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**CLEARED TO ENGAGE:
IMPROVING JOINT CLOSE AIR SUPPORT EFFECTIVENESS**

by

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Abstract

The importance of close air support (CAS) has markedly increased over the last five years in Operations Enduring Freedom and Iraqi Freedom. Ground forces have increasingly relied on the effects that airpower provides and will continue to do so in the foreseeable future. This has occurred while CAS doctrine and execution has undergone radical changes. While the fundamentals of a serviceman with a radio calling in air support have remained relatively constant since World War II, the level of mission complexity has steadily increased. Digital communications, precision guided munitions, collateral damage considerations, effects based operations and a “joint” battlefield have placed increased requirements on terminal attack controllers and CAS aircrew.

Close air support has been a heavily debated topic within the services for decades. CAS doctrine and training issues have affected aircraft procurement, inter-service relationships and the application and effectiveness of airpower on the battlefield. This has produced numerous Congressional inquiries and service introspection on how to “get it right”. While much progress has been made since 2001, the services must continue to make close air support more effective. On the modern battlefield, the joint application of firepower is a reality, not a concept. It is time to “engage” the doctrinal and training challenges facing our services in order to increase the effectiveness of our aviation forces in the close air support arena.

JCAS Effectiveness

Close air support- the term evokes scenes from the movie *Platoon* where a ground commander is exhorting aircraft to “drop all remaining on my pos” to avoid being overrun by enemy forces. In the current context, CAS has evolved into much more. This seemingly simple yet complex mission has been at the heart of airpower debates for decades. CAS, it can be argued, is the most difficult mission flown by an air platform on today’s battlefield.¹ CAS requires the highest level of integration with ground forces, indirect fires, and other assets.² It also, in most cases, requires the greatest precision due to proximity to friendly forces. Finally, it has the highest potential for negative ramifications if something goes wrong, such as fratricide, civilian deaths, or ground forces being overrun.

The importance of close air support (CAS) has markedly increased over the last five years in Operations Enduring Freedom and Iraqi Freedom. Ground forces have increasingly relied on the effects that airpower provides and will continue to do so in the foreseeable future. The percentage of missions classified as CAS during Operation Desert Storm was small (six percent) and in Operation Allied Force was zero (due to no terminal attack controllers on the ground in Kosovo).³ In Operations Enduring Freedom and Iraqi Freedom this increased drastically. During Operation Anaconda, nearly all of the missions flown were close air support of ground forces in the Shah-e-Kot Valley.⁴ During the push to Baghdad in 2003, 75% of Navy and Marine air involvement consisted of CAS missions.⁵ In the CENTAF report *OIF: By the Numbers*, 79% of targets struck during the campaign fell under the Killbox Interdiction / Close Air Support (KI/CAS) category.⁶ In current operations in OIF, almost all air missions require positive control to engage ground targets.

Recent combat operations have also become increasingly joint in nature. Some examples

of this joint execution include: Air Force F-16s and Army AH-64s providing CAS for Marine battalions, Marine AH-1s supporting Army brigades, and Navy F-18s supporting special forces. This increase in joint interaction coupled with differences in each service's approach to doctrine and training have decreased the effectiveness of close air support.

This increased requirement for CAS coupled with numerous problems noted during execution prompted the Government Accounting Office (GAO) to submit a report to the Congressional House Committee on Armed Services on CAS training and equipment issues in May of 2003. Several recommendations were provided in this report, many of which have been implemented.⁷ Joint Close Air Support has also been one of the main areas of responsibility of Joint Forces Command (JFCOM) since 1999.⁸ While much attention has been focused on CAS and its intricacies, there are lingering issues that still inhibit the effectiveness of CAS. The question, therefore, is how do we overcome these remaining hurdles to increase CAS effectiveness and achieve a truly joint system?

Joint Publication 3-09.3 Joint Tactics, Techniques, and Procedures for Close Air Support lists eight conditions for effective close air support: (1) effective training and proficiency, (2) planning and integration, (3) command, control, and communications, (4) air superiority, (5) target marking and acquisition, (6) streamlined and flexible procedures, (7) appropriate ordnance, and (8) favorable weather.⁹ Current doctrine and training issues impact all of these except air superiority and favorable weather. This paper will address the question of improving CAS effectiveness by focusing on these two areas. Improvements in the services' approach to doctrine and training will enable airpower to become more effective at close air support. Service differences in the approach to doctrine and training are a key limiter in joint CAS execution. Problems in these areas will be highlighted with recommendations on how the military can

improve the current joint CAS construct and increase effectiveness on the battlefield. Doctrine will first be examined.

Close Air Support Doctrine

doctrine — *Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives.*

JP 1-02

Close air support has its roots in the early decades of the 20th century. The advent of the airplane quickly led to its application in strafing and bombing on the battlefields of Europe in World War I. Marine aviators began developing an early form of close air support in the Nicaraguan civil war in 1927.¹⁰ These early uses of air power in support of ground troops gradually matured through World War II, Korea, and Vietnam to the doctrine we have today.

Service viewpoints on CAS diverged after World War II. Many proponents in the Air Force viewed air power in broader terms based on the results of strategic bombing during the war. CAS was deemed “a maximum waste of firepower” by Air Force leadership.¹¹ The Army viewed air power in terms of supporting a ground campaign. These viewpoints have continued within the Air Force and the Army in some form to present day. The Key West Agreement of 1948 attempted to clarify service relationships while also tasking the Air Force to provide CAS to the Army.¹²

The underlying tension regarding the two services differing viewpoints on CAS affected interservice relationships and aircraft procurement throughout the 1960s. The Johnson-McConnell agreement of 1966 further delineated the Air Force’s role as the sole provider of fixed wing close air support to the Army while recognizing that Army helicopter missions included fire support.¹³ This agreement along with the subsequent 1975 letter outlining the Air Force and Army understanding of airpower use shaped the Army’s doctrinal stance on CAS that

has continued to this day.¹⁴ Army leaders first used the term “direct aerial fire support” to describe helicopter CAS and attached a definition that would not antagonize the Air Force: “fire delivered by aerial vehicles organic to ground forces against surface targets and in support of land operations.”¹⁵ This evolved into “close in fire support”¹⁶ and currently to “close combat attack”.

The United States Marine Corps views close air support through a much different lens. The Marine approach to warfare stresses combined arms fires. Aviation fires have been an integral part of the plan since the development of CAS tactics eighty years ago during campaigns in Latin America. In 1935, the Marine Corps established its aviation branch as an independent section with the mission “primarily for the support of Fleet Marine Forces in landing operations and in support of troop activities in the field.”¹⁷ Indeed, the construct of combat units with the Corps is based on the Marine Air Ground Task Force (MAGTF), where an aviation element is tasked to provide support to ground forces. This air-ground approach has endured in the Marines due to a historically lighter force. Marine units typically deploy with less artillery assets than the Army, due to their amphibious background. This has cemented the requirement for aviation fires to provide that additional support. Additionally, Marine aviation has historically been focused on the tactical level. The Marine Corps has no strategic bombers and thus has avoided the debate within the Air Force on the most efficient application of airpower. This has contributed, however, to problems with joint integration as Marine leadership is constantly at odds over the right mix of providing aircraft for a joint air campaign while maintaining the direct support capability of Marine aviation upon which the MAGTF was established.

