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**FRATRICIDE:  
Doctrine's Role in Reducing Friendly Fire**

**A Monograph  
by  
Major William B. Garrett, III  
Infantry**

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**School of Advanced Military Studies  
United States Army Command and General Staff College  
Fort Leavenworth, Kansas**

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## ABSTRACT

FRATRICIDE: DOCTRINE'S ROLE IN REDUCING FRIENDLY FIRE by  
Major William B. Garrett III, USA, 55 pages.

This monograph seeks to identify doctrine's role in limiting fratricide--specifically, ground-to-ground and air-to-ground fratricide. Fratricide is hardly a new condition on the battlefield. However, an increasingly complex, dynamic, and lethal battlefield can only serve to increase the risk of fratricide. Doctrine can have a significant impact on the ways and means of reducing this risk.

First, selected fratricide incidents during World War II, Vietnam, and the Persian Gulf War are examined to determine the historical role of doctrine in fratricide reduction. Then, current and emerging U.S. Army and U.S. Air Force doctrine are surveyed to assess conceptual similarities concerning fratricide.

This monograph concludes that doctrine can assist in reducing the risk of fratricide by: 1) developing a doctrinal awareness for fratricide; 2) directing and facilitating the training required to reduce the risk of fratricide; and 3) driving the technological development and materiel acquisition required to support fratricide reduction efforts. Ultimately, the role of doctrine is not to furnish any final answers, but to provide the impetus to develop innovative and creative solutions to the problem of reducing fratricide on tomorrow's battlefield.

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## Section I

### INTRODUCTION

Fratricide is hardly a new condition on the battlefield. Fatalities inflicted by the unintentional engagement of friendly forces are as old as warfare itself. Four hundred years before the birth of Christ, the Greek historian Thucydides recorded the defeat of the Athenians by the Syracusans in the night battle at Epipolae (413 B.C.):

The Athenians were trying to find each other and taking all who came towards them to be enemies, even though they might be people on their own side ...many parts of the army ended by falling upon each other, friend against friend...not only causing panic among themselves, but actually fighting hand to hand, and only being parted with difficulty.<sup>1</sup>

Fratricide has been a battlefield reality for the U.S. Army from the Revolutionary War through the Persian Gulf War. As Stonewall Jackson's inadvertent death at Chancellorsville proved, fratricide can impair a campaign beyond the impact of physical losses. Fratricide increases the risk of unacceptable losses and defeat by causing loss of confidence in unit leadership, leader self-doubt and hesitation, loss of initiative and aggressiveness, oversupervision of units, disrupted operations, and a general degradation of cohesion and morale.<sup>2</sup>

In previous conflicts fratricide was not as serious a problem due to relatively smaller armies, shorter



engagement ranges, and circumscribed battlefields. However, today's armies no longer attack or defend in the ranks, files, and echelons of the 19th and early 20th century. The modern battlefield has expanded in terms of speed, space, and time. Moreover, future battles will most likely be fought on a nonlinear, extended battlefield characterized by the use of advanced sensors and acquisition means to facilitate precision engagements at extended ranges by high technology weapons and munitions.<sup>3</sup> Such an increasingly complex, dynamic, and lethal battlefield can only serve to increase the likelihood of fratricide.

As a result of intense media scrutiny of the Persian Gulf War, most Americans now have a general idea of what is meant by fratricide, often called friendly fire. Yet, fratricide is not defined in Joint Pub. 1-02, Department of Defense Dictionary of Military and Associated Terms, nor in US Army Field Manual (FM) 101-5-1, Operational Terms and Symbols. In its most literal translation, fratricide means "the act of killing one's brother."<sup>4</sup> However, a more complete definition is required to facilitate further discussion. For purposes of this monograph, the following definition is proposed:

Fratricide is the employment of friendly weapons and munitions with the intent to kill the enemy or destroy his equipment or facilities, which results in unforeseen and unintentional death or injury to friendly personnel.<sup>5</sup>

Doctrine can play an important role in preventing fratricide. Doctrine focuses combat power to achieve victory on contemporary and future battlefields. It explains how to conduct campaigns, major operations, battles, and engagements in conjunction with other services and allied forces.<sup>6</sup> Doctrine also provides the catalyst for development of subordinate doctrine, force design, technology, professional education, and unit and individual training. Thus, doctrine can have a significant impact on the ways and means of limiting fratricide.

However, given the friction, chance, and uncertainty of Clausewitz's "fog of war," it hardly seems appropriate to question whether doctrine can totally eliminate the risk of fratricide. Rather, a better question would be: can doctrine reduce the risk of fratricide? Hence, the purpose of this monograph is to identify doctrine's role in limiting fratricide--specifically, ground-to-ground and air-to-ground fratricide.

To answer this question, Section Two seeks to gain a historical perspective regarding doctrine and fratricide. Section Two begins by analyzing selected incidents of fratricide during World War II, the Vietnam War, and the recent Persian Gulf War. The criteria for this historical analysis of doctrine, in terms of reducing fratricide, centers upon doctrine's ability to:

a) Anticipate events that increase the risk of fratricide.

b) Adapt to change and conserve the fighting potential of the force.

c) Lower the probability of fratricide while not overly restricting boldness and audacity in combat.

With this foundation established, Section Three will survey current and emerging U.S. Army and U.S. Air Force doctrine to arrive at a common understanding of concepts regarding fratricide. This discussion is designed to familiarize the reader with the doctrinal measures used to limit fratricide.

Finally, Section Four attempts to answer the research question by providing a series of implications necessary to institutionalize the use of doctrine in reducing the risk of fratricide.

## Section II

### A HISTORICAL PERSPECTIVE

Each segment of the past is rich in large events and shifts, is linked one way or another with tasks standing before us, and, therefore, is in no way only of academic interest to us.

A. A. Svechin<sup>7</sup>

In his theoretical, political, and historical study of war, Carl von Clausewitz explains that the critical analysis of historical examples can serve several purposes. Historical examples can help explain or show application of an idea or concept, support or validate

the possibility of such an idea or concept, or in combination with several events, be used to distill the essential truths of the matter and then arrive at a consensus of thinking or doctrine.<sup>8</sup> Further, historical studies are especially valuable in peacetime by supplying evidence that can otherwise only be simulated.

