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14. ABSTRACT Technological advances in modern weaponry have provided the United States military with unparalleled speed, precision and lethality. However, with these newfound capabilities comes increased responsibility to ensure positive identification of the enemy in order to mitigate the risk to non-combatants and friendly forces. This task, that is extremely difficult to master during training, often proves overwhelming among the stress and uncertainty that defines the modern battlefield. Consequently, Operation DESERT STORM saw a spike in the percentage of coalition casualties caused by fratricide. To counter this trend, the Department of Defense poured time and resources into solving the problem. However, technology alone proved ineffective during OEF/OIF as displayed by another increase in percentage of fratricide casualties. Thus a joint effort combining technological innovation, joint doctrine and training and greater dissemination of lesson learned must be adopted to mitigate this unacceptable risk.					
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**NAVAL WAR COLLEGE
Newport, R.I.**

**FRATRICIDE PREVENTION:
AN OPPORTUNITY TO DEVELOP A JOINT SOLUTION**

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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Contents

Introduction	1
Background	3
Discussion	7
Conclusions	14
Recommendations	15
Bibliography	18

Abstract

Technological advances in modern weaponry have provided the United States military with unparalleled speed, precision and lethality. However, with these newfound capabilities comes increased responsibility to ensure positive identification of the enemy in order to mitigate the risk to non-combatants and friendly forces. This task, that is extremely difficult to master during training, often proves overwhelming among the stress and uncertainty that defines the modern battlefield. Consequently, Operation DESERT STORM saw a spike in the percentage of coalition casualties caused by fratricide. To counter this trend, the Department of Defense poured time and resources into solving the problem. However, technology alone proved ineffective during OEF/OIF as displayed by another increase in percentage of fratricide casualties. Thus a joint effort combining technological innovation, joint doctrine and training and greater dissemination of lesson learned must be adopted to mitigate this unacceptable risk.

INTRODUCTION

Losing soldiers in combat is a tragic result of war. However, losing a soldier to fratricide is not only tragic but inexcusable because, in almost every case it is preventable. Studies have shown that fratricide erodes confidence in a command, diminishes the nation's trust in its military leaders, and profoundly affects warriors at the tactical, operational, and strategic levels. The enemy combatant understandably seeks to kill the American soldier. That a Joint Force would kill its own through fratricide is unacceptable. In spite of technology and service doctrine, fratricide percentages in recent conflicts have spiked from 20th century historical levels. The purpose of this paper is to illustrate that technological advancement alone is not the solution, as the problem does not have a common understanding. The Joint Forces Commander must develop and implement a system to more efficiently analyze fratricide incidents in order to incorporate lessons into joint doctrine and disseminate the lessons learned to operational commanders and service components in a timely and efficient manner.

To illustrate the disparity currently within joint doctrine on fratricide, you need look no further than for a joint definition of the term. Joint Publication 3-09.3, *Joint Tactics Techniques and Procedures for Close Air Support* defines fratricide as “casualties to friendly forces caused by friendly fire.”¹ However, in Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms* it is defined as: “In casualty reporting, a casualty circumstance applicable to persons killed in action or wounded in action mistakenly or accidentally by friendly forces actively engaged with the enemy, who are directing fire at a

¹ Joint Chiefs of Staff, *Joint Tactics, Techniques and Procedures for Close Air Support*, Joint Pub 3-09.3, September 3, 2003, I-4.

hostile force or what is thought to be a hostile force.”² More specifically this encompasses air, ground or sea based-forces engaging friendly forces resulting in fatalities. For the purpose of this paper the second definition seems to be more precise and thus will be the standard. Of note, fratricide statistics do not include non-combat related injuries including negligent discharges of weapon systems due to human error. These equally tragic circumstances are investigated and are compiled under safety related incidents rather than fratricide.

