor and he cannot afford to launch an attack without it. lf the CAS he based his attack on is not forthcoming, he may very well fail in his attack with devastating results. "Let him

request immediate CAS" you say. Well, that is not a viable alternative if the foundation for his attack is based on an absolute need for CAS; as we both know immediate CAS is not always available. There is another reason for preplanned CAS that is more of a human nature problem than it is tactical; commanders don't always have time to consider or request CAS in the heat of battle (i.e., if it shows up, they'll use it; if it doesn't, they won't.)

The other age-old problem is a tendency to delay requests for CAS until the battle is in doubt; then request the entire allocation of CAS all at once. We Air Force types know that doesn't work since individual aircraft must refuel/rearm several times a day to produce the number of sorties allocated (i.e., they cannot all be flown at the same time.) By using preplanned CAS, the maneuver commander is forced to pace his attack as well as his use of TACAIR. We get a more efficient use of TACAIR as aircraft are constantly being recycled into the fight instead of sitting strip alert. Don't get me wrong; there is still a need for CAS on strip alert, but this isn't Vietnam where battles were largely a no notice affair. Today's battle requires that the proportion of CAS sitting strip alert should be minimized. The bottom line is that preplanned CAS is not only viable, it is mandatory. Provide the fire support foundation the maneuver commander needs and let him decide where it is used. We pay good money to our Air Force ground FACS to assist the maneuver commander in updating target coordinates and maximizing the effectiveness of his CAS; let them do their jobs, but insure they have CAS assets they requested!

The other age-old problem is a tendency to delay requests for CAS until the battle is in doubt; then request the entire allocation of CAS all at once.

THE EFFECTIVENESS OF F-16 CAS/BAI AT THE NATIONAL TRAINING CENTER (NTC)

By Capt Bryan T. Newkirk, USAF
(Originally published 30 September 1991; Air Land Bulletin 91-2/3)

The United States (US) Army and Air Force are becoming increasingly reliant on the F-16 for close air support (CAS) and battlefield air interdiction (BAI) missions. As a result of this, the F-16 was first used during Air Warrior rotations 90-6 and 90-7 to provide CAS/BAI for US Army Mechanized Infantry blue forces at the National Training Center (NTC) in Ft Irwin, CA. (Prior to these rotations the F-16 was only used to prove air support for red forces.) This first time use of the F-16 to support blue forces confirmed the effectiveness of the F-16 in a CAS/BAI role during Air Warrior in support of mechanized infantry and armor units against mechanized red forces employing soviet tactics at the NTC.

The A-10 has for several years proven its effectiveness in a close air support role for US Army mechanized forces at the NTC by "killing" numerous high value targets. Comparison of F-16 and A-10 kills and losses during attack and defend mission from four NTC rotations serves as a reliable tool to determine the effectiveness of the F-16. At the NTC, and for the purpose of this comparison, the value of a kill is based on the destroyed weapon system's ability to kill tanks. The T-72 and BMP have the greatest ability to kill tanks and are therefore the primary vehicles considered in determining total kills. Destruction of the T-72, which has the greatest tank killing ability, is worth two kills, and destruction of the BMP, which has a slightly lesser ability to kill tanks than the T-72, is worth one kill. Total kills are based on the average number of kills made by the A-10 and the F-16 flying in support of blue forces during four different NTC rotations. Both the A-10 and F-16 delivered a combination of CBU-87 (cluster

Pictured is an F-16CG Fighting Falcon over central Iraq, 14 May 2006 of the 332nd Air Expeditionary Wing, Balad Air Base, Iraq and from its homestation 177th Fighter Wing (ANG), Atlantic City, New Jersey. (Photo by MSgt. Lance Cheung, USAF)

bomb unit(s)) and AGM-65 maverick missiles to kill BMPs and T-72s. Losses are the average number of A-10 and F-16 losses caused by the red force air defense artillery threats. The threat remained the same for all battles and all NTC rotations analyzed.

Observation of kills and losses from blue force attack missions indicates the F-16 had almost as many kills and slightly fewer losses than the A-10. Most of the kills by F-16s were against BAI targets 2 to 5 kms behind enemy lines as opposed to close battle CAS targets along the forward line of troops (FLOT). The red force vehicles the F-16s attacked in the close battle were normally well dug-in, camouflaged, and dispersed. The high speeds at which the F-16 flew over these targets made it difficult for pilots to identify and deliver bombs on these red force vehicles. The F-16 compensated for its kills in the attack when directed against stationery or moving BAI targets 2 to 5 kms behind the FLOT. Red force targets this far behind the FLOT were usually red forces preparing to counterattack or battalion/regimental headquarter and logistic sites. In most cases, F-16 pilots easily identified all these targets because they were either vehicles massed together or vehicles moving forward to reinforce front line units. The speed and maneuverability of the F-16 permitted it to make one to two passes over these deep targets and still survive. Its survivability is indicated as one observes a slightly lower loss record compared to the A-10.

The high speeds at which the F-16 flew over these targets made it difficult for pilots to identify and deliver bombs on these red force vehicles.

Average number of F-16 kills for all blue force attack missions during NTC rotations 90-6 and 90-7 using a kill value of one for the BMP and two for the T-72:

T-72	6(x2)=12 kills
BMP	14(x1)=14 kills

26 total

Average number of A-10 kills for all blue force attack missions during NTC rotations 90-8 and 90-9 using kill values of one for BMP and two for the T-72:

T-72	10(x2)=20 kills
BMP	12(x1)=12 kills

32 total

The average number of F-16 losses for all blue force attack missions during NTC rotations 90-6 and 90-7 was 13. The average number of A-10 losses for all blue force attack missions during NTC rotations 90-8 and 90-9 was 14.

In blue force defended mission, the F-16's kills were again comparable to the A-10s. With ease, the F-16 pilot identified and killed red force BMPs and T-72 tanks moving toward blue force defensive positions in the close battle. Additionally, with its speed and maneuverability, the F-16s flew deeper into the enemy's rear area and attacked moving reserve forces, regimental artillery groups and command elements not yet in contact. Even when flying deep into the enemy's rear (2 to 5 km) the F-16 had slightly fewer losses than the A-10.

Average number of F-16 kills for all blue force defense missions during NTC rotations 90-6 and 90-7 using kill values of one for the BMP and two for the T-72:

T-72	10(x2)=20 kills
BMP	26(x1)=26 kills

46 total

Average number of A-10 kills for all blue force defense missions during NTC rotations 90-8 and 90-9 using kill values of one for the BMP and two for the T-72:

T-72	6(x2)=12 kills
BMP	6(x2)=12 kills

28 total

The average number of F-16 losses for all blue force attack missions during NTC rotation 90-6 and 90-7 was 13; while the average number of A-10 losses for all blue force attack missions during NTC rotation 90-8 and 90-9 was 15.

Overall, F-16 kills and losses sustained in both blue force attack and defend missions were similar to A-10 kills and losses. With its speed and maneuverability, the F-16 successfully attacked not only targets along the FLOT but targets 2 to 5 kms in the enemy's rear. The F-16's ability to service and kill just as many high value tanks as the A-10, regardless of the targets position along or behind the FLOT, makes it an effective CAS/BAI player. This favorable comparison of the F-16, with the A-10 in support of US mechanized and armor forces, clearly demonstrates the utility of the F-16 in its new role as a CAS/BAI fighter.

Overall, F-16 kills and losses sustained in both blue force attack and defend missions were similar to A-10 kills and losses.

CAS: WHO SHOULD DO IT?

By LTC Art Breithaupt, USA, Lt Col Dave Lockett, USAF, LCDR James Bradford, USN, and Maj Mac Coleman, USAF
(Originally published September 1993; Air Land Sea Bulletin 93-3)

Whenever the subject of air power and its contribution to military victory arises in professional conversation, two thoughts immediately come to mind. The first is Giulio Douhet's contention that air power alone, used in a strategic bombing campaign, could bring the enemy to its knees and force a surrender. The second is the story about the Russian Commander in Chief of Warsaw Pact Forces who, while drinking a brandy in captured NATO Headquarters, turned to his second in command and asked "by the way, did we win the air war"? This dream and humorous fable are the untenable extremes from which to define how best to employ air power in direct support of ground forces.

Despite advancements in technology and employment since World War I, Douhet's vision of an all-powerful air force rests in the misty future. Ground forces are still required on the battlefield and, not surprisingly, their requirements for close air support (CAS)

have grown with advances in air power and ground force maneuverability. Predictable, therefore, is one of the major questions arising in this middle ground between the two extreme schools of thought: Who should be responsible for CAS to ground forces, and who should control the concomitant assets?

Who should be responsible for CAS to ground forces, and who should control the concomitant assets?

We contend that the Army should be responsible for its own CAS and should develop and control the forces that perform the mission. Weapon system specific arguments that tend to stray from the base issue are not needed to defend this position. Rather, the case can be made from an exploration of service doctrine, examples that support that doctrine, and the weight of the two together. In this paper, we will show why the Army and not the Air Force should define CAS employment doctrine. We will review how the Air Force prioritizes its primary roles and missions (i.e., why CAS is the least preferred and the least "efficient application of aerospace forces,..."[1] and explain which roles the Air Force should concentrate on to support the commander's overall campaign plan. Next, we will explore how the Army's concept of CAS has evolved into an integral part of the Army's maneuver doctrine and is consistent with established Principles of War. Then we will examine some of the disagreements between Air Force and Army CAS doctrine caused by the evolving face of the modern battlefield and some of the pragmatic solutions to CAS application suggested in Desert Storm. Finally, we will focus on how the joint forces commander (JFC) may continue to use the apportionment process to control all aspects of air power to best accomplish his overall campaign objectives.