It is axiomatic that those who fail to learn from history are doomed to repeat its mistakes. Yet, those who attempt to learn from past battles must be aware that history does not teach, it enlightens, not with the searchlight of maxims, but with the reflected glow of analogies.<sup>9</sup> In fact, there are few instances where the military past has been successfully used to predict the future.<sup>10</sup> Therefore, "insight gained" might be a more appropriate term than "lessons learned" as we study the three historical vignettes presented in this section.<sup>11</sup>

#### World War II

Operation COTTAGE involved the retaking of Kiska Island in the U.S. Aleutian Islands southwest of Alaska. Anticipating a U.S. invasion, the 5,000 man Japanese garrison at Kiska quietly evacuated the island in a dense fog on July 28, 1943. For three weeks their departure went undetected, and U.S. air and naval forces continued to bomb and shell the abandoned island.<sup>12</sup>

Gradually, however, aerial reconnaissance and other nagging clues began to appear that suggested the Japanese

had evacuated. Regardless, the Commander of North Pacific Force, Admiral Thomas C. Kinkaid, decided to go ahead with the planned full-scale invasion of Kiska. If the enemy had evacuated, he said, the troop landings "would be a good training exercise, a super dress rehearsal, excellent for training purposes."<sup>13</sup>

The invasion force included 15,000 men from the 7th Infantry Division, half of them veterans of the May 1943 invasion of Attu; 5,000 men from the Alaskan 4th Regiment; 5,000 men of the 87th Mountain Combat Team, 5,300 troops of the 13th Royal Canadian Infantry Brigade; and 2,500 commandos from the First Special Service Force. Altogether, Invasion Force Kiska numbered an impressive 34,426 combat troops.<sup>14</sup>

The invasion force conducted less than a week of preparatory training on Adak Island. Equipped with new Arctic gear, the force hastily practiced amphibious landings. Planners studied a map of Kiska, based on aerial photos and a 1935 chart, and made plaster models of the island for unit commanders and staff to study.<sup>15</sup>

It is significant to note that until the landing on Kiska, the Regimental Headquarters of the 87th Mountain Infantry had never participated in a regimental field exercise or maneuver of more than twelve hours duration. Furthermore, standard operating procedures varied greatly since none of the units within the invasion force had

ever trained together. This lack of regimental and combined training was brought to the attention of the commanding general. He replied that regimental and battalion training was "not important" and that all stress should be placed on squad and platoon training.<sup>16</sup> Consequently, in the 87th Mountain Infantry Regiment, all units spent one night in the field practicing patrolling, marching by compass, and map reading. Patrol leaders were observed and selected for definitely assigned patrols in the upcoming operation. All troops were given conditioning marches and small unit tactical problems.<sup>17</sup>

Field Order #1, Landing Force 16.8, dated August 1, 1943, outlined procedures for avoiding air-to-ground fratricide:

Upon approach of friendly air units, fluorescent panels will be habitually displayed to mark front lines or detached groups. The checkerboard panel (individual panel) will be displayed for the recognition of friendly ground troops and to augment fluorescent panels for identification by friendly air units.<sup>18</sup>

Accordingly, the packing list for Field Order #1 directed every individual soldier to carry a black and white identification panel and a 7" x 3" luminous identification panel in his pocket.<sup>19</sup> The order did not discuss ground fratricide countermeasures.

The invasion force left Adak on August 13, 1943. On D-Day, August 15, 1943, following a final heavy

bombardment, the first assault waves came ashore on the main beach and were met by abandoned dogs. The troops fanned into the fog in battalion columns of approach, like the parallel fingers of a probing hand. A post-operation report noted:

Much of the time visibility was extremely limited and recognition of our own troops was impossible beyond five to ten yards.... Because of the high wind, voice recognition was impossible and patrols 15 yards apart could not tell when they had been challenged.<sup>20</sup>

The probes found each other and started shooting into the fog. One infantryman engaged an "enemy" patrol, whose members shouted at him to stop. When he began to throw grenades he was shot down.<sup>21</sup>

Another infantry company sent out a patrol from each platoon. Returning to their platoon, one patrol reported: "We were afraid to go through the 87th Infantry area at night. They have already shot five of their own men." Two days later, they "got shot at by the 87th Infantry."<sup>22</sup>

By nightfall on August 16, twenty-four men were shot to death by their own comrades in the fog. Booby-traps and mines killed four others. Fifty were wounded - booby trapped or shot by mistake. Finally, the destroyer Abner Read hit a mine and suffered seventy-one dead and thirty-four wounded.<sup>23</sup>

The final outcome of Operation COTTAGE was satisfactory, but nothing could disguise the fact that

for more than two weeks the Allies had bombarded an abandoned island, and then deployed 35,000 soldiers--313 of whom became needless casualties--against a nonexistent enemy. Afterward, Admiral Kinkaid proved somewhat disingenuous when he stated: "[O]f course we had no way of anticipating our men would shoot each other in the fog."<sup>24</sup>

However, in a lecture entitled "Action on Attu," given on June 17, 1943, Lieutenant Colonel K. H. Ewbank of the Amphibious Branch, G3 Section, Army Ground Forces related lessons learned from the invasion of Attu in May 1943:

We must have some means of identification for patrols.... They must have some physical means of signaling to our own troops.... They would go up there, get lost, and...our own troops here would shoot at them.... It is necessary that we take steps to stop troops shooting at our own flanking patrols.<sup>25</sup>

Thus, three months before the tragicomedy on Kiska, U.S. forces faced the same problems concerning fratricide on Attu, yet failed to implement necessary changes in training and materiel.

Doctrine published prior to Operation COTTAGE provided guidance, albeit sketchy, for reducing the possibility of fratricide during periods of limited visibility. The 1942 version of FM 7-10, Rifle Company, Rifle Regiment, stated:

Means of identification for all personnel must be prescribed...so that any personnel moving to the



objective before daylight can be properly identified. Unless special identifying means are issued, the means prescribed must be readily available to all men.<sup>26</sup>

FM 7-10 continued by cautioning that any attempt to combine a night frontal attack with an envelopment "usually results in an uncoordinated assault and brings conflict between the two friendly forces."<sup>27</sup>

Likewise, the 1940 version of FM 7-5, Organization and Tactics of Infantry, The Rifle Battalion, provided guidance for reducing fratricide. In a discussion of night training, FM 7-5 stated that "men must be as careful in returning as in starting out in order to avoid hostile patrols and to keep from being fired on by friendly sentries."<sup>28</sup>

Finally, the invasion planners failed to recognize certain situations and contributing factors (e.g., offense, limited visibility) which inherently create a greater risk of fratricide. Other than directing the use of identification panels for signalling aircraft, Field Order #1 did not address fratricide. This lack of foresight can be attributed to a doctrinal neglect of fratricide, minimal preparatory training, and failure to learn from the Attu experience.