The effects of fratricide most profoundly influence those at the tactical level because of proximity to the incident and the immediate effect on small unit cohesion. Observations of units experiencing fratricide show that these units tend to: lose confidence in their unit’s leadership, experience self-doubt, lose initiative, lose aggressiveness during fire and maneuver, and show a general degradation of cohesion and morale.³ Furthermore, although the results of fratricide are not as direct at the operational and strategic levels of war, the result has a profoundly negative impact and erodes the confidence of the American public we are sworn to protect. As a result, at the operational level of war the commanders will have to re-allocate resources to replace the combat losses resulting in the potential loss of momentum during offensive operations. Commanders at all levels must quickly build his situational awareness and an investigating officer will be dispatched to begin compiling facts related to the incident in order to inform strategic leadership. Further complicating matters, unlike war of past generations, fratricide incidents are now reported in near real-time from the front line due to embedded media. This places operational leaders at a marked disadvantage as they

² Joint Chief of Staff, *Department of Defense Dictionary of Military and Associated Terms*, Joint Pub 1-02, October 17, 2008, 222.

³ U.S. Army Combined Arms Center, Center for Army Lessons Learned, Fratricide Avoidance CALL Handbook No. 08-43, Fort Leavenworth, Kansas: September 2008, 10.

are informed by media speculation on fratricide thus making it difficult for him to have all the information he needs to release an official statement. These circumstances can potentially result in a loss of focus on the objective as the American public, media and political leaders demand answers immediately, despite investigations often taking weeks to gather eye witness statements, audio and video recordings, autopsy results and various other investigation techniques to accurately re-create a single fratricide event.

BACKGROUND

To illustrate that fratricide has been a persistent problem throughout our nation's history, several fratricide events are chronicled over the next several paragraphs. One of the most closely scrutinized and controversial fratricide incidents in American history was the death of General "Stonewall" Jackson during the Battle at Chancellorsville. General Jackson was a Corps Commander in the Confederate Army and was General Robert E. Lee's most aggressive and capable operational leaders. "Stonewall" Jackson died on May 10, 1863 of Pneumonia as a result of a gun wound received at Chancellorsville, Virginia. The shot was fired by a North Carolina Confederate soldier while returning from a leader's reconnaissance. As the sun began to set Jackson attempted to re-enter friendly lines on horseback and was mistaken as part of a Union cavalry unit. He was shot in the left arm and evacuated from the battlefield where his left arm was amputated. Just a few days later, General "Stonewall" Jackson was dead, accidentally killed by his own army.⁴

Many historians attribute "Stonewall" Jackson's death as a contributing factor for the Confederates loss at Gettysburg, Pennsylvania and eventually the Civil War. General Robert E. Lee's deep remorse numbed his keen ability to devise a strategy at Gettysburg due to being physically exhausted and emotionally distraught while grieving the loss of his friend

⁴ James McPherson, *Battle Cry of Freedom* (New York, NY: Oxford University Press, 1988), 264.

and partner.⁵ This historical fratricide example demonstrates how the loss of one life can profoundly affect the morale and welfare of an entire Corps if not an entire Army.

During World War I there was no official documentation of friendly fire incidents. However, there was an unofficial report that was published by General Percin, an artillery expert in the French Army, entitled *Le Massacre de notre Infanterie* that estimates some seventy-five thousand French casualties were caused by friendly-fire due to inaccurate artillery barrages between 1914-1918.⁶ Artillery prior to World War I had mainly been used as a direct fire weapon system in close proximity to maneuvering troops. However, as more powerful shell-fuse combinations were developed artillery was moved behind the front lines and used as indirect fires to support maneuver. This innovation protected the artillery pieces from being engaged by direct fire but resulted in the need for infantrymen to maintain situational awareness and communicate where they wanted the indirect fire to target using a map coordinates. From these coordinates, artillery units plotted their location and translated the data into a fire mission. According to General Percin, mistakes were made because of “carelessness, stupidity and incompetence” with rounds often falling short into the allied trenches. This often happened unbeknownst to the artillery because they were unable to observe their fires. The problem became so prolific that many infantrymen began searching out artillery units following such accidents in an attempt to even the score. As the war continued new techniques and procedures were instituted that included formal training for artillery forward observers and aerial observers to call for and adjust fires.⁷ But this example demonstrates how advanced weaponry and emerging technologies can prove lethal to both

⁵ Geoffrey Regan. *Blue on Blue, A History of Friendly Fire* (New York, NY: Avon Books,1995),62.