CAS DOCTRINE

The United States (US) Army, not the Air Force, should establish the definitive employment doctrine for CAS. The term CAS denotes that the Army's mission is the one to be supported. The Army knows best the lethal effects it requires from CAS, and it is important that the support the Army receives should meet those needs. Also, if evolving combat capabilities call for change in support requirements, then it is incumbent upon the supported service, the Army, to reevaluate existing doctrine for relevance. To abdicate these responsibilities is to risk getting less than is required. This is analogous to a rifle company in a firefight having an urgent requirement for resupply of 5.62mm cartridges and receiving 9mm rounds instead, because the logisticians determined them to be easier and safer to deliver. The Army must establish the doctrine and set the requirements. Because the Air Force has had difficulty delivering CAS according to Army maneuver doctrine, the Army has had to develop organic assets to do it. Such a strong position brings out parochial views about why the Air Force may want to keep primary control of the CAS mission. One writer said it this way:

The United States (US) Army, not the Air Force, should establish the definitive employment doctrine for CAS.

CAS has been the most consistently neglected mission of the Air Force... [However, the job will not be given back to the Army lest it creates a rival air am, and it will not be embraced because it relinquishes the central control of air power. The Air Force has the dilemma of a rival in air power or a sharing of its control, neither of which is acceptable. So the Army tries to make do with helicopters.][2]

Such a position smacks of throwing down the gauntlet to the Air Force and preparing for a bloody interservice fight that would benefit no one. However, as quoted in its own doctrine, the Air Force, as well, admits that its air power is not best applied in the CAS mission. Therefore, an examination of how the Air Force currently prioritizes its roles and missions will tell us what the Air Force does best and, perhaps, why it is not doctrinally well suited to accomplish CAS.

AIR CONTROL

According to the basic doctrine of the US Air Force: Aerospace control normally should be the first priority of aerospace forces. Aerospace control

permits aerospace and surface forces to operate more effectively and denies these advantages to the enemy. As the degree of control increases, all aerospace and surface efforts gain effectiveness. Conversely, any reduction in control threatens every mission, campaign, and type of force. Control is an enabling means rather than an end in itself.[3]

"Offensive counter aerospace actions" best accomplish this role while the "defensive counter aerospace" mission, especially "early in a campaign," may also be required.[4]

History has shown that since the US Air Force has existed as a separate service, it has accomplished what is now called aerospace control in an unsurpassed manner. In Korea, Vietnam, and the Persian Gulf, there were virtually no incidents of the enemy air forces attacking friendly surface forces or US/allied air bases after Air Force fighters arrived in force. In addition, the Air Force was able to conduct offensive counter air operations with good success and achieved air superiority over enemy territory whenever it wanted. In the case of the Gulf War, the Air Force came as close to establishing "the ideal aim," of "absolute control of the air (air supremacy)"[5] as ever in the history of US warfare. Indeed, the Air Force air superiority force has been a superb "enabling means" to the ends of "surface effectiveness" in all conflicts in which it has engaged.[6]

The force application role is the next priority for the Air Force; strategic attack, interdiction, and CAS are typical missions. It is also in this order of force application missions that the Air Force says it can best achieve "decisive contributions in gaining a war's objectives."[7]

While not straying too far from the topic of control of CAS, it is important to look at a recent example of a strategic air campaign. Because of this campaign, Air Force doctrine writers are convinced that offensive air power is best employed in a strategic role. This will also show that, by virtue of its own doctrine and current employment practices, the Air Force isn't the best suited service to perform CAS.

An F-15E Strike Eagle flies over Afghanistan 12 November 2008. The F-15E's primary role in Afghanistan is providing close-air support for ground troops. (Photo by Staff Sgt. Aaron D. Allmon II, USAF)

DESERT STORM

In Air Force Manual 1-1, the Air Force's prioritize strategic attack as the first of its typical force application missions. This stresses the contention that air power is best employed when it "… affect(s) the entire war effort rather than just a single campaign, or a single battle."[8] The manner by which the air campaign in Desert Storm evolved best illustrates this point.

Indeed, the Air Force air superiority force has been a superb "enabling means" to the ends of "surface effectiveness" in all conflicts in which it has engaged.[6]

In August 1990, Colonel John A. Warden III, the author of The Air Campaign: Planning for Combat found himself tasked by General John Loh, US Air Force Vice Chief of Staff, to develop for CENTCOM a concept of operations for an aerial campaign against Iraq. Led by Warden, the Air Staff, not the Joint Staff, quickly put together a plan for an air campaign. Instant Thunder (the name of the campaign plan) reflected Warden's thinking about the potential of an air campaign … When Warden examined the aerial balance of power between Iraq and the coalition, he saw what he termed in his book the commander's dream… [it] provides the opportunity for decisive action–action so decisive that the war can theoretically be won from the air. Warden's

A United States Air Force F-117A Nighthawk Stealth Fighter aircraft flies over Nellis Air Force Base, Nevada, during the joint service experimentation process dubbed Millennium Challenge 2002. (Photo by Staff Sgt. Aaron D. Allmon II, USAF).

plan identified five strategic centers of gravity: leadership, key production facilities, infrastructure, population, and field and military forces. Warden believed that air power could bypass the front lines and strike at the enemy's brain.[9]

This "preparation of the battlefield" was similar to interdiction, especially what the Air Force used to call battlefield air interdiction (BAI) and what is often now called close interdiction.

Based on the fact that strident air power advocates have preached that air power alone can win a war by destroying a nation's "capacity to sustain warfighting,"[10] the aims and structure of this Air Staff effort hardly seem surprising.

Even after General Schwarzkopf disagreed with the strategic thrust of the air plan and Brigadier General Buster C. Glosson (Warden's successor) "... thought Instant Thunder [to be] an overly ambitious, ruthless, application of air power, too air-force biased to be acceptable ..." the final, approved concept of air operations held "few differences ... about targeting..." from Instant Thunder. The main difference was that the new plan was "more surgical ... and less focused on Baghdad ..." Yet, in a seemingly contradictory move, a new "strategic target" was added: the elite Republican Guard army divisions deployed to southern Iraq near Kuwait.[11]

In this war, the overall US commander would reluctantly rely more heavily than any previous US commander on air power to achieve his strategic and operational objectives. Even the field army facing our ground forces had become a "strategic target" best attacked initially by air power because

In the late summer and fall, General Schwarzkopf, unable to launch a Ground campaign to liberate Kuwait, had to give incredible leeway to his air planners. As a result, whatever the doubts of Generals Schwarzkopf and Powell about the capabilities of air power applied independently, Glosson found himself directing the development of an air plan that hopefully would make 'it unnecessary to have a land campaign...' Thus, once Desert Storm began, the allies initiated two parallel air wars ... an independent strategic air effort against Iraq while the other units focused their attention on the preparation of the battlefield and (for only 4 days) direct support of the ground campaign.[12]

This "preparation of the battlefield" was similar to interdiction, especially what the Air Force used to call battlefield air interdiction (BAI) and what is often now called close interdiction. In fact, General Powell, in explaining the objective of the then week-old air campaign in southern Iraq, succinctly defined interdiction: "Our strategy to go after this army is very, very simple. First we are going to cut it off, and then we're going to kill it."[13] That indeed is what happened.

The initial assessments of the air portion of Desert Storm have had a powerful reinforcing effect on air power advocates' cherished views of the value of strategic air power. The success of the strategic and interdiction missions in Desert Storm lead General Glosson to comment: "I knew, and still believe, that air power could have accomplished the presidential objectives if we were able to wait for it to have its impact."[14] Air Force Chief of Staff Merrill A. McPeak was even more blunt in his assessment of the value of air power–most specifically aerospace control and strategic attack and interdiction: "My private conviction is that this is the

first time in history that a field army has been defeated by air power."[15]

What does this resounding success of air power signify to doctrinaires in the Air Force and Army? It means that, no matter the factors that made Desert Storm a "Dream case" for air planners, they consider themselves vindicated in writing that air power is best employed at the strategic and operational levels of a campaign. Strategic attack and interdiction have been securely established as Air Force missions of choice. It is hard to contest such success.

An AH-64 Apache helicopter from the 1st Attack Reconnaissance Battalion, 10th Combat Aviation Brigade, Task Force Tigershark, departs Forward Operating Base Fenty, Afghanistan, to conduct a security and reconnaissance mission over Nangarhar province 8 December 2013. (Photo by CAPT Peter Smedberg, USA)

CAS CONTROL

Only one pertinent question remains to our discussion of why the Air Force is ill-suited to control CAS. Why are the operational and strategic applications of Air Force air power successful and the tactical application less so?

The device that controls all Air Force assets in a theater; i.e., the air tasking order (ATO) cycle, has evolved to work best when it is systematic in its application of air power and divorced from last-minute changes due to the tactical situation. Not surprisingly, therefore, it best supports the strategic and operational level applications of air power.

Strategic attacks should be designed to be persistent and coordinated... Thus, strategic attacks should affect the entire war effort rather than just a single campaign or a single battle.[16]

The selecting and prioritizing of targets for strategic attack and, in many instances interdiction, also follow critical functional areas or systems within an enemy's country. This is consistent with basic Air Force doctrine:

"Strategic attacks are carried out against an enemy's center of gravity including command elements, war production assets, and supporting infrastructure (for example, energy, transportation, and communication assets)."[17]

Whatever the center of gravity, it is often fixed in position. As well, there is often enough opportunity in peacetime for the intelligence targeteers and operations planners to study the center of gravity as a system. In so doing, they determine its vulnerabilities, choke points, and effects on the overall war effort. The individual targets eventually selected for attack, damage assessment, and subsequent reattack are chosen because of their relationship to the system as a whole. This target selection and planning process primarily consider the conflict as a whole, on the operational level, and is ill-suited to fully support the fluid requirements of the fast changing, tactical battlefield. In fact, the more the mission moves away from strategic attack toward interdiction, BAI, and then CAS, the more difficult it is for the ATO cycle to be responsive.

... the air tasking order (ATO) cycle, has evolved to work best when it is systematic in its application of air power and divorced from last-minute changes due to the tactical situation.

We see that the Air Force has firmly established its doctrine and operational command and control to accomplish what it does best. Nonetheless, just because Air Force Manual 1-1 says CAS is an inefficient use of air power doesn't diminish its necessity to ground forces.[18] The increasing need, over the years, for rapid, flexible air support has forced the Army to develop organic air power that is more mobile and able to operate deeper into enemy territory than ever before. This air support to fluid operations works best when its employment doctrine is

The increasing need, over the years, for rapid, flexible air support has forced the Army to develop organic air power ...

consistent with the basic Army concept of combined arms and with applicable Principles of War.