U.S. forces in World War II also faced air-to-ground fratricide. Although the airplane made its formal debut in World War I, the U.S. Army Air Corps entered World War II with no written doctrine for support of ground forces,

no operational experience supporting ground forces, and no doctrinal requirement for aircraft to support ground operations.<sup>29</sup> These shortfalls and the subsequent heavy and frequent use of aircraft in support of ground forces made the occurrence of air-to-ground fratricide inevitable, given the available identification and location technology. Operation COBRA is probably the best documented example of air-to-ground fratricide in World War II.

Operation COBRA called for Major General J. Lawton Collins' VII (US) Corps to penetrate German defenses on a narrow front west of St. Lo. Once the rupture was achieved, infantry units would quickly widen and secure the flanks, creating a gap for the mobile armored forces to pass through and attack deep into enemy territory. Lacking sufficient artillery, General Omar N. Bradley, Commander of the First U.S. Army, intended to use airpower to force the initial breach.

On 19 July, 1944 Bradley met in conference with air commanders Carl Spaatz, Arthur Tedder, and Trafford Leigh-Mallory to explain his concept. His ultimate objective for using the bombers was to create the "blast effect" typical of artillery preparatory fires, only in a more concentrated manner. Weapons effect and troop safety were important issues.<sup>30</sup>

To reduce the risk of air-to-ground fratricide,

Bradley proposed the readily identifiable St. Lo-Periers road as a "no bomb line." As long as the bombers flew parallel, but south of the road, Bradley contended his troops north of the road would be safe. Moreover, Bradley argued for only an 800 yard buffer line to ensure troop safety. He felt that it was imperative to be as close as possible to reduce the time the enemy had to recover. The air commanders advocated a 3,000 yard buffer line. A consensus was finally reached that a 1,200 yard buffer zone would suffice. However, where Bradley thought the bomber's approach axis had been resolved, later events would prove different.<sup>31</sup>

Troop safety also factored into decisions concerning aircraft selected for the mission. Highly accurate fighter bombers were to strike a rectangular target area 250 yards wide and 7,000 yards long just south of the St. Lo-Periers road with light fragmentation bombs. Heavy bombers would hit a one mile wide area beyond this target. Next, medium bombers were to follow and concentrate on destroying enemy strongpoints that could not be ranged by artillery.<sup>32</sup>

By using lighter fragmentation bombs it was hoped to get the desired destruction of enemy forces without obstructing the movement of the mobile armored forces. By using more accurate fighter bombers in the target area adjacent to the friendly troops, attacking ground units

could advance shortly after the air strikes and avoid the long delay between air and ground attacks experienced at Caen.

After several weather delays, Air Chief Leigh-Mallory gave the go-ahead for Operation COBRA to begin on 24 July. When he found the skies still overcast with poor visibility that morning, he cancelled the strikes again. However, six fighter bomber groups and three heavy bomber divisions had already taken off. Only three of the fighter groups were able to be recalled prior to making their strikes.<sup>33</sup>

Visibility over the target area was so poor that no one in the first formation was able to drop his bombs. As the skies began to clear, 33 planes of the second formation and 300 planes of the final formation dropped their bombs. One lead bombardier accidentally dropped his load early and the 15 aircraft following him dropped early also. The accidental drop killed 25 and wounded 131 soldiers of the 30th Division.<sup>34</sup>

Contrary to earlier agreements, the heavy bombers approached the target area from a direction perpendicular to the front. Bradley had understood that the bombers would approach on a parallel approach to ensure troop safety. From Bradley's perspective, not only had the air commanders deceived him about the bombers' approach, but the errant drop had also cost him the element of surprise

and 146 casualties. Fearing the Germans were forewarned, Bradley had no choice but to allow the bombers to fly again as planned the next day.<sup>35</sup>

On the morning of 25 July, some 2,400 aircraft, flying perpendicular to the road, approached their targets. Fighter bombers hit first, exactly on target just south of the road. As the dust and smoke drifted back over U.S. positions, the target area became obscured to the successive formations. The bomb loads of thirty-five heavy and forty-two medium bombers fell short of the mark repeating the disastrous results of the previous day. The final toll was shocking: 111 dead, 490 wounded. Among the dead was Lieutenant General Lesley J. McNair, Army Ground Forces Commander, who had been observing in the front lines with the 30th Division.<sup>36</sup>

Contributory factors to this series of air-to-ground incidents included human error, improper briefing on the bomblines, and poor visibility due to dust and smoke that obscured reference points and the St. Lo-Perriers road, causing a parallel road three miles to the northeast to be mistaken for the bomblines. Also, the absence of direct radio communication between the troops on the ground and the heavy bombers in flight made reliance on visual signals necessary.<sup>37</sup>

U.S. Army doctrine of the period recognized the importance of carefully coordinating air support for

ground forces. The 1941 version of FM 100-5, Operations, noted that the effectiveness of air support for ground troops was dependent upon "careful coordination, close cooperation, and rapid signal communication." Consequently, supported ground troops were required to keep supporting combat aviation informed of the location of leading elements and plans of maneuver and fire. There was also a requirement for aviation to be included in the air-to-ground radio net and wire net of supported units. Finally, doctrine required that adequate means of identification of friendly ground troops be carefully arranged and coordinated.<sup>38</sup>

As World War II progressed, the obvious inadequacies of smoke and panels as aids for target identification in close air support operations caused increased attention to be focused on the development of better technical methods. Air-to-ground communications improved and a more effective marker system was subsequently developed.<sup>39</sup> However, as the war ended, doctrine and training regarding fratricide continued to lag behind the advance of technology.

#### The Vietnam War

Fratricide incidents occurred with disconcerting frequency in Vietnam. There, units fought in an environment characterized by rough terrain, no clearly delineated front lines, numerous noncombatants, and

continuous massing of firepower in support of ground operations. Most fratricide incidents in Vietnam were precipitated by nervousness, lack of fire discipline, or by inadequate coordination.<sup>40</sup> The confusion and disorientation that affect even veteran troops in active combat often produced incidents of fratricide, especially when coordination was inadequate.