⁶ Ibid. P. 67.

⁷ Ibid.

friend and foe if they are not incorporated into both doctrine and training prior to implementation in combat.

Despite the problems with fratricide identified during World War I, there was no formal documentation system developed to record fratricide prior to World War II. The first American recognized for attempting to study the occurrence of fratricide was Lieutenant Colonel Charles R. Schrader (USA). In his book *Amicide: The Problem of Friendly Fire in Modern War* published in December 1982, he calculated fratricide rates based on data from various sources collected from World War II, Korea and Vietnam. Lieutenant Colonel Schrader cites fratricide rates between World War II to Vietnam as approximately two percent.⁸ Schrader writes that casualty reporting figures during this time period were “cryptic” and the prevailing attitude among the military officers was that fratricide was not serious enough problem to warrant further study. In fact, the only fratricide figures that were documented involved a large loss of military combat power and classified under “hostile-misadventure”. Schrader concludes that the advent of air power, computer technology and maneuver warfare has compounded the occurrence of fratricide since World War II.⁹

In contrast to Schrader’s findings the U.S. Army War College conducted a study on fratricide in 1995 that estimated between 177,000 to 250,000 service members were killed or wounded during the 20th century.¹⁰ If these updated figures are more accurate than Schrader’s, fratricide would represent ten to fifteen percent of all U.S. casualties during the same time period.

⁸ Henry S. Larson III, *Fratricide: Reducing the Friction through Technology* (Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1994: reprint, Alexandria, VA: Defense Technical Information Center, 1995), 5.

⁹ Ibid

¹⁰ Michael H. Sedge, Not-So-Friendly Fire, *Armed Forces Journal* 140, no. 10(May 2003),18.

During Operation Desert Shield, the percentage of casualties caused by fratricide spiked at twenty-four percent of the total casualties, nearly doubling fratricide percentages from World War II, Korea and Vietnam. After only 100 hours of intense conflict a total of 35 out of the 148 KIA and 72 of 467 WIA resulted from fratricide.¹¹ These startling numbers coupled with the near real-time pictures from media coverage of the front lines publicized the problems to the American public directly. These incidents resulted in intense scrutiny of the U.S. military from both the public and the media that dampened the spirit of an otherwise triumphant coalition returning from an overwhelming victory over the Iraqi military.

Despite emerging technologies and comprehensive combat identification efforts by Joint Forces Command following Operation Desert Storm, fratricide incidents during major offensive combat operations of both Operation Iraqi Freedom and Operation Enduring Freedom resulted in 53 deaths to U.S. service members or slightly above 20 percent of the total American casualties.¹² During fratricide post-incident investigations and after action reviews, operational and tactical commanders whose units suffered casualties felt anguish and pain for the loss of a service member within their unit and their families. These same leader inquired about what they had done wrong as a commander, or what they had failed to do during the military decision making process to mitigate the risk of fratricide? More importantly Joint Forces Command began a focused effort of analyzing the process by which fratricide incidents are investigated in order ensure future commander's learn have a more comprehensive data in order to ensure mistakes from OEF/OIF don't repeat themselves.¹³

¹¹ Bobby J. Cline, Marine Corps Fratricide Reduction Efforts, *Marine Corps Gazette* 88, no. 8(August 2004),44..

¹² Ibid. p. 45.

¹³ U.S. Army Combined Arms Command, Center for Army Lessons Learned, *Fratricide Avoidance*, CALL Handbook No. 08-43,(Fort Leavenworth, Kansas: September 2008), i.