Current CAS Doctrine

Joint Publication 3-09.3 Joint Tactics, Techniques, and Procedures for Close Air

Support is the doctrinal publication governing close air support procedures. With the JCAS publication revision in 2003, current CAS doctrine is just over three years old, and has two major conflicts from which to draw lessons learned. The publication has had one change disseminated and is currently in the process of rewrite and revision. Current doctrine has addressed many problems that were inherent with the old “positive control” and “reasonable assurance” doctrine. Many of the problems that remain, however, deal with different service approaches to CAS and understanding of the doctrine.

First are the Air Force and Army approaches to close air support. Service parochialism has been a significant force driving the differing viewpoints. The argument of whether or not close air support is an effective use of airpower is beyond the scope of this paper, but a couple of important points must be addressed. The underlying debate has driven both services’ mindset and approach to the mission.

Development of the helicopter in the Army was originally designed to provide ground commanders with an organic air platform to provide fire support.¹⁸ This fire support was deemed necessary due to a perceived lack of support from the Air Force, whose focus was on the strategic bombing mission. This development, unfortunately, also involved the use of semantics and wordsmithing to avoid an “encroachment” on the Air Force’s responsibility of providing close air support to the Army. This tit for tat over close air support has resulted in an almost superstitious avoidance of using the term within Army circles or implying that Army aviation does anything approaching the mission. In the September 1975 letter from the Army and Air Force Chiefs of Staff to the Chairman of the House Armed Services Committee, the role of the attack helicopter was defined as “integral to the Army ground maneuver unit and is an extension of organic firepower.” The two services agreed that “the attack helicopter does not perform CAS

but is intended to complement Air Force CAS capabilities.”¹⁹ Army helicopters do conduct CAS, but under the guise of calling it something else. The following is an excerpt from the Army’s FM 3-04.111 *Aviation Brigades* dated August 2003 regarding close combat attack:

For aviation units, close combat attack (CCA) is defined as a hasty or deliberate attack in support of units engaged in close combat. During CCA, armed helicopters engage enemy units with direct fires that impact near friendly forces. Targets may range from a few hundred meters to a few thousand meters. CCA is coordinated and directed by a team, platoon, or company-level ground unit using standardized CCA procedures in unit SOPs.

Effective planning, coordination, and training between ground units and armed aircraft maximize the capabilities of the combined arms team, while minimizing the risk of fratricide. The key to success for enhancing air/ground coordination and the subsequent execution of the tasks involved begins with standardizing techniques and procedures. The end state is a detailed SOP between air and ground maneuver units that addresses the CCA situation. This procedure is best suited for units that maintain a habitual combined arms relationship during training and war.

The CCA briefing follows the joint standard nine-line format with minor modifications for Army helicopters. The briefing provides clear and concise information in a logical sequence that enables aircrews to employ their weapons systems. It also provides appropriate control to reduce the risk of fratricide.

Before the armed helicopter team engages, the target must be confirmed by the aircrew and friendly unit in contact. During engagement, open communication and continuous coordination with friendly ground elements are required to ensure the desired effect. Coordination of the direct and indirect fires from all participants produces the most efficient results in the least amount of time, with the least risk to all. This coordination includes CAS and any nonlethal methods that may be employed.²⁰

Compare this excerpt with the current JCAS definition of close air support: “air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces.”²¹ CCA even goes so far as to utilize the nine-line brief format that is the accepted standard for joint CAS operations, but instead calling it the “close combat attack briefing.”²²

This approach had minimal impact on joint operations prior to OEF and OIF when Army helicopter units generally supported only Army ground units. This has affected operations, however, after 9/11. Army attack helicopters have been tasked to provide close air support for special forces and Marine ground units. Problems were encountered due to the fact that Army pilots were not well versed in CAS procedures as outlined in J-Pub 3-09.3.²³ Command and control and forward air controller procedures were adjusted when AH-64s supported Marine units based on this doctrinal issue.²⁴

On the Air Force side, there is a persistent perception that CAS is a lower priority mission or a less effective use of airpower than interdiction or strategic bombardment.²⁵ Current Air Force doctrine perpetuates this perception. AFDD 2-1.3 Counterland Doctrine states that the “benefits of CAS must be weighed against the other, potentially more effective, uses for CAS-capable assets such as air interdiction (AI) or even strategic attack.”²⁶ This approach inhibits effectiveness because units spend less time on training for CAS, a problem that will be addressed later. This viewpoint also, in some cases, gives pilots the false impression that CAS is somehow a less complex mission than other mission taskings that they routinely practice. Again, this was not as big an issue prior to OEF and OIF. A-10 aircraft provided the preponderance of close air support sorties and were generally well versed in CAS procedures. Other Air Force assets did not execute the mission as often and rarely flew in support of other services on missions involving CAS. Technology and an increase in CAS tasking have changed this drastically during OEF and OIF. Advances in weapons and sensors allow many different aircraft to perform the CAS mission. Nearly all fixed wing platforms capable of dropping a bomb have been employed in a CAS role, to include B-52 and B-1 strategic bombers.

This shift in CAS support coming from other aircraft traditionally not tasked for the

mission has resulted in aircrew supporting the mission that have little or no understanding of the ground scheme of maneuver or intricacies of an integrated fire support plan. A common approach seen in these situations is the “bomb on coordinate” mentality. Aircrew focus on target coordinates for a precision guided munitions delivery and miss the importance of an assigned final attack heading or a time on target (TOT), which to the ground unit or controller is also a critical piece of the mission. Perhaps the final attack heading was given to keep the aircraft from delivering ordnance over the top of friendly positions, or the TOT was assigned because helicopters are landing in a zone near the target one minute after bomb impact.²⁷

Doctrinal differences with regards to CAS and fire support coordination measures are also a factor. Much discussion and research has been accomplished on the fire support coordination line (FSCL) emplacement and utility. The FSCL discussion is also beyond the scope of this paper, however, it does impact the effectiveness of CAS. Nowhere in the JCAS manual does it state that CAS is tied to a specific fire support coordination measure. Specifically it says that the FSCL “does not divide an area of operations by defining a boundary between close and deep areas or create a zone for CAS.”²⁸ Misunderstanding of this basic CAS premise has put undue restrictions on aviation fires and unnecessarily required CAS control for missions that meet the definition of interdiction. Understanding of what close air support “is” and “is not” still varies within the branches.²⁹ Briefs given at the 2004 JCAS conference described SCUD hunting missions in the western desert of Iraq during OIF as CAS.³⁰ Confusion over the difference between CAS, interdiction and terminal guidance operations has also led to recommendations to call operations something else such as Battlefield Air Interdiction or Ground Aided Precision Strike.³¹