In one incident, a Forward Observer (FO) with an infantry company requested a 100 meter shift away from a previously fired Defensive Concentration (DEFCON). The DEFCON had been fired during darkness, in thick growth, and apparently was much closer to the battalion's perimeter than estimated. The observer's target description misrepresented the urgency of the situation and caused the fire direction center to fire the DEFCON as a contact mission not requiring safe fire adjustment of the battery. This incident resulted in the death of three U.S. soldiers and injury to nineteen others.<sup>41</sup>

Rough terrain, close combat, and inadequate coordination were also contributing factors to air-to-ground fratricide incidents. During one incident, two B57 aircraft were diverted to support a Vietnamese Civilian Irregular Defense Group (CIDG) company in contact with an enemy force. The air strike was controlled by a US airborne Forward Air Controller (FAC).<sup>42</sup>

Friendly ground forces marked their position with green smoke. This was considered necessary because heavy jungle vegetation prevented visual sighting of friendly troop locations from the air. Prior to the attack by the B57s, several changes regarding target position and attack headings were made between the ground commander, the FAC, and the strike aircraft. After several changes, one of the B57s strafed the suspected target area with 20mm cannon. During the strike, the rounds impacted on the friendly positions resulting in 4 CIDG killed, 28 CIDG wounded, and 2 U.S. advisors wounded. The second B57 did not make a strafing pass.<sup>43</sup>

As early as 1964, the increased rate of accidental casualties became a matter of grave concern to Commander, U.S. Military Assistance Command, Vietnam (MACV) who stated, "[O]ne mishap, one innocent civilian killed, one civilian wounded or one dwelling needlessly destroyed is one too many." Consequently, commanders were directed to maintain a personal interest in these incidents and to take appropriate corrective action to drastically reduce or eliminate such occurrences. This was to be accomplished by constantly reviewing and updating training programs and safety directives, and by the strict enforcement of approved operational procedures and rules of engagement. The ultimate goal was to eliminate, to the maximum extent possible, friendly casualties due



to human errors.<sup>44</sup>

MACV initiated a quarterly analysis of fratricide incidents to ensure continuing command attention and emphasis on this subject. Subsequent to the quarterly update, data was disseminated to subordinate commanders for information and necessary corrective action to minimize casualties inflicted on friendly forces and civilians.<sup>45</sup>

The U.S. Army Continental Army Command (CONARC), charged with the responsibility of conducting training for officers and enlisted soldiers, also conducted its own study of fratricide. Entitled "United States Casualties From Own Fires," it recommended training measures to reduce the fratricide problems identified by MACV. These measures included increased practical training emphasis on troopleading procedures, map reading, identification and recognition, and patrolling. CONARC also established a system for monitoring the implementation of these changes.<sup>46</sup>

Thus, the Army moved to incorporate tactics, techniques, and procedures for reducing fratricide in the jungle fighting of Vietnam. However, adherence to proven techniques and established procedures remained the rule. As one author of a Vietnam fratricide report noted:

They [fratricide incidents] also serve as a reminder that the battlefield is and always has been a strict and harsh disciplinarian. Those who have deviated from proven techniques, used "short cuts" because it

was the "easy way out" or failed to follow directives and established procedures, have done so with disastrous results.<sup>47</sup>

Subsequent measures to reduce fratricide failed to progress beyond individual and small-unit training. Hence, except for minor adjustments to tactics, techniques, and procedures, Vietnam-era doctrine regarding fratricide reduction remained relatively unchanged.

#### The Persian Gulf War

The Persian Gulf War, like every other, was unique. U.S. and coalition forces fought in a desert environment ideally suited to employment of armored forces and airpower and largely free of noncombatant civilians. The realization that thousands of American tanks and combat vehicles would be fighting side-by-side with Arab coalition units using Soviet-built tanks that resembled Iraqi vehicles spurred an early interest in reducing the risk of fratricide.

Fratricide reduction training prior to unit deployment included use of the Unit Conduct of Fire Trainer (UCOFT), introduction of friendly vehicles into gunnery tables, and combat vehicle identification training using flashcards. In theater, units prepared by revising standard operating procedures, exchanging liaison teams, and training on newly delivered position locating systems.

Nevertheless, the initial attack by Iraqi forces at Al Khafji, Saudi Arabia resulted in fratricide to U.S. ground forces. On 29 January 1991, an Air Force A-10 Thunderbolt was ordered to provide close air support to a company-size unit of 8 to 10 Marines Corps Light Armored Vehicles (LAVs) preparing to engage a battalion-size column of more than 50 Iraqi armored vehicles moving south from the Kuwaiti settlement of Umm Hujul toward Saudi Arabia. The Iraqi column was part of a coordinated reconnaissance-in-force operation that simultaneously probed the city of Al Khafji astride the north-south coastal highway on the Kuwaiti-Saudi border.<sup>48</sup>

The A-10 made two passes in an effort to identify the Iraqi vehicles and dropped a flare in the vicinity of the Marine position as a reference point. The forward observer on the ground told the pilot not to attack unless he could positively identify an Iraqi vehicle. Subsequently, the A-10 pilot acquired a series of targets that he identified as Iraqi armored vehicles and fired a single infrared-guided Maverick missile.<sup>49</sup>

The missile struck a Marine LAV, killing seven Marines and wounding two. A military investigation attributed the fratricide to technical malfunction. Others familiar with the incident said that the missile functioned properly and that the pilot misidentified the target.<sup>50</sup>

The Khafji incident made headlines around the world. More importantly, it spurred U.S. Army Central Command (ARCENT) to quickly focus its fratricide reduction program. This all-out effort centered on a theater-wide vehicle marking procedure using No-Power Thermal Material (NPTM). NPTM tape presents a reverse polarity image to thermal sights. The inverted "V" was adopted since it could easily be understood by Arab allies as the number eight in Arabic.