Each fratricide incident reminds Commanders at all levels once again that despite increased technological innovation developed specifically to reduce fratricide, that human error caused by fatigue, a lack of situational awareness and miscommunications remain a constant variable that cannot be compensated for with a high tech solution alone. Furthermore, the increased capabilities leveraged through the use of joint forces had resulted in many preventable fratricide incidents had these forces trained routinely at the Joint Readiness Training Centers and lessons learned incorporated into joint doctrine.

DISCUSSION

In order to properly address all aspects of fratricide avoidance we must examine the current processes in place to frame the problem. Over the past two decades the revolution of military affairs has placed a heavy emphasis on research and technology to deal with mitigating the risk of fratricide. These advances have undeniably provided the U.S. military with an unparalleled advantage over our adversaries in many areas. However, an unintended consequence has manifested itself in the form of technology capabilities exceeding our capacity as humans to gain and maintain situational awareness during the highly dynamic and often chaotic conditions that exist on the modern battlefield. In order to compensate for this disparity, Joint Forces Command must develop a comprehensive long range plan to mitigate this risk through continued technological innovation, revisions to joint doctrine, adoption of joint training methods and standards, and a rigorous after action process to capture lessons learned.

One of the many challenges when trying to determine contributing factors involving fratricide incidents is that war is far from exact science. War is shrouded in what Clausewitz called the “fog of war” or “friction” that can also be described as a lack of situational

awareness of one's surroundings during combat. Thus, when trying to gather the facts in an investigation the factors of time, space and force historically have been nearly impossible to accurately replicate. The tracking system known as Force XXI Battle and Command Brigade and Below (FBCB2) or Blue Force Tracker (BFT) system is a technological innovation that was developed specifically to reduce the threat of fratricide between ground forces. This L-band satellite communications system helps ground commander's at both the tactical and operational level identify friendly locations or tracks. This system significantly increased situational awareness by enabling adjacent units to identify vehicles over the horizon that would have previously been undistinguishable. Furthermore, the BFT enables units to communicate via text message with adjacent units to coordinate actions.¹⁴ This technology provides commanders not only with a fratricide risk mitigation tool, but also the ability to replicate the battle space geometry based on a common operational picture when a fratricide incident occurs. The two main detractors from the BFT are that it is not a real-time feed and not all vehicles or units have them. It has been documented that some delays in position updates take as long as five minutes. During the rapid advance of armored units that characterize modern warfare these delays could prove fatal.¹⁵ Thus, a commander can become over confident that he has a clear understanding of the array of his forces and authorize an action based on data that is several minutes old as displayed on his BFT or simply not have a current plot of a unit transiting through his area of operation uncoordinated without a BFT device. Either of these circumstances could result in a fratricide incident and clearly demonstrates how technology in this case might potentially

¹⁴ Michael H. Sedge, Not-So-Friendly Fire, *Armed Forces Journal* 140, no. 10(May 2003),18.

¹⁵ Elaine M. Grossman, "Air Force May Expand On Army Tracking Tool," *Defense Information and Electronics Report*(November 7, 2003),16.

increase the risk of fratricide due to lax tracking procedures due to an over-reliance on technology.

Another example of a recent innovation that has significantly decreased the chance of fratricide is the Joint Cooperative Identification Systems (JCID). It was developed primarily as an air to ground targeting discrimination system. The JCID provides an additional layer of fratricide risk mitigation by sending out a radio signal from aircraft to ground vehicles with a JCIDs beacon that “reply and respond” prior to engaging. For example, if an attack aircraft misidentifies a friendly vehicle and attempts to engage, the targeting system will not allow the pilot to engage if it is receiving an active response from the vehicles radio systems.¹⁶

Many new technologies if not properly integrated into training can not only increase our ability to observe potential threats, but significantly increase our susceptibility to fratricide. Most would argue that technologies such as the Forward Looking Infrared (FLIR), Night Vision Goggles (NVGs) and Laser-Guided Bombs (LGBs) have provided the American Soldier a decisive advantage over the enemy. However, these technologies provided information at a rate that has surpassed our ability as humans to process information quickly enough under chaotic conditions thus increasing the risk of fratricide due to misidentification of friend or foe. As evidence of this emerging risk, fifty-seven percent of all fratricide incidents during Operation Desert Storm and Operation Iraqi Freedom were from aviation platform against ground forces. This number is twenty percent higher than during World War II, Korea and Vietnam.¹⁷ These statistics reinforce that while technology does enhance capability; operational risk management must be rigorously applied during

¹⁶ Fratricide Avoidance Handbook Tactics, Techniques, and Procedures. Center for Army Lessons Learned, Fort Leavenworth, Kansas, (September 2008) p. 78.