Another shortfall of current CAS doctrine is that it focuses almost exclusively on fixed

wing tactics, techniques, and procedures. A total of six pages in the current JCAS publication is allotted to cover rotary-wing CAS employment, control points, tactics, and weapons. This is due, in part, to the fact that the Army, while owning the preponderance of helicopters in the military, does not conduct close air support or Forward Air Controller (Airborne) (FAC(A)) missions. However, Marine Corps attack helicopters routinely execute these missions. During Operation Anaconda, Marine Cobra helicopters were underutilized in the FAC(A) and Strike Coordination and Reconnaissance (SCAR) role due to a lack of understanding within the JTF chain of command of their capabilities.³² This is through no fault of the Army commanders whose exposure to rotary-wing attack aviation in most cases was limited to AH-64s, which do not routinely perform those missions. Target sets during Anaconda included cave entrances and camouflaged bunkers in rugged terrain. These targets were oftentimes very difficult to acquire from fixed wing aircraft and ISR platforms operating at medium to high altitude. Low altitude platforms such as helicopters were ideal for target location in this instance. This lack of knowledge of helicopter CAS and FAC(A) capabilities leads to inefficiency in employment of rotary-wing assets.³³ This problem also affects training, as service FAC(A)s (with the exception of the Marine Corps) rarely control helicopters during FAC(A) training.³⁴

There is also still a lack of understanding of current types of CAS control and employment of FAC(A) platforms by ground commanders. Change 1 to the JCAS publication disseminated in September of 2005 attempted to clarify the definitions and procedures for the three types of CAS control.³⁵ This has helped but there are still occasions where ground commanders remain hesitant to use type 2 or 3 control due to a perceived increase in risk. Commanders have also been hesitant to employ FAC(A) platforms due to a lack of familiarity or a developed relationship with a particular unit or platform.³⁶

Technology has also had a dramatic impact on doctrine. CAS doctrine has not been able to keep up with the pace of technological advancements. The increased use of precision guided munitions (PGMs) has shifted how air attacks are executed during CAS. The increased stand off and delivery ranges of PGMs such as the Hellfire missile or Joint Direct Attack Munition (JDAM) in many cases require a ground controller to authorize a pilot to deliver the weapon without first seeing his aircraft. In some cases, the pilot may not acquire the target prior to weapons release. This requires a higher level of confidence by the ground commander in his air controller and the CAS platform.

Use of video feeds such as the Remotely Operated Video Enhanced Receiver (ROVER)³⁷ has also affected CAS doctrine. Joint Terminal Attack Controllers (JTACs) can now view Unmanned Aerial Vehicles (UAVs) and aircraft sensors on a computer screen to aid in targeting. This has both benefits and drawbacks. JTACs no longer have to see the target with their eyeballs to engage it, and in many cases, no longer have to be in the same geographic location as the target. Unfortunately, in some cases, this has led to micromanagement of tactical attacks by the chain of command.³⁸ Commanders now have a bird's eye view of an engagement and feel the need to step in vice letting the tactical operators execute the mission based on their knowledge of the situation. CAS doctrine is a step behind on this issue and has not addressed it sufficiently.

Tied to this problem is the increasing use of UAVs during CAS. UAV usage has far outpaced the ability to define doctrine and TTPs for these systems during CAS missions. The growing proliferation of these systems have many ramifications for CAS, to include: clearance of fires, UAV control authority, airspace deconfliction, and target handoff, just to list a few.

Airborne target coordinate generation/designation and digital communications are two other areas that doctrine must sufficiently address. Advanced targeting pods have provided

greatly increased capability to many platforms. In some cases, these pods are capable of obtaining extremely precise coordinates for weapons such as JDAM. Currently, there is limited data and information on the capabilities of the several different pods and the fidelity of these systems on specific platforms.³⁹ The Air Force has developed some information on its systems, but other services have not. Digital communication TTPs are also lacking in current doctrine. There are several systems in operation, each with its own requirements and procedures. The JCAS publication provides some basic procedures for digital CAS, but falls short of the detail needed.

Technological advances have in many cases increased the effectiveness and efficiency of CAS, however the requirements on terminal attack controllers have also increased. In many cases, the JTAC no longer is the person seeing the target or marking the target. He may be coordinating target acquisition through one air platform via a video feed while another aircraft marks the target via a laser designator. He may be delivering clearance to fire via a computer keystroke instead of talking on a radio. Doctrine currently lacks the detail that allows him to harness this technology most efficiently during close air support.

Many of the doctrinal problems outlined affect close air support training as well. CAS training has varied from service to service and conflict to conflict. Standardization has occurred for terminal attack controllers, but there are many areas in CAS aircrew training in need of improvement.

Close Air Support Training

In professional sports, teams do not develop a game plan during practices and then execute something completely different on game day. Teams may have to make adjustments based on their opponent, but they still execute the basic procedures of their game plan. In close

air support operations however, aircrew and controllers oftentimes improvise during execution based on a lack of practice or training in CAS procedures. All members of the military have heard the oft repeated expression: “train like you fight and fight like you train”. Nowhere is this more important than in close air support. The JCAS publication lists effective training and proficiency as one of the eight conditions for effective CAS.⁴⁰ Several initiatives have been incorporated over the last five years that attempt to standardize JCAS training. The JTAC Memorandum of Agreement (MOA) signed in 2004 standardized CAS training for terminal attack controllers at the service schoolhouses.⁴¹ The Joint Forward Air Controller (Airborne) Memorandum of Agreement (JFAC(A) MOA) does the same for services and platforms who conduct the FAC(A) mission.⁴² This training standardization has focused on the terminal controller end of CAS. CAS aircrew standardization varies between services and units, thus there are still hurdles to overcome in CAS training to make it more effective.

The first hurdle is the lack of joint training. This was one of four main areas for improvement highlighted in the GAO report on military readiness in May of 2003.⁴³ Recent initiatives such as the Joint National Training Capability by JFCOM are attempting to address this problem.⁴⁴ While this is a good first step, service specific taskings and lack of a central authority to oversee joint training continues to be a problem. Training requirements and high operational tempo often force units to forego joint training in lieu of higher priority tasking within their own service. Additionally, while JFCOM is a joint training facilitator and can provide incentives such as funding for exercises, they hold no authority to compel units to participate. Thus while units such as an Army Attack Aviation battalion may know that they will be supporting Marine infantry units in Iraq, geographic location within CONUS and limited training time may prevent them from conducting joint training prior to deployment. This is a

problem even within the Marine Corps, which generally performs air-ground integration well. There is a tendency to train with Marine air platforms vice other service aviation assets due to a familiarity between Marine air and ground units.⁴⁵ This inhibits Marine controllers and aircrew from becoming more knowledgeable and familiar with joint air assets that they might work with in theater.

Another hurdle is the lack of emphasis within some units on CAS training. Some unit commanders have focused unit training on other mission sets such as air-to-air training or interdiction despite the low probability of these missions occurring, especially in current Iraqi operations.⁴⁶ While it is understood that units must maintain proficiency and competency in all unit taskings and missions, it is unfathomable to neglect training in one of the most likely areas of employment in theater.