HELICOPTERS AND CAS

Army doctrine emphasizes "application of several arms, such as infantry, armor, artillery and aviation"; i.e., combined arms.[19] The resulting maneuver and deep operations require air support that is an integral part of the maneuver unit, responding immediately to the ground commander's tactical needs. The Army recognized this and developed its attack helicopters for just such a purpose:

It's an airborne, armored, fighting vehicle; and, in intent and purpose, is more closely related to the tank than to the airplane.

Attack helicopter units provide a highly mobile force with precision-guided and direct firepower. They move to close with and defeat a wide array of enemy forces. The speed and mobility of Army aviation combine with natural cover to compensate for its vulnerabilities. Aviation is ideally suited for situations in which rapid reaction time and depth of attack are important or situations in which terrain restricts ground forces. They can rapidly be reused to influence the outcome over large areas of contested battle space.[20]

A combined arms team, with attack helicopters, puts a wide range of capabilities at the ground commander's disposal to achieve his tactical objectives.

An F/A-18F Super Hornet from the "Jolly Rogers" of Strike Fighter Squadron 103 breaks away from his wingman (not pictured) during a close air support mission supporting coalition forces over Afghanistan 29 April 2009. (Photo by LT Charlie Escher, USN)

The Army commander directly controls his helicopters and does not consider them a part of any air campaign.

Attack helicopters are not considered CAS systems in the Army's view and justly so. It's an airborne, armored, fighting vehicle; and, in intent and purpose, is more closely related to the tank than to the airplane.[21]

Importantly, this association of attack helicopters with ground systems differs from what Army doctrine calls CAS:

CAS missions support land operations by attacking hostile targets close to friendly forces. CAS can support offensive operations with planned or immediate attacks. All preplanned or immediate CAS missions require timely intelligence information. CAS missions require positive identification of friendly forces and positive control of aircraft.[22]

The Army's CAS definition is closely tied to the Air Force's capability to provide CAS. However, the attack helicopter, as part of combined arms teams in Desert Storm, has probably rendered outmoded both Service doctrinal definitions of CAS. A new definition should emerge from the use of air assets as part of a ground maneuver force—Maneuver Air Support, perhaps?

USMC APPROACH

While the Marine Corps still uses the term close air support, it understands the importance of organic air assets in direct support of the Marine commander's immediate objectives in his Amphibious Operations Area.

The reason the Marines maintain the air capability they do is the same reason any commander would if allowed—dedicated, flexible, far-ranging, potent, reliable, organic combat power that fights (and wants to fight) your fight—not prosecute an independent air campaign or stay aloof at the "operational level".[23]

The Marine Corps already fights as a true combined arms team with

both fixed and rotary wing. They incorporate fixed and rotary wing into the how-to-fight manual "FM 5-41, Close Air Support and Close-In Fire Support." It is second nature to Marine Corps units.

UNITY OF COMMAND

To give the Army doctrinal responsibility for its own direct air support and give it all assets associated with the mission would be consistent with, among others, the principles of Unity of Command, Simplicity, and Maneuver. The less coordination required through a different service's command and control system, the more potentially responsive and effective the ground commander's actions. As well, when the fire support and maneuver scheme have organic air assets, the commander can "plan clean, uncomplicated plans and concise orders to ensure thorough understanding."[24] Finally, air assets in a maneuver force can better "place the enemy in a position of disadvantage through the flexible application of combat power."[25]

Unity of Command and its sister concept of Unity of Effort suffered in Desert Storm CAS efforts. As alluded to earlier, the Air Force's ATO cycle requires a target nomination process from all Services to select targets for attacks. According to some Army commanders in Desert Storm, the target nomination process worked well when servicing targets well beyond the fire support coordination line (FSCL)–However, two problems existed when trying to attack targets that were an immediate threat to the division, yet somewhat beyond the FSCL. Target nomination was not responsive. It required 48 hours prior request to process. [Also] all requests [were] approved at the air component commander level. [There was] no guarantee that you would be supported.[26]

Simplicity in command and control, training and doctrine in peacetime is critical; no matter the task levied in peacetime, it usually becomes difficult to do in wartime. The friction and fog of war may quickly erode procedures and agreements carved in stone in peacetime. Although there are doctrinal differences by definition between CAS and BAI, in reality the differences became blurred by the fog of war. One arm of the Service identifies what needs to be hit; another arm decides whether or not it is going to be hit. As a result, many ground commanders simply do not plan CAS because they cannot rely on its being responsive unless it has been integrated in detail (and approved) beforehand.[27]

One arm of the Service identifies what needs to be hit; another arm decides whether or not it is going to be hit.

Many internal coordination problems exist when an Army force executes a large maneuver operation over extended ranges with differently equipped forces. To these problems, one must also add a request for air support from another Service:

CAS sorties dedicated to immediate response are not a satisfactory answer. CAS has to be integrated in the maneuver scheme from the outset just as attack helicopter assets are integrated.[28]

You cannot maneuver with forces you don't control.

United States Soldiers (not pictured) with Bravo Battery, 1st Battalion, 38th Field Artillery Regiment, 210th Fires Brigade, 2nd Infantry Division, conduct a live fire exercise with the M-270A1 multiple launch rocket system at Rocket Valley in Pocheon, Gyeonggi Province, South Korea, 7 March 2013. (Photo by Staff Sgt. Carlos R. Davis, USA)

DEPTH

The primary reason there are disagreements between the way the Air Force and the Army view the use of air power is that the battlefield has continually changed since airplanes first entered combat and adjustments in command and control have not kept up. With each technological step, the size and scope of the battlefield and the areas of the battlefield that each component can affect have expanded. Air power advocates have always looked at a large battlefield: anywhere their airplanes can fly to touch the enemy. The Army also has more or less constrained itself to the limits of its weapons systems; however, until recently, these limits were quite short. But, with its newer weapons and maneuver doctrine, the Army can now conduct deep operations to strike the enemy on the battlefield weII beyond the artillery range than previously determined the FSCL. One of the Army's current tenets of operation, depth, states:

Depth is the extension of operations in time, space, resources, and purpose... For an Army corps, depth will normally reach depths up to 300 kilometers.[29]

The FSCL's main purpose was to coordinate and ensure adequate air support to the ground forces and not to restrict the Army's battlefield responsibilities in favor of independent Air Force attacks. However, it has only been recently, in Desert Storm, that improved Army mobility and maneuver stretched the FSCL into geographic areas that traditionally have been Air Force domains. As quoted earlier, the fog of war often blurs the distinction between close interdiction and CAS targets. Improved mobility and firepower allow a maneuver force to attack second echelon enemy forces before they have closed on the battle. Where is the FSCL in this case? Which component has the primary responsibility to attack that enemy target, and who should coordinate their attacks as support? Should CAS be the term applied to air assets attacking enemy forces "close to friendly forces" when those friendly forces are an armed reconnaissance thrust 175 kilometers behind our main line of troops? If so, then must the Army go through the process of target nomination and approval with the joint force air component commander (JFACC) or should the Army be responsible for its own air support wherever it is on the battlefield and have the organic assets to provide that support? Some of these questions about coordinated battle on the "nonlinear battlefield" were answered unofficially by Army commanders' actions in Desert Storm.

... improved Army mobility and maneuver stretched the FSCL into geographic areas that traditionally have been Air Force domains.

During Desert Storm, coalition ground commanders could move FSCLs within unreasonable distances of the nearest friendly forces which induced overcontrol and thus reduced the effectiveness of air power. Their intent was to exercise control over assets employed within their area of interest. In short, they patched execution to doctrine by labelling all targets short of the FSCL as being in the proximity of friendly forces. In this case, the lack of doctrinal clarity with regard to proximity had the effect of degrading the centralized application of air power.[30]

CAS PROPOSALS

Had Army commanders been responsible for their own direct air support and had the assets to accomplish the mission, the limits of their areas of interest probably would have been more prudently drawn. The Air Force would have then been free to apply its assets to its centrally controlled air campaign. Also, the Army could have greatly lessened its reliance on the target nomination process and could have concentrated its efforts on how to better integrate information derived from battlefield intelligence and management systems (such as JSTARS) into its maneuver doctrine.

Finally, the Army and Air Force could put into doctrine what they had to do by necessity, concerning decon-

fliction of CAS and kill boxes over the battlefield. Consistent with the Army corps' doctrinal planning timeline, the ground component commander could tell the JFACC the areas where his maneuver forces would be operating in the next 3 to 5 days. Organic Army air support to these maneuver forces would then be the only air attack activity in the area.

For close interdiction in areas surrounding the army maneuver force, the Air Force could establish kill boxes wherein preplanned targets or targets of opportunity are attacked. This would support existing Air Force doctrine that states:

Complementary employment of interdiction and surface maneuver should be designed to present the enemy with a dilemma... If the enemy attempts to counter the surface maneuver, his forces will be exposed to unacceptable losses from interdiction; if the enemy employs measures to reduce such losses, his forces will not be able to counter the surface maneuver. Gaining maximum advantage from the enemy's dilemma depends on the ability of friendly surface forces to exploit the enemy's delay and disruption.[31]

Of course, if there are disagreements about who should be the predominant attacking force in an area, the JFC will make the decision. Nonetheless, that decision must take into account the compelling priority of any ground force that is already operating therein.

At first look, the Army's assumption of the CAS mission and assets may seem a step away from joint operations and a return to independent service decision making on the battlefield. On closer inspection, however, it is merely an adjustment of responsibilities that has finally come of age. Air power application over the last 80 years of warfare has evolved into a continuum of vital responsibilities. At one end is strategic attack; at the other end is CAS; interdiction, deep and close, are in between.

A joint terminal attack controller with United States Marine Corps Forces, Special Operations Command communicates with a Navy MH-60S helicopter during takeoff as part of Carrier Airwing Training conducted by the Naval Strike and Air Warfare Center aboard Naval Air Station Fallon, Nevada 7 April 2011.

At the strategic attack end, there is no question as to who is best suited to perform that mission. In addition, the Air Force has little need to closely coordinate its attacks with theater ground forces since deconfliction of forces is rarely an issue and strategic attacks usually have little effect on the immediate ground battle.