¹⁷ Bobby J.Cline, “Marine Corps Fratricide Reduction Efforts,” *The Marine Corps Gazette* 88 , no.8(August 2004): 45.

training exercises, after action reports compiled and submitted and doctrine revised to incorporate such innovations. For example, based on the number of air to ground fratricide incidents with joint fixed-wing aircraft during Operation Iraqi Freedom while providing close air support, an operational commander may decide to limit night close air support to rotary wing only due to the potential fratricide risk. A skilled operational planner might deduce that perhaps joint fixed wing should conduct shaping operations well beyond the forward line of troops during low-light or adverse conditions while utilizing rotary wing to support in close proximity to ground troops.

Joint Publication 1-02, *Operational Terms and Graphics* defines doctrine as: “The fundamental principles by which a military force or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application”.¹⁸ Moreover, doctrine bridges the gap between technology and the tactics, techniques and procedures that are developed, implemented and executed during training and in combat. Thus, you can extrapolate how important it is to ensure that Joint Doctrine remains current to provide a framework on how to employ increasing lethal weapon systems. Interestingly, Joint Doctrine is inconsistent when dealing with the subject of fratricide. Joint Publication 3-06, *Doctrine for Urban Operations* published in December 2002 is one of our most widely referenced publications based on current operations in Iraq and Afghanistan. However, it makes no reference to fratricide prevention despite the risk to fratricide greatly increasing when using supporting arms into an urban area. In contrast, Joint Publication 3-09.3, *Joint Tactics, Techniques and Procedures for Close Air Support* which was published in September 2003 and modestly revised in 1995, it highlights specific ways to minimize the possibility of fratricide:

¹⁸ Joint Chiefs of Staff, *Joint Operational Terms and Graphics*, Joint Pub 1-02, September 30, 1997, I-55.

“Items such as detailed mission planning, standardized procedures for friendly force tracking and supporting immediate air requests, realistic training/mission rehearsal, use of friendly tagging or tracking devices, and effective staff, forward air controller/air officer and air liaison officer coordination, and sound clearance of fire procedures can significantly reduce the likelihood of fratricide.”¹⁹ Furthermore, this same publication was revised based on lessons learned from OIF/OEF that further refine close air support roles and responsibilities when attaining positive identification: “Each participant must make every effort possible to correctly identify friendly units and enemy forces prior to targeting, clearing fires, and weapon release. Combatant identification is the process of attaining an accurate characterization of detected objects to the extent that high confidence and timely application of military options and weapon resources can occur. Depending on the situation and the operational decision that must be made, this characterization may be limited to “friend,” “enemy” or “neutral.”²⁰ This nexus between technology and operational lessons learned demonstrated above plays a vital role in revisions of Joint Doctrine. From Joint Doctrine both military training commands and operational units conducting planning for combat operations possess a single source document that helps to clearly define responsibilities and planning factors when conducting close air support.

Another key element to reducing the risk of fratricide is by conducting realistic joint combined-arms training prior to conducting combat operations. Currently the Army and Marine Corps have developed a pre-deployment training plan culminating in a capstone exercise that closely replicates both the environment and operational tempo of combat operations. The end state of these exercises is to evaluate both Battalion and Brigade sized

¹⁹ Joint Chiefs of Staff, *Joint Tactics, Techniques and Procedures for Close Air Support*, Joint Pub 3-09.3 October 17, 2008, I-4.