The fluidity of recent operations also in some ways contributes to CAS training issues. Many sorties during the Iraqi ground campaign in 2003 were rolled to provide CAS from other mission taskings once airborne. This prevented effective pre-mission planning and integration to be conducted, another listed condition for effective CAS.⁴⁷ This has perpetuated the mindset that CAS is a pickup mission that can be executed on the fly, thus less emphasis is placed on it in the training environment.

Also at the core of CAS training issues are the previously mentioned Air Force and Army mindset toward the mission. Air Force emphasis on other missions such as strategic attack or interdiction tacitly allows squadrons to focus on these areas during training instead of CAS. The Army's refusal to acknowledge that their attack aviation assets conduct CAS provides them a loophole to forego CAS training.

Other external requirements also impact training. The Army restructuring has placed greater demands on the Air Force for terminal attack controllers.⁴⁸ More controllers means more training requirements with the same amount of aviation support. The Marine Corps faces a similar situation with the stand up of the single seat FAC(A) program within fixed wing units.⁴⁹

Technology has also played a part in inhibiting CAS training. Advances in weapons and sensors have outpaced doctrine. In many cases, this forces CAS aircrew and controllers to develop ad hoc tactics, techniques, and procedures. Failure to capture TTPs at a central point and disseminate them leads to varying degrees of proficiency and different procedures from unit to unit.⁵⁰ In some cases, shortages of systems such as advanced targeting pods preclude aircrew training with them prior to deployment, which can lead to less effective use during CAS operations in theater. Technology has also impacted range training due to the fact that range regulations have not kept up with the pace of precision guided munitions and CAS control procedures. This unnecessarily restricts ground and aviation units from training effectively.

The issues outlined in doctrine and training have in most cases not prevented U. S. forces from receiving CAS. The United States is without a doubt the world leader in applying military power and in CAS this holds true as well. The implementation of the following recommendations will increase effectiveness across all services and make CAS truly joint.

Recommendations

Knowing is half the battle.

GI Joe

Discussion of an issue without a recommendation is merely a history lesson. Many of the CAS issues outlined have been highlighted in other theses, articles, and books. Recommendations in this thesis focus on the areas of doctrine and training highlighted at the

beginning and address the specific issues outlined. Each service has its own CAS shortfalls to work through. The goal is to make a more effective product for the user: the serviceman on the ground.

Doctrine

1. Acknowledgement by Air Force and Army Headquarters that Army attack aviation performs close air support.

This recommendation lies at the heart of the Air Force and Army's relationship regarding CAS. Employment of air power in combat has continued to evolve over the last three decades since the two services agreed that attack helicopters "do not perform CAS".⁵¹ To allow such a myopic view to continue forward in light of continued proof otherwise is reprehensible. Both services readily agree that the Army relies on external support for fixed-wing CAS and the preponderance of this support comes from the Air Force based on historical precedent and agreements. It should also be agreed upon that the attack helicopter is a viable platform for providing CAS as demonstrated for over 35 years by the Marine Corps and by the Army in recent operations in OEF and OIF. Acceptance of this fact in no way impacts each service's mission sets or support. Army attack aviation can still perform as maneuver elements and conduct other missions such as deep attack. This proposal merely formalizes what is already happening. This would also require a change in Army doctrine that would remove close combat attack as a mission and incorporate CAS. A method to do this is to make the JCAS publication the service CAS doctrine. This is what occurred within the Marine Corps in 2003. Prior to 2003, the Marine Corps published a *Marine Corps Warfighting Publication 3-23.1 Close Air Support*.⁵² With the publication of the updated JCAS manual in 2003, the Marine Corps rescinded MCWP 3-23.1 and now solely reference J-Pub 3-09.3 for close air support.

Acknowledgement that the Army does CAS is crucial because Army aviation is actively involved in providing CAS to Army, Marine, and Special Forces units in OIF and OEF. This requires pilots to be trained and familiar with CAS procedures. A Casey-Moseley agreement⁵³ similar to Johnson-McConnell or the 1975 agreement between General Jones, USAF, and General Weyand, USA⁵⁴ would provide the basis for this recommendation. This proposed Casey-Moseley agreement would reaffirm the Air Force commitment to providing fixed wing CAS for the Army while acknowledging that Army attack aviation has a role in CAS and FAC(A).

2. Stand up an Army FAC(A) program.

The creation of an Army rotary-wing FAC(A) program has many advantages. It would provide Army commanders with an increased capability to call in aerial fires. FAC(A)s are trained and operate under standardized procedures as outlined in the JFAC(A) Memorandum of Agreement. Having this capability could, in some cases, ease the requirement from the Army for additional JTACs as they restructure under the brigade concept. This would also aid in familiarizing Army pilots in CAS TTPs. Army attack aviation has practiced many FAC(A) functions for years under the Joint Air Attack Team (JAAT) concept.⁵⁵ In Vietnam, controllers routinely flew in Army helicopters. More recently in Iraq, terminal attack controllers were put in the right seat of OH-58 scout helicopters of the 101st Airborne Division.⁵⁶ The Marine Corps already employs its Cobra and Huey helicopters as rotary-wing FAC(A)s.

Proof of concept training has already occurred on this idea. In January of 2006, four AH-64D pilots from the 1st Battalion, 227th Attack Regiment, received FAC(A) familiarization training. The pilots attended a FAC(A) academic course taught by the Expeditionary Warfare Training Group Pacific (EWTGPAC), which provides academic instruction and field training for

all Marine forward air controllers and FAC(A) aircrew. The pilots then spent two weeks flying rotary-wing FAC(A) missions with Marine Aviation Weapons and Tactics Squadron One (MAWTS-1). MAWTS-1 provides tactical standardization and advanced level training for all Marine Corps aviators. MAWTS-1 AH-1W FAC(A) instructors flew in AH-64D aircraft and provided live fire instruction in rotary-wing FAC(A) procedures. The pilots on average executed 32 fixed wing controls of Air Force and Marine jet aircraft. The conclusions from the proof of concept affirmed that the AH-64 is an extremely viable and capable platform to conduct FAC(A) and that senior Army attack pilots were able to proficiently conduct FAC(A) following the academic and live fire training.⁵⁷ The current hurdle for the Army is determining whether it should develop a formal FAC(A) program for Army aviation. Granted, there are support issues that must be addressed before this happens, but the decision should be made on the honest analysis of the increased capability that the program would bring to Army ground forces and not traditional rice bowls of the mission within the services.

Many of the requirements are already in place to make the program happen. The Army is already a signatory of the JFAC(A) MOA, which outlines certification standards and requirements. Rotary-wing FAC(A) TTPs are already established and used by attack helicopters within the Marine Corps and could be quickly incorporated into Army aviation doctrine and publications.⁵⁸ Initial training of Army pilots could be accomplished by leveraging Marine Corps rotary-wing FAC(A) instructors at MAWTS-1 under a “train the trainer” concept, to stand up an initial cadre of Army FAC(A) instructors who could then continue the training for Army units.