Complementary employment of interdiction and surface maneuver should be designed to present the enemy with a dilemma...

At the other end of the continuum, the ground forces commander should have complete control of both mission and assets. Little coordination with the Air Force should be necessary for the Army to perform its maneuver operations (including maneuver air assets) since deconfliction of forces should rarely be an issue.

Only in the middle areas of the continuum does close coordination become essential. The closer the interdiction comes to ground maneuver force areas, the more coordination must take place. Air Force kill boxes with their "lateral separation" from the ground force operations is an example of closely coordinated air support.

Throughout the air power continuum, the JFC's knowledge of the capabilities of air power and his apportionment authority allow him to adjust air power application as the

overall campaign phases and the immediate situation require. Assigning the ground component commander and his subordinates the responsibility and assets to perform their own CAS would make the JFC's day-to-day apportionment simpler. Both the Army and the Air Force would have clearly delineated responsibilities at either end of the spectrum. However, if the situation on the ground were to become desperate and the main body of ground forces were in danger of being destroyed by the enemy, even strategic attack and deep interdiction may be stopped to apportion assets in direct support of the Army. If air superiority over the battlefield were threatened, the JFC may indeed apportion the entire air effort to accomplishing that most critical of the Air Force's missions. It is at this operational level where joint action is most critical. Good apportionment choices lead to the desired effects of one of the Army's tenets of operations, synchronization:

Assigning the ground component commander and his subordinates the responsibility and assets to perform their own CAS would make the JFC's day-to-day apportionment simpler.

The focus of resources and activities in time and space to mass at the decisive point... Though separated in time and space, these activities must be well synchronized if their combined consequences are to be felt at the decisive time and place.[32]

CONCLUSION

In summary, control of CAS should rest with the Army; it knows best the requirement. What's more, the Air Force's own doctrine admits inefficiency in providing effective CAS. As well, recent Desert Storm success strongly supports doctrinal statements that the Air Force's primary, and most successful, roles and missions are aerospace control, strategic attack, and interdiction. Even its ATO cycle more effectively manages those roles and missions than it does CAS. Army maneuver doctrine and weapons systems have progressed to a point where the Army's organic air assets are an integral part of the maneuver force. In effect, the Army has redefined CAS and calls it air maneuver. The Army controlling its own CAS assets throughout the nonlinear and deep battlefield will allow the ground component commander to effectively use that end of the air power continuum. Finally, the JFC's knowledge of the capabilities of the entire air power continuum can orchestrate synchronized forces to ensure victory. The Army should be responsible for its own CAS and should control the assets that provide that support. It is the proper adjustment at this moment in the continuing evolution of air power.

... the Air Force's own doctrine admits inefficiency in providing effective CAS.

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KASSERINE PASS AND THE PROPER APPLICATION OF AIRPOWER

B-25s returning to base. (Courtesy US Air Force History Office)

By Maj Shawn P. Rife, USAF

(Originally published Autumn/Winter 1998-99; Joint Forces Quarterly)

In November 1942 the Allies began Operation Torch, a massive invasion of French Morocco and Algeria with over 107,000 troops—three-fourths American—designed to throw Axis forces out of North Africa. Many factors including faulty decisions, confused command relationships, supply problems, and inexperienced troops thwarted hopes for a rapid victory. Forces under Field Marshal Erwin Rommel concentrated in Tunisia and were reinforced. Allied difficulties culminated in near disaster at Kasserine Pass in February 1943. In the process, the U.S. Army learned a major lesson on the appropriate relationship between air and ground forces—a lesson that it later put to good use. Kasserine Pass is the only important battle fought by the Armed Forces—either in World War II or since that time—without enjoying air superiority.

During the winter of 1942–43, the air organization in North Africa paralleled the division of ground forces into American, British, and French contingents. Major General Carl Spaatz, nominal commander of Allied Air Force, ordered Eastern Air Command under Air Marshal William Welsh to support British 1st Army while Twelfth Air Force under Brigadier General Jimmy Doolittle, hero of the April 1942 raid on Tokyo, was directed to support all U.S. land forces. In particular, Twelfth Air Force's XII Air Support Command (ASC) was charged with cooperating with the American land forces, organized and consolidated under II Corps

Loading fighter bombers, Tripolitania. (Courtesy US Air Force)

XII ASC possessed a large proportion of available American fighters and light and medium bombers but suffered a number of operational handicaps. The rainy season turned many airfields to mud. Logistics shortfalls and inexperience among ground crew reduced sortie rates. Lack of radar coverage at the front forced XII ASC to rely upon fighter sweeps for counterair operations, which the Germans usually managed to avoid.

AERIAL UMBRELLAS

One of the most crippling obstacles for XII ASC was poor air support doctrine as embodied in Field Manual 31-35 of April 9, 1942, *Aviation in Support of Ground Forces*. Although the Army Air Force had spearheaded development of this manual, intending that it address only the conduct of close air support, in trying to reconcile different viewpoints it contained inconsistencies that opened the door in doctrinal terms to the subordination of the air force to ground force needs.

Contrary to popular belief FM 31-35 did not prescribe that air units should be either assigned or attached to ground units. This omission disappointed ground force officers who, ignoring the disastrous French experience in 1940 when the *Armée de l'Air* was fragmented into individual units under different ground commanders, objected to the centralized control of air assets. However, the manual did state that "the most important target at a particular time will usually be that target which constitutes the most serious threat to the operations of the supported ground force. The final decision as to priority of targets rests with the commander of the supported unit."[1] This excerpt would be the centerpiece of the doctrinal disagreement between air and ground officers. Despite any agreement on what FM 31-35 actually meant for command and control of airpower, General Dwight Eisenhower, who exercised nominal control over the entire Allied force, wrote in January that "[we] have a published doctrine that has not been proved faulty."[2] A headquarters memo of October 1942, stating that aircraft should not be "frittered away" on unimportant targets but instead "reserved for concentration in overwhelming attack upon important objectives," failed to resolve the problem.[3]

The effects of this doctrinal dispute were exacerbated by the lack of an effective air-ground support team. Inexperience and inadequate training on all levels, the fluid situation on the ground, and frequent command changes all contributed to the problem. The Americans neglected to glean any meaningful lessons from the British experience in the Western Desert. Neither of the architects of the successful British air operations present—Air Vice Marshal Arthur Coningham nor Air Chief Marshal Arthur Tedder—were consulted during the planning for Operation Torch. The confusion engendered by a doctrine that blurred lines of authority and encouraged conflict in setting priorities resulted in such incidents as aircraft sitting idle during a fierce German attack on French lines in late January. On one occasion, Major General Lloyd Fredendall, command-

er of the U.S. II Corps, ordered XII ASC to refuse an urgent French request for air reconnaissance support on the grounds that II Corps had no responsibilities in the affected area.

On January 31, German *Stukas* struck an American truck convoy near Maknassey, Tunisia, and inflicted numerous casualties. Although the troops were inexperienced and had little antiaircraft support, this incident convinced ground commanders of the need for aerial "umbrellas." Lieutenant General Kenneth Anderson, commander of British 1st Army (who was unfamiliar with air-ground experiences in British 8th Army in the Western Desert), wanted available aircraft employed as flying artillery and, according to his chief of staff, was uninterested "in the bombing of enemy airdromes." Similarly, Fredendall "wanted his men to see some bombs dropped on the position immediately in front of them and, if possible, some [enemy] dive bombers brought down in sight of his troops." However, U.S. medium bomber and P–40 groups had suffered heavy losses to German fighters and ground fire in air support missions, and the replacement rate for both pilots and aircraft could not keep pace. Accordingly, an exasperated General Spaatz argued that the air forces should be allowed to hit airfields, tank parks, and unarmored convoys—targets with greater long-term consequence. Spaatz told Fredendall that "if he maintained a constant 'umbrella'over one small section of the front with only shallow penetrations by bombers and fighters . . . his available force would be dissipated without any lasting effect."[4] Fredendall—who had built an elaborate bomb-proof headquarters far from the front—conceded that infantry, armor, and artillery were not the "soft points" of the Army, but he refused to agree to any ground support arrangement proposed by airmen.

The results of this impasse should have been predictable. With no offensive radar coverage, XII ASC was overburdened trying to both provide umbrellas and escort attack aircraft attempting to conduct missions behind enemy lines. On February 2, friendly forces suffered serious losses in the effort to protect a wide front. A cover mission consisting of six P–40s and four P–39s encountered twenty to thirty *Stukas* and eight to ten Bf 109s. Five P–40s were lost while only one *Stuka* was shot down. The Germans, reinforced with aircraft transferred in the retreat from Libya, asserted air superiority over Tunisia—not by greater numbers but because of ex-

P-40 after German night raid, Algeria. (Courtesy US Air Force)

ceptional aircraft (the Americans still could not match a well-handled Bf 109) and U.S. Army support doctrine that permitted the *Luftwaffe* to operate virtually with impunity.

BACK TO THE DORSAL

Taking advantage of the situation, Rommel launched an offensive designed to instill in the Americans "an inferiority complex of no mean order." The Allied front in Tunisia had gathered along a mountain range known as the Eastern Dorsal, which ran north to south parallel to the eastern shore of Tunisia.