²⁰ Ibid.

units on their ability to conduct mission essential tasks. The Army, Air Force and Marine Corps conduct pre-deployment training at separate sites in the Mojave Desert in south central California and western Nevada. Despite being within 200 miles neither the Army National Training Center (NTC) nor the Marine Corps Air-Ground Combat Center (MCAGCC) has conducted joint training using aircraft, artillery, armor and infantry units with any regularity. Thus, often times joint aircraft and ground forces will fight together for the first time during combat operations without having a solid understanding of a supporting unit's capabilities and limitations. Unfortunately this lack of "jointness" during pre-deployment training is clearly an opportunity missed. A well designed joint mission rehearsal exercise with skilled instructor controllers could develop scenarios or vignettes that teach fratricide avoidance tactics, techniques and procedures and facilitate fratricide avoidance training while maintaining the safety of individual service members and provide a comprehensive debrief based off their observations.

Following multiple fratricide incidents involving coalition forces during both OIF and OEF the department of defense decided that the process of conducting unit after action reports following fratricide incidents, conducting legal investigations and collecting lessons learned was dysfunction and inefficient. Thus, the Secretary of Defense published the Department of Defense Instruction 6055.07, with change 1, dated April 24, 2008, states: "When a fratricide incident occurs, the Geographic Combatant Command working with the service component with the preponderance of losses or injuries shall conduct both a safety and legal investigation into the incident. The purpose of the legal investigation is to identify the facts of the incident and guide further actions."²¹

²¹ Memorandum for Distribution, US Joint Forces Command, *USJFCOM Friendly Fire Reporting and Investigations Process Procedures*. October 21, 2008. Norfolk, Virginia

Mr. Wade Johnson from the Joint Fires Integration and Interoperability Team at the United States Joint Forces Command speaks to the problems with legal investigations: “because of the complex nature, sensitivity and location of fratricide incidents near the front lines, legal investigations often would take months or in some cases even years to complete and would often yield little useful information to help future operational or tactical commander’s mitigate the risk of future fratricide incidents.”²² To address this problem the Joint Requirement Oversight Council Memorandum (JROCM) 076-05, “OPERATION IRAQI FREEDOM Major Combat Operations Lessons Learned – Fratricide Prevention”, on 14 April 2005, requested United States Joint Forces Command (USJFCOM) to “implement an independent, non-retribution joint fratricide process – similar to safety, hazard and mishap reporting within the aviation community, that provides timely feedback to the operating forces. Additionally, the JRCOM requested USJFCOM be designated as the lead agent for friendly fire mishap analysis and gap resolution and to establish a database of combat and training fratricide events and analyze their contributing causes. This analysis was to accelerate the information flow to help determine corrective action across the doctrine, organization, training, material, leadership, personnel and facilities (DOTMLPF) spectrum in order to prevent future incidents.”²³ Since the USJFCOM Friendly Fire Reporting and Investigation Process (FRIP) Procedures were instituted, service components conducting the safety investigation are required to forward the results to the Combatant Commander for review. Once the Combatant Commander has read the safety investigation he shall forward all material to the service safety centers and carbon copy the USJFCOM J-8 for further

²² Wade Johnson, telephone conversation to author, March 13, 2009.

²³ Memorandum for Distribution, US Joint Forces Command, *USJFCOM Friendly Fire Reporting and Investigations Process Procedures*. October 21, 2008. Norfolk, Virginia

analysis and entry in to their database. Additionally the Combatant Commander can publish an urgent feedback message to his operational commanders, other services and other Combatant Commands. The addition of the safety investigation coupled with the legal investigation is an example of how the Department of Defense has integrated some of the best practices used by the aviation community into joint operating environment. This change has increased the timeliness and accuracy of fratricide reporting and significantly enhanced the cross-talk and cooperation between Combatant Commanders and the Service Components Commanders. An example of this enhanced cooperation is demonstrated by the publication of the *Fratricide Avoidance Handbook Tactics, Techniques, and Procedures* by the Center for Army Lessons Learned (CALL) in Fort Leavenworth, Kansas in September 2008. This handbook provides the joint community with planning considerations, causal factors and operational risk management tools to mitigate the risk of fratricide. Although this document is a good start, it fails to provide examples from fratricide incidents for the reader to reference that demonstrate the importance of the material and how it applies within the Joint Operation Planning Process.