3. Services place greater emphasis on the close air support mission.

Emphasis on the CAS mission has improved somewhat since 9/11, but the advent of

advanced sensors and PGMs have thrust many platforms into the CAS role in combat without a solid foundation of CAS training. Standardization initiatives have focused on the terminal attack controller and neglected aircrew and units performing CAS. This is most needed in units who have just recently begun employing their platforms in the CAS role and have traditionally been focused on other missions. Emphasis on the mission by service headquarters will drive these units to increase their focus on CAS, thereby increasing standardization and effectiveness.⁵⁹

4. Institute changes in services' doctrinal approach to fire support coordination and close air support.

This requires education and discussion of CAS employment procedures and doctrine within each service's command and control structure. The lessons learned from CAS operations supporting V Corps and I MEF during OIF show that joint air operations were more effective in I MEF's AO.⁶⁰ Personnel manning the Battlefield Coordination Detachment (BCD), Air Support Operations Center (ASOC) or Direct Air Support Center (DASC) must have a thorough understanding of what CAS "is" and "is not", and how management of fire support coordination measures and fires is critical to the effectiveness of CAS. This education and discussion must also include ground commanders at all echelons. Their understanding of CAS employment principles is a crucial piece to air delivered fires being more effective.⁶¹

5. Expand detail in CAS doctrine on helicopter tactics, techniques, and procedures (TTPs).

Expansion of Army attack aviation into the CAS and FAC(A) roles requires more detail incorporated into CAS doctrine on helicopter TTPs. Knowledge of helicopter CAS TTPs varies greatly within fixed-wing units and the services. Marine fixed-wing attack pilots generally are the most knowledgeable regarding helicopters due to a habitual relationship with rotary-wing units within the MAGTF construct. Lack of its own attack helicopter assets limits Air Force

exposure to helicopter employment during CAS, although some units are familiar with Army attack helicopter TTPs based on JAAT operations.⁶² Other units' experience however, is limited to academic classes and simulation of rotary-wing assets during FAC(A) and CAS missions.⁶³ A concerted effort must be made to incorporate more information and TTPs regarding helicopter operations into doctrine. The JCAS publication is the best source for this since it is a joint publication and has a wider dissemination than service specific manuals.

6. Promote better understanding of CAS control types and FAC(A) utilization by ground commanders.

CAS effectiveness would also benefit from a better understanding by ground commanders of the types of CAS control and utilization of FAC(A) platforms. In general, understanding of the types of CAS control and their application has improved over the last five years. Continued education and inclusion of ground commanders into the JCAS process will make this much better. One method could be a CAS "primer" course given at the services' commanders courses to better familiarize incoming commanders with JCAS and FAC(A) TTPs.⁶⁴ Greater integration of ground officers into forums such as the JCAS and JFAC(A) conferences held annually would be beneficial. Generally speaking, ground officer participation at these two conferences is usually limited. The majority of participants are from aviation or terminal controller backgrounds.

7. Incorporate latest CAS TTPs with regards to technology.

Finally, CAS doctrine must catch up to technology. There is a wealth of field expertise from CAS aircrew and controllers who have developed procedures out of necessity in combat that need to be filtered and codified into JCAS doctrine. TTPs must be expanded in detail on PGM targeting and delivery, video feed usage, and UAV integration. The Joint Unmanned

Aerial Systems Center of Excellence (JUAS COE) was stood up in 2005 at Creech AFB in Indian Springs, NV.⁶⁵ Subject matter experts at the center must stay engaged in incorporating UAV TTPs into CAS doctrine.⁶⁶ There needs to be continued discussion on the UAV role in CAS, to include possible Joint Fires Observer (JFO) and/or FAC(A) training for UAV operators. Digital communication TTPs are constantly evolving as well. Incorporation of the latest information into J-Pub 3-09.3 will ensure a baseline level of knowledge is disseminated to all controllers and aircrew vice remaining at a unit or service level.

Training

The more you sweat in peace, the less you bleed in war.

Hyman G. Rickover

Commanders and units must constantly emphasize training that routinely exercises CAS tactics, techniques, and procedures. Successful CAS training will result in safe and effective CAS employment.

MCWP 3-23.1

Training is the second part of the equation with doctrine that must be addressed in order to have an impact on JCAS effectiveness. Changes in doctrine will have little effect unless they are accompanied by improvements in training. Joint training does occur to varying degrees, but it is on an ad hoc basis, and most times is coordinated through the buddy system via phone conversation or email from squadron to squadron. For example, Marine Cobra squadrons may call an Air Force F-16 squadron and set up CAS sorties to fulfill AH-1W FAC(A) training. While this does work and accomplishes the training requirements of the squadron, it is an informal method and neither squadron gets credit for joint training. The lack of joint training issue can be approached in many ways.

1. Establish a joint training requirement.

The first recommendation is to establish a minimum joint training requirement for units.

The idea of levying an additional requirement on units would not be a popular one based on current services' operations tempo and deployment cycles, but realistically it is the only way to get units to increase joint interaction. It is critical however, to apply a common sense approach to minimize the impact on overburdened units. Geographic location is a major consideration. Ensuring units are aligned to joint training opportunities within reasonable distance to their home station would be ideal. Joint tasking requirements should also be a key factor in determining unit participation. For instance, Marine rotary-wing units that will operate in an Army area of operations should be aligned to train with Army BCTs that will be there during the same period if at all possible. This has happened in some instances. In December 2005 an Army National Guard UH-60 squadron was tasked to deploy to OIF in support of the 3rd Marine Aircraft Wing and participated in Desert Talon, a Marine Corps pre-deployment training exercise in Yuma, Arizona.⁶⁷ This joint training should also count towards service specific pre-deployment training requirements.

This recommendation requires expansion of the Integrated Training Initiative currently sponsored by the Air Force.⁶⁸ While this initiative does include joint training opportunities, it is Air Force centric, and needs increased participation from the other three services. Expansion of the initiative to include alignment of units to joint exercises based on mission requirements and deployment cycles would greatly increase the effectiveness of units conducting JCAS operations. It would also have the additional benefit of meeting the increased requirements for training of CAS controllers and FAC(A) aircrew. By aligning units based on training requirements, you get more "bang for the buck" and provide a more efficient use of aviation assets during training.

2. Increase joint interaction between the services' weapons schools.

Joint interaction at the services' weapons schools has improved in recent years, but

participation is often limited to high demand/low density platforms such as AWACS, JSTARS, or EA-6B Prowlers. Joint CAS aircraft participation is very low and should be increased. This participation should also include conferences on tactics and lessons learned. The JCAS and JFAC(A) conferences are excellent joint forums for the discussion of TTPs and lessons learned, but greater interaction at the tactical level during other forums such as the Air Force WEPTAC conference would be ideal.⁶⁹ Many of the CAS and FAC(A) lessons learned and TTPs are beneficial to platforms from all services. A joint WEPTAC conference is one method to accomplish this.