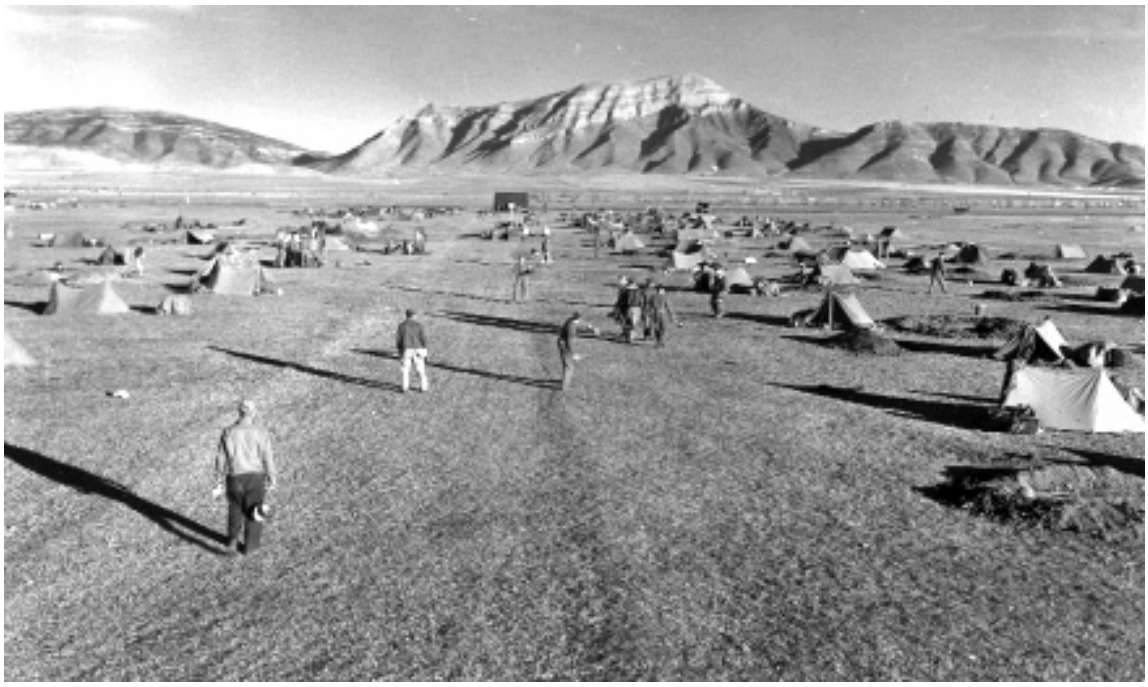
II Corps was spread out in defense of passes on the southern end of the range. Rommel's plan was to break through the American-defended passes, drive across the wide plain to the west, force through the passes of another mountain range known as the Western Dorsal, and then overrun Allied airfields and supply depots northward to the Algerian coast.

Between February 14 and 16, 1943, the Germans destroyed two battalions each of American armor, artillery, and infantry and forced II Corps off the Eastern Dorsal. XII ASC, compelled to hastily evacuate forward airfields and hampered by bad weather, was unable to intervene effectively and II Corps, harassed by the *Luftwaffe*, retreated in disorder to the Western Dorsal. Here attention turned to Kasserine Pass, a corridor to the vital Algerian crossroads town of Tebessa. Fortunately for the Allies, the Germans were plagued by command and control problems of their own, which delayed the assault on the pass by two days. The exhausted Americans used the time to regroup and receive reinforcements.

In the midst of the Kasserine crisis, the Allies completed a number of command changes previously proposed at the January 1943 Casablanca conference. The most important was the establishment (under Sir Coningham) of the Northwest African Tactical Air Force (NATAF), a sub-element of the new Northwest African Air Force under the command of Spaatz (who would thenceforth participate in Allied conferences as an equal to his ground and naval counterparts). Consistent with British doctrine, one of Coningham's first actions was suspension of air umbrella missions unless specifically authorized by NATAF. He pointed out that there were never enough aircraft to meet demand and directed a halt to tank-busting. Instead, all future missions would center on airfields, infantry concentrations, and soft-skinned vehicles. Guidance was issued that:

Ju 52 escorted by Ju 87. (Courtesy US Air Force History Office)

[Maximum air support for land operations] *can only be achieved by fighting for and obtaining a high measure of air supremacy in the theater of operations. As a result of success in this air fighting, our land forces will be enabled to operate virtually unhindered by enemy air attack and our air forces will be given increased freedom to assist in the actual battle area and in attacks against objectives in the rear. . . . The enemy must be attacked wherever he can be found, and destroyed . . . the inculcation of the offensive spirit is of paramount importance.*[5]



301st Bomb Group Headquarters, Algeria. (Courtesy US Air Force)

Eisenhower eventually embraced the new philosophy, in part because he lost confidence in Fredendall (replaced by George Patton on March 6). Nevertheless, it would take time for these new arrangements to affect the battlefield. On February 20, the Germans broke through Kasserine Pass after two days of fighting, again forcing the Americans back in disorder. Seemingly on the verge of victory, Rommel suddenly became cautious. Impressed by the abundance of American equipment and supplies and the speed with which reinforcements had been rushed into the Kasserine area, he withdrew his forces to the Eastern Dorsal to prepare for an expected Allied counteroffensive. Freed from constraints on the ground, British and U.S. aircraft punished the retreating enemy. Although the effect of these missions was not apparent to the Allied commanders at the time, Rommel would later write that his forces "were subjected to hammer-blow air attacks by the U.S. air force in the Feriana-Kasserine area, of weight and concentration hardly surpassed by those we had suffered at Alamein."[6] Several days later, Rommel was relieved of command (officially to take "sick leave") after unsuccessfully arguing with Hitler that North Africa should be abandoned. The Americans did not adopt every British idea on airpower. There was disagreement as to whether XII ASC should follow the Royal Air Force practice of directing all air support requests to the headquarters level. Americans preferred using air support parties where Army Air Force liaison teams traveled with the forward ground elements and communicated directly

Coningham with war correspondents. (Courtesy US Air Force History Office)

with aircraft assigned to close air support. (In practice, as Allied aircraft grew in number, both methods proved effective.)

Nor did disagreements cease between ground and air commanders. Patton, who at first had endorsed the schemes implemented by Coningham, angrily criticized his colleague when a German air attack killed one of his aides. Eisenhower was forced to intervene, suggesting that Patton drop the matter for "the great purpose of complete Allied teamwork." Nevertheless, complaints from ground commanders over air support continued for much of the remainder of the campaign. Spaatz concluded that they originated from the inability to obtain close air support when and where needed. His visits to the forward headquarters indicated that lack of communication rather than of aircraft was the difficulty. Some problems were the result of conflicting requests between British 1st Army and U.S. II Corps. Spaatz took action, including sacking the air liaison officer at II Corps. A return visit by Spaatz to the forward lines on May 4 revealed greater satisfaction with the air support.[7]

THE PALM SUNDAY MASSACRE

Meanwhile, the rest of Twelfth Air Force, consisting mainly of heavy and medium bombers and escorts, had not been idle in North Africa. During the height of the Kasserine crisis, Spaatz had placed most of the bombers in XII Bomber Command at Coningham's disposal. After February 24, Twelfth Air Force resumed its campaign against German supply in North Africa in force. Air attacks on shipping and harbors, along with minelaying operations, had begun in earnest in mid-January. By the end of February Allied aircraft were forcing the *Luftwaffe* to withdraw its fighters to protect ports and convoy routes. This relinquishment of air superiority had a cascading effect: Stuka losses went up even as the deteriorating ground situation increased German demands for close air support. To meet these needs, enemy bombers were forced to give up attacks on enemy ports, thus easing

Ju 87B-1 *Stukas*. (Courtesy US Air Force History Office)

Spaatz and Patton meeting in Algiers. (Courtesy US Air Force History Office)

the Allied supply situation but not achieving any significant results at the front.[8]

The sinking of Axis shipping continued, forcing the Germans to rely increasingly on aerial resupply. In the face of the growing quantitative superiority of Allied fighters, the result was disaster. On April 18, for example, four squadrons of P–40s intercepted a formation of more than a hundred Ju 52 transports escorted by mixed Axis fighters. Some 78 Axis aircraft were shot down with the loss of only seven American planes. It would be known as the "Palm Sunday Massacre."[9]

In April and early May, the *Luftwaffe* lost 177 Ju 52s supplying North Africa. Combined with the catastrophic losses at Stalingrad, the German air transport fleet was effectively destroyed. In Tunisia the Germans possessed plenty of men and guns but were soon desperately short of food, ammunition, and fuel. On April 22, the *Luftwaffe* began to withdraw from its North African bases and the Allied air forces were able to shift from attacks on airfields to ground support missions. German defenses crumbled and the campaign in North Africa ended on May 13 with the surrender of 250,000 Axis soldiers.

LESSONS

There were many reasons for the American debacle at Kasserine Pass in February 1943, but perhaps the most significant in terms of lessons for the future was poor handling—largely as a result of inferior doctrine—of the combat air assets available to the Allies prior to the battle. Most of the traditional principles of war were ignored. The treatment in FM 31-35 of airpower as flying artillery to be parceled out in support of ground formations at the point of attack squandered aircraft on costly and frequently inconsequential missions, ensured that other aircraft were underutilized in the midst of disagreements over priorities, and

left many more lucrative targets untouched. The emphasis on defensive air umbrellas meant that superior German fighters could concentrate at important points and return to the sanctuary of their airfields. The enemy was able to take the initiative both in the air and on the ground until stopped by the weight of numbers, but many Allied casualties were incurred.

In July 1943, in response to the problems with FM 31-35, the Army introduced FM 100-20. The new manual asserted: "Land power and air power are co-equal and interdependent forces. . . . Control of available air power must be centralized and command must be exercised through the air force commander if this inherent flexibility and ability to deliver a decisive blow are to be fully exploited."[10] This doctrine would be proven in Western Europe in 1944–45.

The tenets of FM 100-20 remain integral to current Air Force doctrine. AFDD 1, *Air Force Basic Doctrine*, makes "centralized control and decentralized execution" a fundamental of airpower:

Air and space power must be controlled by an airman who maintains a broad strategic and/or theater perspective in prioritizing the use of limited air and space assets to attain the objectives of all U.S. forces in any contingency across the range of operations. . . . The lesson is clear: attempts to fragment the control and planning of air and space power will ultimately cost blood and treasure by diverting effort and impact. Centralized control allows commanders to focus on those priorities that lead to victory.

As our forces shrink because of budget reductions, the need for a single commander who can efficiently prioritize the use of precious air assets in pursuit of campaign objectives should be readily apparent.

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CONTROLLING CAS WITH THE PREDATOR: IS IT FEASIBLE?

An Air Force MQ-1B Predator from the 361st Expeditionary Reconnaissance Squadron takes off from Ali Al Salem Air Base, Kuwait 18 December 2007 in support of Operation IRAQI FREEDOM. (Photo by A1C Jonathan Snyder, USAF)

By Lt Col Jonathan J. Greene, USAF
Originally published May 2006; Air Land Sea Bulletin 2006-2

"In the development of air power, one has to look ahead and not backward and figure out what is going to happen, not too much what has happened."