Unfortunately, NPTM tape could not be placed on the rear of combat vehicles since it melts easily. Moreover, NPTM tape was not available in sufficient quantity until 23 February 1991. Thus, the ground war started with little time to fully implement the vehicle marking plan.<sup>51</sup>

ARCENT's vehicular marking system used VS-17 panels to provide daylight air-to-ground target identification. A shortage of VS-17 panels forced some units to use a three foot square sheet of orange plastic. The plastic was a poor substitute since it faded quickly in the desert sun and was too small to be seen anyway.<sup>52</sup>

The Army did not possess a positive identification system for reduced visibility operations prior to Operation DESERT STORM. Consequently, the Department of Defense rushed thousands of infrared (IR) beacons to the Persian Gulf to attempt to provide a quick fix to the

problem. These beacons were mounted on vehicles at the forward edge of the battle area to make them more readily identifiable to Air Force aircraft and Army helicopters using IR sights. The IR beacons were used at night with mixed results; ground units did not like the signature they presented to the Iraqis.<sup>53</sup> Furthermore, the IR beacons were generally not visible in thermal sights and were hard to distinguish from visible light sources.<sup>54</sup>

U.S. and coalition ground forces finally attacked into Kuwait and Iraq on G-Day, 24 February 1991. Their mission included "cutting off and killing " the Iraqi forces arrayed against them. The ferocity of their assault carried a heavy price in terms of fratricide. Despite more than seven months of coordination and efforts to mark thousands of tanks and other vehicles, the procedures and technology used by coalition forces were only marginally effective in preventing fratricide.

A typical example occurred on Day G+4, 27 February, when a U.S. Army mechanized task force conducted a night movement to contact on the right flank of a brigade wedge formation moving east. The right flank company in the center task force trailed the lead tank company in the southern task force by a distance of 2-3 kilometers.<sup>55</sup>

In the confusion caused by contact with an enemy dismounted force, this company acquired and engaged friendly vehicles in the southern task force's lead tank

company. In simultaneous engagements, five tanks in the task force were hit for a total of two vehicles destroyed, one KIA, and seven WIA.<sup>56</sup>

This fratricide incident significantly impaired the combat power and effectiveness of both units. Contributing factors included: visibility (50 meters with night vision goggles), turret orientation, thermal identification, fatigue and antitank rocket explosions mistaken for main gun signatures. Moreover, instructions to avoid engagements beyond 2,000 meters were not followed.<sup>57</sup>

The inability to determine friend or foe caused units to establish restrictive rules of engagement. In one case, a U.S. Army unit did not fire unless fired upon. That unit also did not send out patrols, either mounted or dismounted, for fear of fratricide.<sup>58</sup>

In another case, a U.S. Army unit attached to the 2nd Marine Division, fearing a possible repeat of the Khafji incident, refused close air support because the ceiling had dropped below 1,000 feet. Fortunately, in this case, mission accomplishment did not require use of CAS.<sup>59</sup>

Of the total of 615 U.S. military battle casualties in Operation DESERT STORM, 148 service personnel were killed in action, including 35 by fratricide, and 467 were wounded, including 72 by fratricide.<sup>60</sup> These

numbers do not include the 29 Americans killed by unexploded coalition and enemy ordnance.<sup>61</sup> Also not included in this tally are the 22 British soldiers killed or wounded by American forces.<sup>62</sup>

An official post-war report noted a combination of featureless desert terrain; large, complex and fast moving formations; fighting in rain, darkness, or low visibility; and the ability to engage targets from long distances as contributing factors in DESERT STORM fratricides.<sup>63</sup> Alternately, these same factors also contributed to U.S. forces achieving their victory more rapidly, thereby keeping casualties to a minimum.

However, nearly a quarter of the casualties that U.S. forces suffered during Operation DESERT STORM were the result of fratricide--significantly higher than the historic rate of 2%.<sup>64</sup> Indeed, some researchers estimate that losses due to fratricide may have reached as high as 50% of all casualties during the four day ground assault.<sup>65</sup> Other analysts attribute the higher percentage of fratricide casualties to better accounting procedures and the lack of combat seasoning caused by a 100 hour ground war. In addition, firing incidents may have occurred that did not produce casualties and were consequently not reported.<sup>66</sup> It is also important to note that these casualties were sustained in an operation in which the enemy put forth moderate resistance and

executed limited maneuver against U.S. forces.

However, as the most recent combat test of our doctrine, Operation DESERT STORM offers significant insights for reducing fratricide in future conflicts. If nothing else, Operation DESERT STORM proves conclusively that technology has outstripped the ability of our current doctrine to accommodate it. The M1A1 tank, M2 Bradley Fighting Vehicle, AH-64 Apache helicopter, close air support aircraft, and other weapon systems used in Operation DESERT STORM had the capability to acquire and engage targets at extended ranges. However, an inability to positively identify friend from enemy at extended ranges prevented the full exploitation of the potential offered by these systems.

Lastly, although the lessons of the Persian Gulf War are still emerging, our fratricides there have already generated much interest in reducing self-inflicted losses. At the same time, one war's experience with fratricide is an imprecise guide to the course of the next conflict. Lessons learned from the Persian Gulf War should be tempered with the realization that historical analysis is only one input in the development of doctrine, training, and technology. Therefore, these lessons should serve as a start-point for the detailed analysis of fratricide that must be conducted over the next few years.



This examination of the Persian Gulf War concludes our analysis of history. All three historical vignettes show that fratricide incidents are most likely to occur in the early stages of combat, during reduced visibility, or along shared unit boundaries. Moreover, the nature of future fratricide risk may be dependent upon the specific theater and enemy encountered. For example, incidents during the Vietnam War and the Persian Gulf War are at opposite ends of the scale in terms of tempo, duration, tactics, and terrain. Thus, theater characteristics affect the risk of fratricide and will vary with each conflict.

With our historical canvassing complete, we now turn to analyze current and emerging doctrine of the U.S. Army and U.S. Air Force.

### Section III

#### CONCEPTS AND DOCTRINE

Doctrine is the "how" in the way the Army and Air Force expect to conduct their operations. Joint Pub. 1-02 defines doctrine as:

Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgement in application.<sup>67</sup>

Doctrine must balance continuity and change, yet remain adaptable and realistic. It must be flexible enough to enable the tactical commander to improvise to meet the requirements of the specific case. Equally important,

doctrine requires periodic updating to keep pace with the changing environment. The purpose of this section is to survey current and emerging U.S. Army and U.S. Air Force doctrine and arrive at a common understanding of concepts regarding doctrine.