Cross training of service CAS and FAC(A) subject matter experts is also extremely beneficial. Familiarization flights with other service CAS or FAC(A) platforms provides great benefit to all involved.⁷⁰ This joint interaction gives greater understanding of the employment TTPs of different platforms, sensors, and weapons, which leads to more efficient execution the next time those two platforms or units work together.

3. Establish CAS mission essential task list and incorporate into training of all aircraft performing the mission.

Close air support must be incorporated and/or expanded in the training syllabi for units performing the mission. To aid in this, a baseline CAS mission essential task list (METL) should be established similar to ones established for JTAC and JFAC(A) training.⁷¹ This baseline level of CAS knowledge would increase the effectiveness of CAS platforms by laying the framework of what is expected from a CAS platform by a terminal controller. Much of this standardization is already in place with the JTAC and JFAC(A) MOAs. Service and platform CAS experts can take those existing standards and modify them to define the requirements based on aircraft specifics. This should include UAV controllers who provide fires in support of CAS.

Leveraging current CAS syllabi from like fixed- and rotary-wing platforms will provide information for units expanding or creating a CAS training syllabus.

4. Elevate the importance of CAS in the Air Force.

To facilitate this increase in CAS training, the Air Force must attach greater importance to the CAS mission than it has historically. In the past, issues arose over the capabilities of aircraft to perform the CAS mission. Advancements in targeting pods and precision weapons now allow many different aircraft to acquire and engage targets in support of a CAS mission. CAS training has not advanced with the capability of aircraft to perform the mission. Until CAS is regarded as a mission of at least equal importance with air interdiction or strategic attack, units will view it as a secondary mission and attach less importance to training for it.⁷² It is accepted that many platforms have missions that focus on areas beyond CAS, but some baseline of standardized training must be accomplished for each platform to perform effectively in the CAS role. As U. S. military doctrine moves toward lighter and more maneuverable ground forces, the requirement for air power to provide CAS will continue to increase. This has been borne out in OEF and OIF.

5. Incorporate CAS training into Army attack aviation training syllabi.

The Army mindset toward CAS training must also change. Acceptance of CAS as a rotary-wing aviation mission must be accompanied by an increase in training. Training syllabi for OH-58 and AH-64 pilots must incorporate CAS academics and flight training. Stand up of a FAC(A) program also requires the addition of training to the syllabus. Current training on close combat attack can be adjusted to incorporate JCAS procedures. Marine AH-1W and UH-1N syllabi can be reviewed to develop a satisfactory syllabus to sufficiently prepare Apache and Kiowa pilots in CAS and FAC(A) TTPs.⁷³

6. Create an Army Weapons School.

The next recommendation is for Army aviation to create a weapons and tactics school based on a model similar to the other three services. Currently, Army aviation standardization resides at Fort Rucker, Alabama with the Directorate of Evaluation and Standardization (DES) while the Directorate of Training and Doctrine (DOTD) is responsible for doctrinal literature and standardization of tactical operations.⁷⁴ The Army has no weapons and tactics course where pilots go to receive advanced training. These “patch wearers”⁷⁵ in the other services are considered the subject matter experts of weapons and tactics for their respective platforms. The Army has a wealth of knowledge and experience in its aviation corps. Lack of a weapons and tactics “center of excellence” prevents the Army from most effectively harnessing this pool of knowledge and institutionalizing it for the whole.

This proposed “Army Aviation Weapons and Tactics Squadron (AAWTS)” could be based on a similar construct to MAWTS-1, the Marine Corps weapons school. Army helicopter missions most closely align with the Marine Corps, so this would be a logical choice. While DES would still be responsible for unit and pilot flight standardization and training, AAWTS would assume responsibility for the tactical standardization and advanced level training of Army aviation. This would include similar functions to what MAWTS-1 performs to include: advanced level training such as FAC(A), tactical publication production, doctrine input, and test and evaluation of emerging technology or procedures.

An ideal location for AAWTS is the U. S. Army Yuma Proving Ground complex in Arizona. This location provides access to several aviation training ranges for flight instruction. YPG is also centrally located to several key institutions and bases from the other services. These include the Air Force Fighter Weapons School at Nellis AFB in Las Vegas, NV, Luke AFB in

Phoenix, AZ, the Marine Corps Air Ground Combat Center in 29 Palms, CA and MAWTS-1 in Yuma, AZ. This location would allow AAWTS to leverage the Air Force and Marine Corps weapons schools as it stood up. Additionally, the location would have a synergistic effect of increasing joint training for all services. The AAWTS instructor courses would provide the ability for Army helicopters and aircrew to participate in joint training during Marine Weapons and Tactics Instructor (WTI) courses or Air Force Fighter Weapons School courses and vice versa. This concept could be easily integrated into the current Joint National Training Capability hosted by JFCOM. The benefits of standing up AAWTS would reach beyond Army aviation and positively affect all services.

7. Address technological impact on training.

Technology can have both a positive and negative impact on training. Advancements allow aircrew and controllers to perform functions faster and better. If service personnel do not have exposure to that technology during training however, it may negate its positive effect in combat. Service procurement programs will always pursue different systems based on specific requirements, but common capabilities should be pursued by all to increase the effectiveness of joint close air support. At a minimum, this should include a video link capable of transmitting and receiving, an interoperable digital communications capability, and continued procurement of precision weapons capable of employment on a variety of target sets under varying conditions. Greater interaction among the services will also pay dividends in this arena. Familiarity with other services' weapons and sensor systems will not only increase effectiveness when employing those systems, but may be of benefit to a particular service (e.g. UAV employment with Block III AH-64Ds and the Tactical Video Link on the AH-1W).⁷⁶

Conclusions

“Close air support is good for your morale; it’s really, really bad for the enemy’s. I think the confidence of the 0311 that’s behind the mortar hole, with RPGs (bouncing) off sandbags, I think it’s good for him when a five hundred pound bomb drops in the vicinity of where he was just taking fire. It’s certainly good at the company level and it’s certainly good at the battalion level, as in, ‘we’re in control here, we can take this over at any time we want to.’ HUMINT reports were (that) it was devastating, absolutely devastating to them.”

Interview with 22 MEU FACs, 5 Jun 2004⁷⁷

The United States is without peer in the close air support arena. The nation’s foes truly fear the capabilities of our airpower more than our ground forces. The evolution of warfare since Desert Storm has thrust CAS into an increasingly prominent role on the battlefield. This increased requirement is being met by expanding joint support across the services. Marine forward air controllers are currently just as likely to have Air Force F-16s support them as Marine F/A-18s. Marine infantry battalions are receiving rotary-wing fire support from Army AH-64s in Al-Anbar province as this is written.

The majority of issues outlined in this paper are not new. A review of CAS literature over the last thirty years reveals these same issues in one form or another. The question becomes then, what is the impetus for resolving these issues? The answer lies in the conflict we face in the Global War On Terror and the realities of limited resources. Joint close air support is a reality. The services must embrace this fact to become more effective.