—Brigadier General William 'Billy' Mitchell

INTRODUCTION

With the addition of Hellfire air-to-ground missiles and advanced optical sensors, the MQ-1 Predator unmanned aircraft system (UAS) is routinely called upon to conduct close air support (CAS) operations in the skies over Iraq and Afghanistan. Its combat record over the past year underscores the Predator's value to the joint force with support for over 220 raids, 140 troops-in-contact (TIC) situations, 30 coordinated air strikes, and 25 Hellfire shots.[1] As the MQ-1's attack capability expands, the question arises as to whether a Predator crew is capable of providing terminal attack control for CAS missions when acting as a forward air controller (airborne) (FAC[A]).

This article contends that the MQ-1 system offers a limited capability to control CAS and advocates the development of applicable tactics, techniques, and procedures (TTP).

... the MQ-1 system offers a limited capability to control CAS ...

The discussion opens by examining some of the limitations commonly associated with the MQ-1 and describes their effect on the ability to control CAS in today's combat operations. Next, a description of the Predator's unique capabilities offers evidence

that its operators can perform the essential tasks required of a FAC(A). The article concludes with implications for training and doctrine.

MQ-1 LIMITATIONS: SIGNIFICANT WEAKNESSES OR OVERLOOKED STRENGTHS?

Augmenting a manned FAC(A) platform with an unmanned MQ-1 is a contentious subject because the Predator lacks some strengths normally associated with modern-day FAC(A) aircraft: unlimited visibility, high speed, and good maneuverability.[2] Nevertheless, the next few paragraphs argue that the MQ-1's limitations do not completely hinder the ability to control CAS and may actually be advantageous in present-day combat operations.

Some argue that Predator pilots and sensor operators should not control CAS because of the MQ-1's restricted visibility. With a single-axis field of view (FOV), Predator crews cannot see both the target and the attacking aircraft and, therefore, cannot conduct type 1 terminal attack control.[3] However, this apparent setback should not affect the ability to control most CAS in the current conflict because the majority of controls are either type 2 or type 3.[4] Although there are a few cases where a joint terminal attack controller (JTAC) requires type 1 control (such as a strafe attack), most of the CAS attacks in Iraq and Afghanistan use precision weapons and occur either above 10,000 feet altitude, during nighttime operations, or in remote areas devoid of a qualified terminal attack controller. In those instances, JTACs usually cannot see both the target and the delivery aircraft. As a result, a JTAC often relies on forward observers or video relays for target verification—a task especially applicable for the Predator. In short, it should be possible for Predator operators to execute types 2 and 3 control given the nature of combat operations in Southwest Asia. Even if opponents accept the above argument, they still might argue that the Predator cannot survive in a high-threat environment.

Effective CAS control requires a heightened awareness of friendly positions, accurate target identification, and effective communications.[6]

Skeptics may disapprove of the MQ-1 as a FAC(A) platform because it is a slow, lightweight aircraft susceptible to enemy air defenses. Although these limitations could affect the MQ-1 during a major conventional war, there are several reasons why a small, propeller-driven aircraft is well suited as a FAC(A) in the current conflict rather than a fast, "threat safe" fighter. First, the threat to aircraft operating at medium altitudes over Iraq and Afghanistan is practically non-existent. Second, the Predator's glider-like characteristics facilitate a constant loiter capability that is perfectly suited for counterinsurgency operations. In a war characterized by cat and mouse tactics, it is difficult to predict where and when the enemy will strike next. With its ability to stay overhead and monitor areas of known or suspected insurgent activity, the Predator can provide highly responsive support when friendly troops encounter sudden eruptions of insurgent violence.[5] Third, the Predator's turbocharged engine is quiet compared to jet-powered aircraft. With its medium altitude standoff capability and low audible signature, insurgents and terrorists are often unaware of the Predator's lurking presence. Whether supporting a planned raid, escorting a convoy, or responding to a TIC, the Predator's persistent presence enables its crews to support any sudden requests for CAS. Despite these attributes, some still question whether MQ-1 operators can maintain situational awareness (SA) over a target area simply because the aircraft is unmanned.

THREE ESSENTIAL TASKS: SITUATIONAL AWARENESS, TARGETING, AND COMMUNICATION

Effective CAS control requires a heightened awareness of friendly positions, accurate target identification, and effective communications.[6] It is traditionally accepted that manned aircraft are necessary for directing CAS because of an on-scene FAC(A)'s ability to hawk the battlefield and mitigate the hazards associated with authoriz-

ing air attacks in close proximity to friendly ground forces. However, the ability to control CAS with a remotely piloted aircraft (RPA) is becoming more plausible due to the Predator's data link architecture, optical sensors, and communications capabilities. Although the data input differs from traditional manned FAC(A) aircraft, the MQ-1 gives operators the ability to maintain SA, identify enemy targets, and provide responsive CAS—even when the crew is geographically separated from the area of operations.

A FAC(A) must have high SA in the vicinity of the target area to alleviate risk and manage CAS assets effectively. There are a couple of inherent MQ-1 capabilities that can increase a Predator crew's battlespace awareness. First, the Predator's extensive on-station time facilitates integration with supported ground units. Whereas FAC(A) fighter aircraft have a limited amount of playtime due to fuel constraints, the Predator can remain airborne in excess of 20 hours. The Predator's continual overhead presence eliminates the need for frequent handoffs of FAC(A) responsibilities—a time-consuming procedure that results in a significant loss of SA every time a new FAC(A) arrives on station. Maintaining continuous contact with ground forces promotes seamless coordination, familiarity with the target area, and the ability to exploit fleeting opportunities.[7] Second, the MQ-1 uses a networked infrastructure to help keep SA in the target area. Exchanging data between aircraft, ground units, and numerous command and control (C2) nodes, the Predator UAS can present real-time aircraft trajectories, friendly ground positions, and enemy locations onto graphics displays inside the ground control station (GCS). Thus, even though not physically located above the battlefield, Predator pilots utilize digital information to gain SA analogous to that of an on-scene FAC(A)—especially if directing CAS at night or in low-visibility conditions. With target-area SA established, the Predator FAC can then find, fix, and track the enemy. Fratricide during CAS operations is often the result of inaccurate or misidentified enemy locations.[8] The MQ-1's optical and infrared sensors allow Predator crews to precisely find, identify, and mark enemy targets during day or night conditions. With a wider FOV and greater magnification than most aircraft targeting pods, the Predator can pick out and track hard-to-find targets in diverse terrain.[9] However, finding the target is only part of the equation. Once located, Predator crews must be able to pass accurate target information to end-users.

Effective communication is another key factor when controlling CAS. There are several ways that the MQ-1 system can relay target information to aircraft, ground forces, or C2 agencies in order to provide responsive CAS. To begin with, the Predator can broadcast real-time video of the target to JTACs, CAS aircraft, or ground commanders equipped with a remote operations video enhanced receiver (ROVER) to allow verification of the target.[10] Moreover, the MQ-1's infrared target marker and laser range designator can accurately mark targets, derive accurate nonmensurated coordinates, and steer laser-guided weapons. Just as a picture is worth a thousand words, these nonverbal targeting capabilities cut down the amount of voice communications required for target identification. Instead of a time-consuming target talk-on, the Predator can significantly speed up the time between target confirmation and weapons release by transmitting target video or providing a laser spot. Finally, the MQ-1's multi-band radio, satellite communications, and secure connectivity offer an interoperable data infrastructure between aircrews, ground units, C2 nodes, and intelligence organizations. These diverse communications capabilities allow Predator operators to process air support requests, prioritize CAS missions, integrate joint fires, and provide enhanced target tracking.[11]

... the Predator's extensive on-station time facilitates integration with supported ground units.

CONCLUSION

After reviewing its basic capabilities, the Predator can act as a FAC(A) platform when conducting types 2 and 3 CAS in a lower-intensity combat environment. Its persistent loiter capability, advanced sensors, and extensive communications architecture enables operators to keep SA, identify enemy targets, and relay critical information. This, in turn, enables the Predator to respond quickly to air support requests and manage CAS assets. In addition to its airborne capabilities, the Predator UAS is easily maintained, has a small logistical footprint, and can operate in remote locations—all highly desired attributes in Iraq and Afghanistan. This does not mean to imply that the Predator should replace FAC(A) aircraft, such as the A-10 or F-16. However, it does suggest that the Predator is well suited for CAS operations in a war characterized by insurgency and terrorism. That said, Predator crews must be trained properly to understand the intricacies of integrating with ground forces, orchestrating CAS aircraft, and the dangers of clearing aircraft to expend ordnance near friendly troops. To fully exploit the MQ-1 as a FAC(A) platform, pilots and sensor operators must attend formal FAC(A) training courses, develop unit upgrade programs, and update their TTP. As simple as that sounds, there are deeper implications.

This does not mean to imply that the Predator should replace FAC(A) aircraft, such as the A-10 or F-16.

The MQ-1's FAC(A) capabilities cannot be denied. But given the stringent qualification, training, and currency requirements for today's JTACs and FAC(A)s, some may balk at the notion of investing so much to produce a Predator FAC(A) that is limited to types 2 and 3 CAS.[12] Two options could alleviate that concern. The first option focuses on using Predator crews as joint forward observers (JFOs) and tactical air coordinators (TAC[A]s).[13] Although Predator crews already coordinate strikes and work with JTACs, they could increase their proficiency and recognition within the joint community with formal joint training. A fully qualified Predator JFO or TAC(A) can become a significant force multiplier when working with JTACs to accomplish types 2 and 3 CAS (as a FAC[A] often does). A second option may be to redefine type 1 terminal attack control so that it eliminates the requirement to "visually acquire the attacking aircraft and the target for each attack." In addition to its optic sensors, the advent of advanced low-latency data links such as Link 16 and Blue Force Tracker can provide MQ-1 crews digital information that gives the ability to analyze attack geometry while acquiring the attacking aircraft, friendly ground forces, and enemy targets at the same time. Changing the definition of CAS to reflect advances in the execution of modern warfare will enable a fully trained Predator crew's capacity to control all varieties of CAS. Regardless of whether the Predator is FAC(A) capable, joint warfighters need published TTP in order to understand how the MQ-1 is currently employed.