Current U.S. Army doctrine is codified in the 1986 version of FM 100-5, Operations. As the Army's keystone warfighting manual, FM 100-5 presents a stable body of principles rooted in actual military experience and capable of providing a long-term foundation for the development of more transitory tactics, techniques, and procedures. Entitled AirLand Battle doctrine, it emphasizes flexibility and speed, mission type orders, initiative among commanders at all levels, and the spirit of the offense.<sup>68</sup>

AirLand Battle doctrine requires decentralization of decision authority because centralization in the chaos of battle can slow action and lead to inertia. Thus, it acknowledges and accepts the risk of "some loss of precision" in execution. However, it addresses the resulting increased likelihood of fratricide in only the most implicit and conceptual terms: "Ensure unity of effort" and "Anticipate events on the battlefield."<sup>69</sup>

Subordinate Army tactical doctrine from corps through brigade level is equally devoid of a detailed discussion of the cause, effects, and reduction of

fratricide. The 1989 version of FM 100-15, Corps Operations, alludes to fratricide in the same vague terms as the 1986 version of FM 100-5. The 1990 version of FM 71-100, Division Operations, devotes exactly one sentence to the subject: "Air defense must be continually synchronized with aviation operations to preclude fratricide of friendly aviation assets."<sup>70</sup> Likewise, the 1988 version of FM 71-3, Armored and Mechanized Infantry Brigade, only briefly mentions fratricide during a discussion of infiltration and link-up operations.<sup>71</sup>

Only at maneuver battalion level and below does a specific discussion of fratricide reduction occur. The 1988 version of FM 71-2, The Tank and Mechanized Battalion Task Force, furnishes fratricide reduction guidance in a discussion of the control of battalion task force fires.<sup>72</sup> FM 71-1J, The Tank and Mechanized Infantry Team, and FM 7-7J, The Mechanized Infantry Platoon and Squad, also provide guidance in sections addressing fire planning, fire control, and establishment of a vehicle recognition system.<sup>73</sup>

Current Army fire support doctrine contains numerous methods for assisting fire support coordinators and their staffs in the reduction of fratricide. Most important are the traditional fire support coordinating measures that help facilitate the rapid engagement of targets and, at the same time, provide safeguards for friendly forces.

Since successful fire support encompasses careful integration of all available weapon systems, synchronization is the key. FM 6-20-30, Fire Support for Corps and Division Operations, tasks fire support officers to assist commanders in synchronizing fire support with maneuver while ensuring that fire support "will not jeopardize troop safety."<sup>74</sup> Alternately, in a discussion of fire support for a hasty attack, TC 6-71, Fire Support Handbook for the Maneuver Commander, encourages commanders to "consider starting the assault under the preparation [*italics added for emphasis*]."<sup>75</sup>

Army Regulation (AR) 350-41, Army Forces Training, directs unit training to be conducted in accordance with published doctrine.<sup>76</sup> Yet, neither FM 25-100, Training the Force, nor FM 25-101, Battle Focused Training, address the training measures required to reduce fratricide. FM 25-101 merely offers commanders the following points to consider when integrating risk assessment:

- Accept no unnecessary risks.
- Make risk decisions at the proper level.
- Accept risks if mission benefits outweigh the costs.<sup>77</sup>

Despite the lack of emphasis by FM 25-100 and FM 25-101, the Army standards contained in subordinate mission training plans (MTPs), battle drill books, soldier's manuals, regulations, and other training and doctrinal publications allow commanders to train on tasks related

to fratricide reduction. An excellent example is Training Circular (TC) 90-1, Military Operations on Urbanized Terrain Training.

TC 90-1 recognizes the increased risk of fratricide on an urbanized battlefield characterized by violent, independent small-unit actions at close quarters. Fratricide reduction measures are repeatedly emphasized:

Rifle rounds penetrate most interior walls. Soldiers must be certain that friendly troops are not on the other side of the wall before firing.<sup>78</sup>

At night or under limited visibility conditions, there is an increased danger of casualties from friendly fire when clearing rooms...As they enter the room, the rear man guides the front man to the left as he moves to the right.<sup>79</sup>

TC 90-1 also recognizes that combat operations may be hampered by the presence of noncombatant civilians on the battlefield. It encourages the integration of civilian play into training scenarios by using dummies or targets as well as soldiers dressed as civilians.<sup>80</sup>

Likewise, the recently revised FM 7-20, The Infantry Battalion, FM 7-10, The Infantry Rifle Company, and FM 7-8, The Rifle Platoon and Squad, all offer detailed instructions for reducing the risk of fratricide. For example, FM 7-8 warns of the potential for fratricide during a patrol's reentry of friendly lines at night by offsetting it in bold letters:

Warning: Reentry of friendly lines at night is dangerous and should only be attempted when it is essential to the success of the patrol.<sup>81</sup>

Due to their recent publication (1990 - 1992), these manuals are able to incorporate the latest lessons learned from fratricide incidents in Grenada, Panama, and Southwest Asia, as well as trends from the Combat Training Centers.

In 1992, the Center for Army Lessons Learned (CALL) published CALL Handbook No. 92-3, Fratricide Risk Assessment for Company Leadership, and CALL Newsletter No. 92-4, Fratricide: Reducing Self-Inflicted Losses. The newsletter contains an operational risk assessment matrix and appendices that list fratricide contributing factors, reduction measures, and lesson plans.

CALL Newsletter No. 92-4 notes that "lack of positive identification" and "inability to maintain situational awareness" are the major contributors to fratricide. Situational awareness involves the real-time accurate knowledge of one's own location and orientation, as well as the locations of friendly, enemy, and noncombatants. The newsletter also describes key fratricide countermeasures including "detailed planning" and "rehearsals to minimize predictable risks."<sup>82</sup>

Both of these documents are written with a heavy bias toward the tactics, techniques, and procedures--the application of doctrine to circumstances--that reduce the risk of fratricide. Lacking any other current alternatives, their utility cannot be questioned. Their

assimilation into emerging Army doctrine can be seen in the ongoing revisions of FM 100-5, Operations, and FM 101-5, Staff Organization and Procedures.