Approaching joint close air support from a system standpoint, we have made improvements in many areas. Technology has allowed us to utilize air assets in the CAS role in ways that twenty years ago would have been unthinkable. Terminal attack controller standardization and doctrine updates have allowed us to more effectively apply those technologies during CAS missions. The last area that has not been addressed within the system is aircrew and units performing the mission. Applying the outlined recommendations in doctrine

and training will complete that step. Ideally, a day will come in the future where the support provided to the JTAC will be uniform regardless of the platform or service providing it.

Notes

¹ LtCol James D. Reed, “Army’s Transformation Impact on Close Air Support Terminal Attack Control.” (strategy research project, U. S. Army War College, 2006), 8. Reed stated the JTACs’ mission “is highly demanding and often complex.”

² David A. Deptula and Sigfred J. Dahl, “Transforming Joint Air-Ground Operations for 21st Century Battlespace,” *Field Artillery*, July-August 2003, 4. Deptula and Dahl stated that “it takes advanced situational awareness and weapons systems knowledge to both ‘rack-and-stack’ multiple flights of attack aircraft and choose the correct delivery system and ordnance for desired effects.”

³ Rebecca Grant, “The Clash About CAS,” *Air Force Magazine Online*, January 2003, 3-4.

⁴ *Ibid*, 5.

⁵ Arthur P. Brill Jr., “Close Air Support: More improvement is needed.” *Seapower*, November, 2003, 1.

⁶ United States Central Air Forces. *Operation IRAQI FREEDOM- By The Numbers*. Prince Sultan Air Base, KSA: CENTAF, 2003, 5.

⁷ United States Government Accounting Office. Report to the Ranking Minority Members, Subcommittees on Total Force and Readiness, Committee on Armed Services, House of Representatives. *MILITARY READINESS Lingering Training and Equipment Issues Hamper Air Support of Ground Forces*. Washington, DC: GAO, 2003, 35.

⁸ Joint Fires Integration and Interoperability Team (JFIIT) website. <https://jfiit.eplin.af.mil/public/JFIITmission.php>. Oversight of JCAS operations are now the responsibility of JFIIT.

⁹ Joint Publication (JP) 3-09.3 incorporating Change 1, *Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)*, 2005, I-6.

¹⁰ Robert L. Sherrod, *History of Marine Corps Aviation in World War II*. Washington, DC: Combat Forces Press, 1952, 25.

¹¹ Douglas N. Campbell, *The Warthog and the Close Air Support Debate*. Annapolis, MD: Naval Institute Press, 2003, 39.

¹² *Ibid*, 31.

¹³ Richard I. Wolf, *The United States Air Force: Basic Documents on Roles and Missions*. Washington, DC: Office of Air Force History, 1987, 379.

¹⁴ Ibid, 403.

¹⁵ Benjamin F. Cooling, *Case Studies in the Development of Close Air Support*. Washington, DC: Office of Air Force History, 1990, 455.

¹⁶ Rhett B. Lawing, “American Armed Forces’ Service Culture Impact on Close Air Support.” *Air & Space Power Journal*, December, 2006, 4.

¹⁷ Sherrod, 32.

¹⁸ J. Kristopher Keener and Massachusetts Institute of Technology. *The Helicopter Innovation in United States Army Aviation*. Cambridge, MA: MIT Center for International Studies, 2006, 13.

¹⁹ Wolf, 403.

²⁰ United States Army. *Aviation Brigades*. FM 3-04.111. Headquarters Department of the Army. Washington, DC: 2003, Q-15.

²¹ JP 3-09.3, I-1.

²² FM 3-04.111, Q-16.

²³ LtCol Jim Adams, Marine Aviation Weapons and Tactics Squadron One operations officer, discussions with author in March 2005. LtCol Adams served as aircraft maintenance officer for HMM-266, the Aviation Combat Element for the 22nd Marine Expeditionary Unit which conducted combat operations in support of OEF in the Tarin Kowt region of Afghanistan, April-July, 2004. During these operations, AH-64s were tasked to support MEU operations on several occasions.

²⁴ Maj Michael D. Grice, “AH-64 Apache Attack Helicopters, Integrating the AH-64 into the MAGTF battlespace,” *Marine Corps Gazette*, March 2007, 27-30.

²⁵ Lawing, 3.

²⁶ Air Force Doctrine Document (AFDD) 2-1.3. *Counterland Operations*. 11 September 2006, 36.

²⁷ Author’s experience as a forward air controller, and forward air controller (airborne) instructor at MAWTS-1.

²⁸ JP 3-09.3, III-22.

²⁹ Deptula and Dahl, 4.

³⁰ The author’s experience while attending the 2004 JCAS conference.

³¹ LtCol Eric E. Theisen, and Air University Press. *Ground-Aided Precision Strike: Heavy Bomber Activity in Operation Enduring Freedom*. Maxwell AFB, AL: AWC, 2003, 1.

³² Author's experience as flight lead during Operation Anaconda with AH-1W detachment from HMM-166, the Aviation Combat Element for the 13th Marine Expeditionary Unit, TACON to 10th Mountain Division 4-26 March, 2002.

³³ Ibid.

³⁴ Author's discussions with service FAC(A) representatives during 2005 JFAC(A) conference in Yuma, AZ, December, 2005.

³⁵ JP 3-09.3, iii, iv.

³⁶ Author's discussions with service FAC(A) representatives during 2005 JFAC(A) conference in Yuma, AZ, December, 2005.

³⁷ ROVER receives camera images from nearby aircraft and UAVs and integrates them with other US positioning and targeting software to allow the JTAC to view the target from the aircraft sensor perspective.

³⁸ Excerpt from HMLA-773 lessons learned brief given at MAWTS-1, May, 2005. HMLA-773 deployed in support of Operation Enduring Freedom from October 2003 until Mar 2005.

³⁹ FM 3-04.15, NTP 3-55.14, AFTTP(I) 3-2.64, *UAS Multi-Service Tactics, Techniques, and Procedures for the Tactical Employment of Unmanned Aircraft Systems*. Langley AFB, VA: Air Land Sea Application (ALSA) Center, 2006, II-20. This publication contains Target Location Error (TLE) categories which refer to the capability of a system to generate target coordinates. The Air Force has derived accuracy estimates based on these categories for various platforms and targeting systems, i.e. F-16 with Sniper pod. These numbers are classified.

⁴⁰ JP 3-09.3, I-6.

⁴¹ JCAS AP MOA 2004-01, *Joint Terminal Attack Controller (JTAC) (Ground)*, 1 September, 2004, 2.

⁴² JCAS AP MOA 2004-02, *Joint Forward Air Controller (Airborne)*, 1 December, 2004, 2.

⁴³ United States Government Accounting Office, 2.

⁴⁴ Joint Forces Command (JFCOM) website. http://www.jfcom.mil/about/fact_jntc.htm.