Since its development over a decade ago, the Predator system has become the most requested air asset by US Central Command for combat operations in Southwest Asia.[14] Oddly enough however, there is hardly any mention of the Predator in joint doctrine for CAS or interdiction even though the Predator conducts CAS, performs joint interdiction, and coordinates air strikes on a routine basis. Although this article focused on the Predator UAS, other unmanned aircraft systems have similar issues pertaining to the development of updated and consistent TTP. The Air Land Sea Application Center's latest endeavor to develop multi-Service TTP for UAS is a step in the right direction for codifying procedures that can be used in the field today. Publishing proven tactics based on sound training and hard-won combat lessons will ensure that not only the MQ-1, but all UAS, have established guidelines to maximize their combat performance in support of joint operations.

END NOTES

[1] LtCol John Breeden, "57 Operations Group Predator," introductory briefing for the Predator Basic Course, 11 RS, Creech AFB, NV, 17 January 2006.

[2] Bruce R. Pirnie et al., Beyond Close Air Support: Forging a New Air-Ground Partnership (Santa Monica: RAND, 2005), 117-19.

[3] Joint doctrine lists three types of terminal attack control. Type 1 control is used when the JTAC must visually acquire the attacking aircraft and the target for each attack. Analysis of attacking aircraft geometry is required to reduce the risk of the attack affecting friendly forces. Type 2 control is used when the JTAC requires control of individual attacks and any or all of the following conditions exist: a) JTAC is unable to visually acquire the attacking aircraft at weapons release, b) JTAC is unable to visually acquire the target, c) The attacking aircraft is unable to acquire the mark/target prior to weapons release. Type 3 control is used when the JTAC requires the ability to provide clearance for multiple attacks within a single engagement subject to specific attack restrictions (e.g., time, geographic boundaries, final attack heading, specific target set, etc.) and then grant a "blanket" weapons release clearance. Joint Publication 3-09.3 JTTP for CAS, 3 September 2003 incorporating change 1, 2 September 2005, V14-18.

[4] LtCol Christopher Plamp, interviewed by author, 2 March 2006. (Notes). LtCol Plamp served as a battalion air liaison officer with Joint Special Operations Command during the early phases of Operation Enduring Freedom in 2001-02. Later, he returned to Afghanistan in 2005 flying combat missions in the A-10 as the operations officer of the 74th Fighter Squadron.

[5] James S. Corum and Wray R. Johnson, Airpower in Small Wars: Fighting Insurgents and Terrorists (Lawrence: University Press of Kansas, 2003), 7, 427-8, 430-1.

[6] JP 3-09.3, I-4.

[7] JP 3-09.3, I-7.

[8] JP 3-09.3, I-4.

[9] The F-16, F-15E, and A-10 commonly carry targeting pods and Litening pods. The following compares the FOV specifications between a targeting pod, a Litening pod, and the Predator's AN/AAS-52 sensor ball: targeting pod wide FOV = 6° x 6°, narrow FOV = 1.7° x 1.7°. Litening pod wide FOV= 18.4° x 24.1°, medium FOV = 3.5° x 3.5°, narrow FOV = 1° x 1°. Predator sensor ball: ultra wide FOV is 34º x 45º, medium FOV is 5.69º x 7.64º, ultra narrow FOV is 0.15º x 0.20º. "AN/AAQ-13 & AN/AAQ-14 LANTIRN Navigation & Targeting Pod," F-16.net, n.p., on-line, Internet, 9 March 2006, available from http://www.f-16.net/f-16_armament_article2.html. "RAFAEL Litening Targeting Pod," Defense Update: International On-Line Defense Magazine, 8 July 2002, n.p., on-line, Internet, 9 March 2006, http://eschel.co.il/dui/ directory/ litening.htm. Operator's Manual MTS-TMSD-1.0, Detecting Set, Infrared AN/AAS-52(V)1 and AN/AAS-52A(V)1, (McKinney, TX: Raytheon, 2004), 19.

[10] ROVER allows ground troops with special laptop computers to receive real-time video imagery from the Predator. "Army Change, Air Force Change," Air Force Magazine Online, March 2006, n.p., on-line, Internet, 9 March 2006, http://www.afa.org/magazine/March2006 /0306 army.asp.

[11] The Predator's communications capability will further increase in the near future with the inclusion of the KY-100 secure voice radio.

[12] Col Matt Neuenswander, USAF Element Director, CGSC, Ft Leavenworth, KS and Col Thomas Webster, Air Force Doctrine Center, Maxwell AFB, AL, interviewed by author, 14-15 March 2006. (email).

[13] A forward observer operates with front line troops and is trained to adjust ground or naval gunfire and pass back battlefield information. In the absence of a forward air controller, the observer may control close air support strikes. A TAC(A) is an officer who coordinates, from an aircraft, the actions of other aircraft engaged in air support of ground or sea forces. Note that neither one is authorized to conduct terminal attack control. JP 1-02 Department of Defense Dictionary of Military and Associated Terms, 12 April 2001 as amended through 31 August 2005, 216, 524.

[14] Adam J. Herbert, "Smashing the UAV Stovepipe," Air Force Magazine Online, February 2006, n.p., on-line, Internet, 9 March 2006, http://www.afa.org/magazine/feb2006/0206UAV.asp.

CURRENT ALSA MTTP PUBLICATIONS

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TITLE	**DATE**	**PUB #**	**DESCRIPTION/STATUS**
AIRSPACE CONTROL *Multi-Service Tactics, Techniques, and Procedures for Airspace Control* **Distribution Restricted**	09 APR 15	ATP 3-52.1 MCWP 3-25.13 NTTP 3-56.4 AFTTP 3-2.78	Description: This MTTP publication is a tactical-level document which synchronizes and integrates airspace C2 functions and serves as a single-source reference for planners and commanders at all levels. **Status: Current**
ATCARS *Multi-Service Tactics, Techniques, and Procedures for the Airborne Target Coordination and Attack Radar Systems* **Distribution Restricted**	22 OCT 12	ATP 3-55.6 MCRP 2-24A NTTP 3-55.13 AFTTP 3-2.2	Description: This publication provides procedures for employing ATCARS in dedicated support to the JFC. It describes MTTP for consideration and use during ATCARS planning and employing. **Status: Revision**
AVIATION URBAN OPERATIONS *Multi-Service Tactics, Techniques, and Procedures for Aviation Urban Operations* **Distribution Restricted**	19 APR 13	ATP 3-06.1 MCRP 3-35.3A NTTP 3-01.04 AFTTP 3-2.29	Description: This publication provides MTTP for tactical-level planning and execution of fixed- and rotary-wing aviation urban operations. **Status: Revision**
DYNAMIC TARGETING *Multi-Service Tactics, Techniques, and Procedures for Dynamic Targeting* **Distribution Restricted**	7 MAY 12	ATP 3-60.1 MCRP 3-16D NTTP 3-60.1 AFTTP 3-2.3	Description: This publication provides the JFC, operational staff, and components MTTP to coordinate, de-conflict, synchronize, and prosecute dynamic targets in any AOR. It includes lessons learned, and multinational and other government agency considerations. **Status: Revision**
IADS *Multi-Service Tactics, Techniques, and Procedures for an Integrated Air Defense System* **Distribution Restricted**	9 SEP 14	ATP 3-01.15 MCRP 3-25E NTTP 3-01.8 AFTTP 3-2.31	Description: This publication provides joint planners with a consolidated reference on Service air defense systems, processes, and structures to include integration procedures. **Status: Revision**
ISR Optimization *Multi-Service Tactics, Techniques, and Procedures for Intelligence, Surveillance, and Reconnaissance Optimization* **Distribution Restricted**	14 APR 15	ATP 3-55.3 MCRP 2-2A NTTP 2-01.3 AFTTP 3-2.88	Description: This publication provides a comprehensive resource for planning, executing, and assessing surveillance, reconnaissance, and processing, exploitation, and dissemination operations. **Status: Current**
JFIRE *Multi-Service Procedures for the Joint Application of Firepower* **Distribution Restricted**	30 NOV 12	ATP 3-09.32 MCRP 3-16.6A NTTP 3-09.2 AFTTP 3-2.6	Description: This is a pocket sized guide of procedures for calls for fire, CAS, and naval gunfire. It provides tactics for joint operations between attack helicopters and fixed-wing aircraft performing integrated battlefield operations. **Status: Revision**
JSEAD *Multi-Service Tactics, Techniques, and Procedures for the Suppression of Enemy Air Defenses in a Joint Environment* **Classified SECRET**	19 JUL 13	FM 3-01.4 MCRP 3-22.2A NTTP 3-01.42 AFTTP 3-2.28	Description: This publication contributes to Service interoperability by providing the JTF and subordinate commanders, their staffs, and SEAD operators a single reference. **Status: Revision**
KILL BOX *Multi-Service Tactics, Techniques, and Procedures for Kill Box Employment* **Distribution Restricted**	16 APR 14	ATP 3-09.34 MCRP 3-25H NTTP 3-09.2.1 AFTTP 3-2.59	Description: This MTTP publication outlines multi-Service kill box planning procedures, coordination requirements, employment methods, and C2 responsibilities. **Status: Current**
SCAR *Multi-Service Tactics, Techniques, and Procedures for Strike Coordination and Reconnaissance* **Distribution Restricted**	10 JAN 14 Change 1 incorporated 31 MAR 14	ATP 3-60.2 MCRP 3-23C NTTP 3-03.4.3 AFTTP 3-2.72	Description: This publication provides strike coordination and reconnaissance MTTP to the military Services for conducting air interdiction against targets of opportunity. **Status: Current**
SURVIVAL, EVASION, AND RECOVERY *Multi-Service Procedures for Survival, Evasion, and Recovery* **Distribution Restricted**	11 SEP 12	ATP 3-50.3 MCRP 3-02H NTTP 3-50.3 AFTTP 3-2.26	Description: This is a weather-proof, pocket-sized, quick reference guide of basic information to assist Service members in a survival situation regardless of geographic location. **Status: Current**
TAGS *Multi-Service Tactics, Techniques, and Procedures for the Theater Air-Ground System* **Distribution Restricted**	30 JUN 14	ATP 3-52.2 MCRP 3-25F NTTP 3-56.2 AFTTP 3-2.17	Description: This publication promotes Service awareness regarding the role of airpower in support of the JFC's campaign plan, increases understanding of the air-ground system, and provides planning considerations for conducting air-ground ops. **Status: Current**
UAS *Multi-Service Tactics, Techniques, and Procedures for Tactical Employment of Unmanned Aircraft Systems* **Distribution Restricted**	22 JAN 15	ATTP 3-04.64 MCRP 3-42.1A NTTP 3-55.14 AFTTP 3-2.64	Description: This publication establishes MTTP for UAS by addressing tactical and operational considerations, system capabilities, payloads, mission planning, logistics, and multi-Service execution. **Status: Current**