The 1992 preliminary draft of the revised FM 100-5 addresses the shortcomings of the 1986 version concerning fratricide in a truly seminal and specific manner. For the first time, FM 100-5 acknowledges and defines fratricide, albeit narrow in scope, as: "the unintentional killing of our own soldiers by our own fire."<sup>83</sup>

This definition incorporates the traditional view that fratricide is the unintentional engagement of a friendly military force. However, most of our future battlefields will contain civilian noncombatants that will probably be allies, or at least friendly. Killing noncombatants creates the same detrimental effects as a mistaken engagement of a friendly military force: hesitancy, reduced aggressiveness, disrupted operations, and a reduction in morale. Therefore, a doctrinal discussion of fratricide must include civilian noncombatants.

More importantly, the revised FM 100-5 codifies the prevention of fratricide as "the fourth component of protection" and continues by describing the primary mechanisms for limiting fratricide: "strong command, disciplined operations, and detailed situational

awareness." Equally important, it cautions against "overly constricting" boldness and audacity in combat as a reaction to fratricide. Finally, it recognizes that advancements in technology must be anticipated and accommodated while minimizing risk to the force.<sup>84</sup>

Similarly, the June 1992 coordinating draft of FM 101-5, Staff Organization and Operations, accepts the increased likelihood of fratricide on future battlefields. It devotes an entire appendix to a discussion of fratricide countermeasures. However, this discussion fails to address the staff responsibilities and procedures required to assist commanders in reducing fratricide. Instead, it simply repeats the major points made in CALL Newsletter No. 2 regarding causes and effects of fratricide. Furthermore, it identifies individual, crew, and unit training, as well as various technological solutions, as potential solutions but neglects to identify how the staff supports them.<sup>85</sup>

Thus far, our discussion has focused on Army doctrinal literature. As we now turn our attention to examine what Air Force doctrine offers, we find perhaps an absence of common terms, but a commonality of thought and basic concepts concerning fratricide reduction.

AFM 1-1, Basic Aerospace Doctrine of the United States Air Force, serves as the Air Force's primary doctrinal publication. AFM 1-1 defines fratricide as:



Destruction of friendly forces when destruction of enemy forces is intended, whether due to misidentification, unforeseen activity, confusion, or inadvertence.<sup>86</sup>

Significantly, aerospace doctrine accepts that new experiences, reinterpretations of former experiences, advances in technology, changes in threats, and cultural changes can all require alterations to doctrine.<sup>87</sup> This approach is essential when addressing the increased likelihood of fratricide on the battlefield.

Air support for Army tactical forces is primarily provided by the U.S. Air Force in the form of close air support (CAS). CAS is defined by Joint Pub 1-02 as:

Air action against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces.<sup>88</sup>

CAS is further defined by AFM 1-1 as "the application of aerospace forces in support of the land component commander's objectives."<sup>89</sup>

CAS is the most difficult of all fire support means to coordinate close to enemy troops because aerial- and surface-delivered fires must be delivered at the same time into a confined area. Recognizing fratricide's detrimental effects, aerospace doctrine notes that CAS should be planned and controlled to reduce the risk of friendly casualties. AFM 1-1 also recognizes a dual effect of fratricide:

Fratricide can have a devastating impact on the ability of surface forces to exploit opportunities

created by close air support in future as well as current battles. Fratricide also is likely to make aerospace forces excessively cautious, handicapping their ability to create opportunities for surface forces.<sup>90</sup>

Thus, there can be little tolerance for error by either Air Force or Army units.

Consequently, AFM 1-1 urges that special attention be given to training for joint and combined employment. AFM 1-1 also asserts that freedom of action for the Air Force is reduced when operating in the vicinity of ground tactical forces. Accordingly, AFM 1-1 advocates an increase in the depth of operations to reduce the danger of fratricide and coordination required between the Army and Air Force.<sup>91</sup>

To increase efficiency, coordinate and control tactical fighters, and alleviate problems of fratricide, an Air Force tactical air control party (TACP) normally is provided to each maneuver battalion and above. Tactical Air Command Pamphlet (TACP) 50-22, Tactical Air Control Party/Fire Support Team (TACP/FIST) Close Air Support Operations, describes how Army fire support teams (FISTs) work with Air Force TACPs to control CAS missions.

The air-to-ground fratricide reduction procedures contained in this publication are extensive. Troop safety is recognized as a key consideration in using CAS. The primary cause of air-to-ground fratricide is

described as "misidentifying friendly forces as enemy forces."<sup>92</sup> Consequently, TACP 50-22 emphasizes target and friendly force identification as part of CAS mission planning.

Likewise, the Joint Munitions Effectiveness Manual (JMEM) Air-to-Surface Methodology Working Group Risk Estimates for Friendly Troops (U) provides risk-estimate distances for aircraft delivered munitions. These risk-estimate distances have been developed for wartime use only and are provided to TACPs and FISTs in the J-Fire: Multi-Service Procedures for the Joint Application of Firepower reference guide. The risk-estimate distances in J-Fire are for using artillery and Air Force delivered munitions near friendly forces. These risk-estimate distances are for munitions delivered parallel to a line of friendly troops that would generally be situated along the forward edge of the battle area .<sup>93</sup>

Risk-estimate distances allow commanders to estimate the risk in terms of friendly casualties that may result from a CAS strike. J-Fire procedures require the FAC to consider friendlies within one kilometer of targets as a "troops in contact" situation and advise the ground commander accordingly. The passing of the ground commander's initials indicates his acceptance of the risk for intentional munitions delivery within 1 kilometer of friendly troops.<sup>94</sup>

Ultimately then, the ground unit commander requesting CAS is responsible for troop safety limits.<sup>95</sup> His staff and the TACP can only make recommendations concerning troop safety limits. Thus, the mutual trust that must exist between the Army and Air Force truly depends on anticipating and reducing the risk of air-to-ground fratricide.

A summary of our review of Army and Air Force doctrine reflects similar concepts, although somewhat differing terms, concerning fratricide. Neither service has a single publication that fully addresses fratricide reduction. Air Force doctrine addresses air-to-ground fratricide reduction in detail at all levels, operational through tactical. The Army's doctrinal concern for fratricide reduction is primarily centered around techniques, tactics, and procedures used at battalion-level and below. Meanwhile, emerging doctrine reflects the fratricide lessons learned from recent combat operations and trends at the Combat Training Centers.

Our review also leads us to the conclusion that *current* Army and Air Force doctrine fail to accommodate recent technological changes in warfighting. Neither doctrine accounts for the increasing range and lethality of ground-to-ground weapons and air-to-ground weapons. The traditional use of "positive identification" as a coordination measure is complicated by the greater range

of modern standoff weapons, fire-and-forget weapons, and associated acquisition systems. As these capabilities have evolved, there has been no corresponding adjustment in doctrine concerning fratricide. Consequently, a significant doctrine-capabilities gap now exists in both services.