⁴⁵ Author's experience while serving as AH-1W division operations officer during Weapons and Tactics Instructor (WTI) courses and Desert Talon exercises at MAWST-1, June 2004-June 2005.

⁴⁶ Author's discussions with MAWTS-1 F/A-18 instructors during Training and Readiness manual revisions, 2005.

⁴⁷ Michael D. Millen and U.S. Army Command and General Staff College. "Improving Detailed Integration in Close Air Support Planning and Execution." U.S. Army Command and General Staff College, 2004, 50.

⁴⁸ Reed, 1.

⁴⁹ Two seat F/A-18D aircraft previously were the only fixed wing aircraft in the Marine Corps inventory to practice the FAC(A) mission. In 2005, the FAC(A) mission was added to the AV-8B and F/A-18C Training and Readiness manuals, both single seat aircraft.

⁵⁰ Marine Corps Center for Lessons Learned. *Two "Quick Look" Reports: VMA and VMFA(AW) Operations*, Volume 3, Issue 3, March, 2007, 7. AV-8B pilots from VMA-513 expressed the need for more pre-deployment training on procedures for employing their targeting pods to detect potential IEDs.

⁵¹ Wolf, 403.

⁵² Marine Corps Warfighting Publication (MCWP) 3-23.1, *Close Air Support*, July, 1998.

⁵³ Named after the current Army and Air Force Chiefs of Staff respectively.

⁵⁴ Wolf, 405.

⁵⁵ FM 90-21, MCRP 3-23A, NWP 3-01.03, AFTTP(I) 3-2.10, *JAAT Multi-Service Procedures for Joint Air Attack Team Operations*. Langley AFB, VA: Air Land Sea Application (ALSA) Center, 1998. JAAT operations are defined as coordinated attacks by rotary- and fixed-wing aircraft, normally supported by artillery or naval surface fire support.

⁵⁶ Bruce Pirnie, RAND Corporation, and Project Air Force (U.S.). *Beyond Close Air Support : Forging a New Air-Ground Partnership*. Santa Monica, CA: RAND, 2005, 72.

⁵⁷ Author's opinion based on his experience as the rotary-wing FAC(A) subject matter expert for MAWTS-1 and the performance of the pilots and aircraft in the conduct of the FAC(A) mission.

⁵⁸ NTTP 3-22.3-AH1W, *Combat Aircraft Fundamentals, AH-1W (U)*. Newport, RI: Naval Warfare Library, 2005. Chapter 11 of this tactical manual covers rotary wing FAC(A) TTPs for Marine Corps AH-1W and UH-1N helicopters.

⁵⁹ None of the 2006-2007 Air Force sponsored research topics deal with close air support. The 2006-2007 list of topics from the Combined Arms Center for Army Command and General Staff

College (CGSC) and School for Advanced Military Studies (SAMS) included “Air-Ground Integration in COIN operations.”

⁶⁰ Notes from Col David Larivee, in L. Ross Roberts, and Center for Strategy and Technology. *Ground Truth: The Implications of Joint Interdependence for Air and Ground Operations*. Maxwell AFB, AL: AWC, 2006, 88.

⁶¹ Roberts, 16. Roberts notes that during the first five days of operations in OIF, the V Corps commander was hesitant to open killboxes short of the FSCL for fixed-wing interdiction even though there were no friendly forces in the killboxes.

⁶² FM 90-21, MCRP 3-23A, NWP 3-01.03, AFTTP(I) 3-2.10, I-2.

⁶³ Discussions during Joint FAC(A) Training and Standardization Board, held during 2005 JFAC(A) conference in Yuma, AZ, December, 2005.

⁶⁴ Each service has a program designed to provide information to prospective commanders. The Marine Corps Commanders’ Program provides information and a course of instruction to enhance their performance as commanders.
<http://www.mcu.usmc.mil/mcu/catalog/21cdrprog.pdf>.

⁶⁵ Briefing. National Defense Industrial Association (NDIA). Subject: Joint Unmanned Aircraft System Center of Excellence (JUAS COE), 26 October, 2006.

⁶⁶ Ibid, slide 13. UAVs in JCAS operations is currently issue #9 for the JCAS Executive Steering Committee (JCAS ESC).

⁶⁷ Virginia National Guard website.
<http://www.virginiaguard.com/news/jan2006/224thinyuma.html>.

⁶⁸ Integrated Training Initiative website. https://totn.acc.af.mil/xoya/int_training_conf. The Integrated Training Initiative (ITI) is a single source forum to combine tactics, training, and scheduling from all weapons systems from all joint and multinational services. The ITI consists of both this scheduling website and a quarterly conference that is held the third week in the 2nd month of the quarter. The Integrated Training Conference (ITC) accomplishes training efficiency through a "bottom-up" strategy of comparing/linking schedules from all fighter, bomber, C2ISR, CSAR, tanker, DMO, ADA and other assets. In this process, areas of commonality are identified and subsequently "synchronized" into a single training event.

⁶⁹ United States Air Force Air Combat Command website.
<http://www.acc.af.mil/library/weaponsandtactics.asp>. The Combat Air Forces Weapons and Tactics Conference is an annual two week event that brings together hundreds of warfighters from the CAF to discuss current issues, to look at future issues, and to provide solutions for joint employment of forces. New technology is a key area. Attendance is primarily Air Force

personnel, but there has been an increasing amount of participation from the Army, Navy and Marines. The movement focuses on joint warfighting.

⁷⁰ As an instructor at MAWTS-1, the author flew in AH-64D, F/A-18D, F-16DG, and AH-6M aircraft which provided invaluable insight and experience as a CAS and FAC(A) instructor in the AH-1W.

⁷¹ Joint Mission Essential Task Lists (JMETLs) are developed for units performing specific missions and are derived from the Universal Joint Task List outlined in the Chairman of the Joint Chiefs of Staff Manual (CJCSM) 3500.04C.

⁷² One pilot interviewed admitted to having never read the JCAS publication while acknowledging that his platform conducted CAS, albeit not as a primary mission.

⁷³ Training and Readiness (T&R) manuals outline the academic and flight training requirements for Marine AH-1W and UH-1N pilots performing CAS. Available online at <http://www.tecom.usmc.mil/atb/Training%20and%20Readiness.htm>.

⁷⁴ United States Army Fort Rucker Command and Directorates website. <http://www.united-publishers.com/rucker/command.html#des>.

⁷⁵ After attending the Air Force Fighter Weapons School or the Marine Weapons and Tactics Instructor Course, graduates receive a patch to wear on their flightsuits signifying that they have completed the course.

⁷⁶ In recent tests, the Army successfully beamed video from unmanned aerial vehicles to an Apache AH-64 Block III attack helicopter in a demonstration. The Tactical Video Link (TVL) is a similar system tested and approved for funding on the Marine Corps AH-1W.

⁷⁷ Marine Corps Center for Lessons Learned. *Urban Close Air Support (Urban CAS), A summary of collected lessons, observations, interviews, after action reports and relevant documents from OEF, OIF-I and OIF-II*, April, 2005, 4.

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