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TITLE	DATE	PUB #	DESCRIPTION/STATUS
ADVISING *Multi-Service Tactics, Techniques, and Procedures for Advising Foreign Forces* **Distribution Restricted**	01 NOV 14	ATP 3-07.10 MCRP 3-33.8A NTTP 3-07.5 AFTTP 3-2.76	Description: This publication discusses how advising fits into security assistance/security cooperation and provides definitions for specific terms as well as listing several examples to facilitate the advising process. **Status: Current**
AIRFIELD OPENING *Multi-Service Tactics, Techniques, and Procedures for Airfield Opening* **Distribution Restricted**	18 JUN 15	ATP 3-17.2 MCRP 3-21.1B NTTP 3-02.18 AFTTP 3-2.68	Description: This publication provides guidance for operational commanders and staffs on opening and transferring an airfield. It contains information on service capabilities, planning considerations, airfield assessment, and establishing operations in all operational environments. **Status: Current**
CF-SOF *Multi-Service Tactics, Techniques, and Procedures for Conventional Forces and Special Operations Forces Integration and Interoperability* **Distribution Restricted**	13 MAR 14	FM 6-05 MCWP 3-36.1 NTTP 3-05.19 AFTTP 3-2.73 USSOCOM Pub 3-33	Description: This is a comprehensive reference for commanders and staffs at the operational and tactical levels with standardized techniques and procedures to assist in planning and executing operations requiring synchronization between CF and SOF occupying the same area of operation. **Status: Current**
CORDON AND SEARCH *Multi-Service Tactics, Techniques, and Procedures for Cordon and Search Operations* **Distribution Restricted**	10 MAY 13	ATP 3-06.20 MCRP 3-31.4B NTTP 3-05.8 AFTTP 3-2.62	Description: This is a comprehensive reference to assist ground commanders, subordinates, and aviation personnel in planning, training, and conducting tactical cordon and search operations. **Status: Revision**
ENGAGEMENT TEAMS *Multi-Service Tactics, Techniques, and Procedures for for Conducting Engagements and Employing Engagement Teams* **Distribution Restricted**	10 MAY 13	ATP 3-07.40 MCRP 3-33.1H NTTP 3-57.5 AFTTP 3-2.84	Description: This multi-Service publication provides a framework for conducting engagements at the tactical level with the purpose of shaping and influencing operations to achieve a commander's objectives. **Status: Current**
EO *Multi-Service Tactics, Techniques, and Procedures for Unexploded Explosive Ordnance Operations* **Distribution Restricted**	20 SEP 11	ATTP 4-32.2 MCRP 3-17.2B NTTP 3-02.4.1 AFTTP 3-2.12	Description: This publication provides commanders and their units guidelines and strategies for planning and operating in an explosive ordnance environment while minimizing the impact of explosive ordnance on friendly operations. This MTTP also familiarizes users with recognition and appropriate reaction and reporting procedures for explosive ordnance. **Status: Current**
EOD *Multi-Service Tactics, Techniques, and Procedures for Explosive Ordnance Disposal in a Joint Environment* **Distribution Restricted**	18 MAY 15	ATP 4-32.16 MCRP 3-17.2C NTTP 3-02.5 AFTTP 3-2.32	Description: This publication identifies standard MTTP for planning, integrating, and executing EOD operations in a joint environment. **Status: Current**
IMSO *Multi-Service Tactics, Techniques, and Procedures for Integrated Money Shaping Operations* **Distribution Restricted**	26 APR 13	ATP 3-07.20 MCRP 3-33.1G NTTP 3-57.4 AFTTP 3-2.80	Description: IMSO describes how to integrate monetary resources with various types of aid within unified action to shape and influence outcomes throughout the range of military operations. **Status: Current**
MILITARY DECEPTION *Multi-Service Tactics, Techniques, and Procedures for Military Deception* **Classified SECRET**	13 DEC 13	MCRP 3-40.4A NTTP 3-58.1 AFTTP 3-2.66	Description: This publication facilitates integrating, synchronizing, planning, and executing MILDEC operations. It is a one-stop reference for service MILDEC planners. **Status: Current**
MILITARY DIVING OPERATIONS (MDO) *Multi-Service Service Tactics, Techniques, and Procedures for Military Diving Operations* **Distribution Restricted**	13 FEB 15	ATP 3-34.84 MCRP 3-35.9A NTTP 3-07.7 AFTTP 3-2.75 CGTTP 3-95.17	Description: This publication is a single source, descriptive reference guide to ensure effective planning and integration of multi-Service diving operations. It provides combatant command, joint force, joint task force, and operational staffs with a comprehensive resource for planning military diving operations, including considerations for each Service's capabilities, limitations, and employment. **Status: Current**
NLW *Multi-Service Service Tactics, Techniques, and Procedures for the Tactical Employment of Nonlethal Weapons* **Distribution Restricted**	13 FEB 15	ATP 3-22.40 MCWP 3-15.8 NTTP 3-07.3.2 AFTTP 3-2.45 CGTTP 3-93.2	Description: This publication provides a single-source, consolidated reference on employing nonlethal weapons. Its intent is to make commanders and subordinates aware of using nonlethal weapons in a range of scenarios including security, stability, crowd control, determination of intent, and situations requiring the use of force just short of lethal. **Status: Current**
PEACE OPS *Multi-Service Tactics, Techniques, and Procedures for Conducting Peace Operations* **Approved for Public Release**	1 NOV 14	ATP 3-07.31 MCWP 3-33.8 AFTTP 3-2.40	Description: This publication offers a basic understanding of joint and multinational PO, an overview of the nature and fundamentals of PO, and detailed discussion of selected military tasks associated with PO. **Status: Current**
TACTICAL CONVOY OPERATIONS *Multi-Service Tactics, Techniques, and Procedures for Tactical Convoy Operations* **Distribution Restricted**	18 APR 14	ATP 4-01.45 MCRP 4-11.3H NTTP 4-01.3 AFTTP 3-2.58	Description: This is a quick-reference guide for convoy commanders operating in support of units tasked with sustainment operations. It includes TTP for troop leading procedures, gun truck employment, IEDs, and battle drills. **Status: Current**

COMMAND AND CONTROL (C2) BRANCH - POC: alsaC@us.af.mil

TITLE	DATE	PUB #	DESCRIPTION/STATUS
AOMSW *Multi-Service Tactics, Techniques, and Procedures for Air Operations in Maritime Surface Warfare* **Distribution Restricted**	15 JAN 14	MCRP 3-25J NTTP 3-20.8 AFTTP 3-2.74	Description: This publication consolidates Service doctrine, TTP, and lessons-learned from current operations and exercises to maximize the effectiveness of air attacks on enemy surface vessels. **Status: Revision**
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BREVITY *Multi-Service Brevity Codes* **Distribution Restricted**	23 OCT 14	ATP 1-02.1 MCRP 3-25B NTTP 6-02.1 AFTTP 3-2.5	Description: This publication defines multi-Service brevity which standardizes air-to-air, air-to-surface, surface-to-air, and surface-to-surface brevity code words in multi-Service operations. **Status: Revision**
COMCAM *Multi-Service Tactics, Techniques, and Procedures for Joint Combat Camera Operations* **Approved for Public Release**	19 APR 13	ATP 3-55.12 MCRP 3-33.7A NTTP 3-61.2 AFTTP 3-2.41	Description: This publication fills the combat camera doctrine void and assists JTF commanders in structuring and employing combat camera assets as effective operational planning tools. **Status: Current**
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EW REPROGRAMMING *Multi-Service Tactics, Techniques, and Procedures for the Reprogramming of Electronic Warfare and Target Sensing Systems* **Distribution Restricted**	17 JUN 14	ATP 3-13.10 NTTP 3-51.2 AFTTP 3-2.7	Description: This publication describes MTTP for EW reprogramming; the EW reprogramming process, requirements, and procedures for coordinating reprogramming during joint and multi-Service operations, Services' reprogramming processes, organizational points of contact, and reprogramming databases and tools. **Status: Current**
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TACTICAL CHAT *Multi-Service Tactics, Techniques, and Procedures for Internet Tactical Chat in Support of Operations* **Distribution Restricted**	24 JAN 14	ATP 6-02.73 MCRP 3-40.2B NTTP 6-02.8 AFTTP 3-2.77	Description: This publication provides commanders and their units guidelines to facilitate coordinating and integrating tactical chat when conducting multi-Service and joint force operations. **Status: Current**
TACTICAL RADIOS *Multi-Service Communications Procedures for Tactical Radios in a Joint Environment* **Approved for Public Release**	26 NOV 13	ATP 6-02.72 MCRP 3-40.3A NTTP 6-02.2 AFTTP 3-2.18	Description: This is a consolidated reference for TTP in employing, configuring, and creating radio nets for voice and data tactical radios. **Status: Revision**
UHF SATCOM *Multi-Service Tactics, Techniques, and Procedures Package for Ultra High Frequency Military Satellite Communications* **Distribution Restricted**	9 AUG 13	ATP 6-02.90 MCRP 3-40.3G NTTP 6-02.9 AFTTP 3-2.53	Description: Operations at the JTF level have demonstrated difficulties in managing a limited number of UHF SATCOM frequencies. This publication documents TTP that will improve efficiency at the planner and user levels. **Status: Revision**

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