CONCLUSION

Many military historians argue that two thousand years of fratricide don't lie. Fratricide is inevitable consequence of war as long as imperfect human beings, exhausted from the strain of combat and fearful for their lives, will always shoot first and worry about positive identification later. However, this reality should not dampen our resolve to employ every asset available to reduce the risk of fratricide for all service members. Only through enhanced integration between technology, doctrine, training and documentation of lessons learned will we be successfully in reducing the current trends of increased percentages of

casualties by fratricide. This goal will become increasingly more difficult during future conflicts as our joint doctrine continues to focus on overwhelming speed and firepower to gain and maintain the initiative over our adversaries. Simultaneously our enemies are developing technologies to counter our information management technological advantages in an attempt to level the playing field. Therefore, the operational commander must be able to maintain his ability to command and control without a fully developed common operational picture, working through friction and de-conflicting fires with maneuver. Only if this core capability is maintained U.S. Joint Forces Command develops a systematic process for integrating new technologies into doctrine and training is there a realistic chance of the risk of fratricide falling below the current levels.

RECOMMENDATIONS

The current practice in the United States military of fielding new equipment directly into the theater is a haphazard practice that has the potential to lead directly to fratricide. New technologies should first be included in joint doctrine prior to being fielded. Next an incremental fielding plan must be developed that provides guidance on doctrinal employment at formal schools on new equipment followed by training and maintenance at home station and an evaluation at the service component pre-deployment training exercise. Throughout this fielding process after-action reports should be collected and forwarded to service and joint doctrine headquarters for revisions as needed. A recent example of a new piece of equipment that was fielded directly into Iraq and Afghanistan was the Advance Combat Optical Gun sight (ACOG). This scope was designed to attach on top of a M16 service rifle to help identify possible threats and greater distances while engaging with greater first round accuracy. Many small unit leaders decided to attach the ACOG to their squad automatic

weapon thinking that it would increase first round accuracy against an identified threat. However, this technique quickly resulted in a large volume of grossly inaccurate fire because of the severe vibration of the weapon system. Furthermore it increased the danger to service members adjacent to the weapon system as the gunner lost situational awareness of the location of his rounds while straining to see through the optic. The employment of the ACOG on the squad automatic weapon was eventually forbidden by operational commanders after several civilians were wounded by stray bullets and the incidental death of a Marine at a vehicle checkpoint.²⁴

Joint Forces Command must develop a more comprehensive approach to dealing with fratricide consistently throughout the Joint Publications. Each publication should have a section that addresses fratricide avoidance. Furthermore, the Fratricide Avoidance Handbook that was produced by the Center for Army Lessons Learned in September 2008, should be a Joint Publication that is revised annually to include the latest fratricide safety reports and their lessons learned. In addition, the United States military should begin leveraging computer technology to replicate fratricide events into a leadership decision making tool. This would allow future commanders to observe the scenario that led to fratricide and make decision to mitigate the risk. A tutorial could provide feedback on decision making and provide a comprehensive debrief that would allow leaders to learn from the mistakes made by others without having to endanger U.S. service members.

The current service-oriented pre-deployment training model should be integrated. The Army, Navy, Marine Corps and Air Force training centers in the Southwestern United States should be consolidated under one joint training command headquarters. All services should be involved in multi-echelon training exercises that focus on joint interoperability on land,

²⁴ First Marine Division Lessons Learned from Operation Iraqi Freedom, p. 11.

sea and air providing a realistic mission rehearsal training exercise against a future peer competitor. This joint exercise will be a combination of virtual, live-fire and non-live fire force on force training against a highly trained and capable opposing forces. A joint exercise of this scale and complexity would allow leaders from the tactical and operational level to conduct operational planning and fight with joint capabilities thus increasing our experience of operating in the joint environment prior to deploying in harm's way.

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