#### Section V

#### CONCLUSIONS AND IMPLICATIONS

Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.

Giulio Douhet<sup>96</sup>

Our review and analysis of history, concepts, and doctrine suggests that doctrine can assist in reducing the risk of fratricide. Moreover, the role of doctrine is threefold:

- Doctrine must develop an awareness for fratricide by laying the foundation for the development of subordinate doctrine.
- Doctrine must direct and facilitate the training required to reduce the risk of fratricide.
- Doctrine must drive the technological development and materiel acquisition required to support fratricide reduction efforts.

Of these three roles, the requirement to develop a doctrinal awareness for fratricide must receive first priority--beginning with AirLand Battle doctrine. By instilling initiative and aggressiveness in the force, AirLand Battle doctrine may have unwittingly created a certain level of avoidable risk produced by the friction

inherent in that doctrine. Hence, the Army may have built in a degree of fratricide that no application of doctrine, training, or technology can eradicate.<sup>97</sup>

While this may be unavoidable, there are a number of doctrinal issues that can be emphasized, adjusted, or changed to reduce the likelihood of fratricide. Improving the shortcomings pointed out in TC 6-71, FM 71-3, FM 71-100, and FM 101-5 would logically seem to lessen the risk of fratricide in certain situations. Likewise, operations plans that incorporate passages of lines, movements to contact, attacks on a converging axis, unspecified coordination for latter phases, cross attachments, movement across adjacent unit boundaries, or limited visibility operations must be viewed skeptically until details are finalized and backbriefs and rehearsals completed.

Furthermore, commanders and planners must employ doctrinal control measures that specifically assist in the reduction of fratricide. These include boundaries, engagement areas (EAs), airspace coordination areas (ACAs), restrictive fire areas (RFAs), no fire areas (NFAs), restrictive fire lines (RFLs), and fire coordination lines (FCLs). However, implementation of more restrictive measures can only serve to inhibit the very initiative, flexibility, and aggressiveness required to execute AirLand Battle doctrine.

Planners must also place particular emphasis on spatial separation between adjacent units. For example, establishing a free fire area (FFA) between converging forces, instead of the more common RFL, allows for continued engagement of enemy forces while reducing the likelihood of intermingled forces. Likewise, use of a one kilometer buffer zone along boundaries of adjacent major commands and coalition forces may reduce fratricide.<sup>98</sup>

Second, doctrine must direct and facilitate individual and unit training to limit fratricide. In training to reduce fratricide, US Army doctrinal training publications must provide leaders correct procedures and principles in order to conduct training properly. New training manuals should identify those collective task measures which help reduce fratricide in high-risk missions. The collective task matrix for these missions should include individual and vehicle recognition tasks.<sup>99</sup>

Clearly, fratricide reduction standards must be incorporated into appropriate MTPs and gunnery tables. However, including fratricide reduction as a *critical* task may foster overemphasis during training. Commanders must maintain their perspective and train to reduce the risk of fratricide without sacrificing boldness and audacity.

Other training areas must also be emphasized. These include rehearsals, fire control, combat vehicle identification, and land navigation. The rehearsal is the "grease" applied to reduce the friction of war. Whether full-up or abbreviated, rehearsals must be conducted prior to any operation to eliminate confusion and reduce the possibility of someone being in the wrong place at the wrong time.

Fire control and vehicle identification go hand-in-hand. To shoot or not to shoot is the question. Although not a problem during Operation DESERT STORM, this is particularly important when allies and enemy use the same equipment. Consequently, standard use of fully manned and properly equipped liaison teams to reduce the frictions associated with joint, combined/coalition, and interagency operations may help to limit fratricide.

Currently, the UCOFT and the combat vehicle identification (CVI) station on the Tank Crew Gunnery Skills Test provide opportunities for friendly identification training. Likewise, FM 17-12-1, Tank Gunnery, and FM 23-1, BFV Gunnery, allow integration of friendly target arrays into infantry and tank live-fire qualification tables. However, training must include the use of thermal and night vision equipment, as well as clear optics. CVI training using graphic training aids must include thermal images depicting friendly and threat



vehicles at various ranges and conditions.

Land navigation training is one of the most important factors in the reduction of fratricide. The ability to maintain one's location reduces the chance of losing situational awareness--a major contributor to fratricide. Furthermore, all flank unit coordination and tracking of the battle rely on the ability of subordinate units to accurately report where they are. Finally, land navigation training should include, but certainly not be limited to, use of position locating systems.

Third, technology has always had an impact on the nature of warfare and, therefore, on doctrine. However, as the U.S. Army's "engine of change," doctrine must drive technological advancement, rather than merely adapting to it. While reflecting the nature of modern warfare, doctrine must also recognize that sophisticated weapons and technologies are no better than the skill with which leaders and soldiers employ them. We have to accept that the most skillful application of modern technology will not completely eliminate fratricide from tactical operations.

Although technology-inspired lessons from a single war are likely to have a very short life, the fratricide losses suffered during Operation DESERT STORM underscore the need for more effective means for identifying friendly and hostile forces on the battlefield. Interim

technological solutions are readily available and relatively inexpensive, but they are vulnerable to exploitation by a well-equipped enemy.

Longer-term developmental solutions must allow target identification through the sight to the maximum acquisition range of the weapon system. The sight cannot be sensitive to environmental degradation and must be based on passive, noncooperative identification measures. These systems must also be capable of rapid issue, assimilation, and use by other services and agencies, as well as coalition allies. Lastly, as author Christopher Bellamy notes, "technology must match man: man is the measure."<sup>100</sup> Thus, any planned technological or materiel solutions to fratricide must include adequate consideration for man-machine interface and the integration of technology with doctrine.

In short, doctrine cannot perform the impossible. Even after we have applied the full range of doctrinal measures available, fratricide will remain a grim reality of combat. Ultimately, the role of doctrine is not to furnish any final answers, but to provide the impetus to develop innovative and creative solutions to the problem of fratricide on tomorrow's battlefield. As S. L. A. Marshall observed, doctrine cannot transform human nature or "change cockroaches into butterflies."<sup>101</sup>

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