

(Unclassified Paper)

NAVAL WAR COLLEGE  
Newport, RI

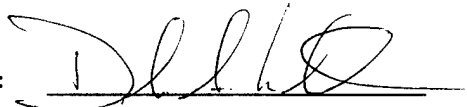
Fratricide and the Operational Commander:  
An Appraisal of Losses to Friendly Fire

by

Douglas A. Wild  
MAJ, U.S. Army

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

Signature: 

13 June 1997

DTIC QUALITY INSPECTED 4

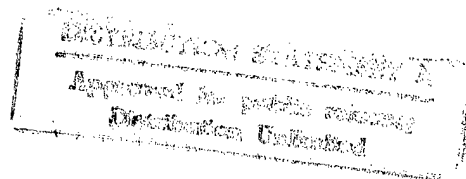
Paper directed by Captain G.W. Jackson  
Chairman, Operations Department



Faculty Advisor  
William P. Goodwin  
Colonel, U.S. Army  
Strategy and Policy Department

6 Feb 97  
Date

19970520 171



REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol:  C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): UNCLASSIFIED Fratricide and the Operational Commander: An Appraisal of Losses to Friendly Fire			
9. Personal Authors: MAJ Douglas A. Wild, US Army			
10. Type of Report: FINAL		11. Date of Report: 7 February 1997	
12. Page Count: 24			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: Fratricide and the operational commander, definitions, causes, impacts and corrections.			
15. Abstract: The "fog of war" may very well establish the conditions for losses due to friendly fire. Whatever the cause, incidents of this type pose a significant challenge for the operational commander in terms of his ability to conduct continuous operations on today's battlefield. Research has shown that some weapon systems rely on human judgment under conditions and distances where such judgment is degraded or even faulty. The gap between technology and human capability is approaching a level where human beings may not be able to employ these systems without significant risk to one's own forces. This limitation does not absolve leaders of the responsibility to incorporate methods to reduce the risk of losses from fratricide. Fratricide is a joint issue that must be addressed in a multi-service manner. Commanders and staff officers alike must understand the problem and be familiar with steps to limit its awful cost.			
16. Distribution / Availability of Abstract:	Unclassified  X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: C	

Abstract of

**Fratricide and the Operational Commander:**

**An Appraisal of Losses to Friendly Fire**

The "fog of war" may very well establish the conditions for losses due to friendly fire. Whatever the cause, incidents of this type pose a significant challenge for the operational commander in terms of his ability to conduct continuous operations on today's battlefield. Research has shown that some weapon systems rely on human judgment under conditions and distances where such judgment is degraded or even faulty. The gap between technology and human capability is approaching a level where human beings may not be able to employ these systems without significant risk to one's own forces. This limitation does not absolve leaders of the responsibility to incorporate methods to reduce the risk of losses from fratricide. Fratricide is a joint issue that must be addressed in a multi-service manner. Commanders and staff officers alike must understand the problem and be familiar with steps to limit its awful cost.

TABLE OF CONTENTS

ABSTRACT . . . . .	ii
INTRODUCTION . . . . .	1
DEFINING THE PROBLEM . . . . .	2
POTENTIAL CAUSES . . . . .	4
OPERATIONAL IMPACTS AND EFFECTS . . . . .	6
CONSIDERATIONS TO CORRECT THE PROBLEM . . . . .	9
Technology . . . . .	9
Training . . . . .	10
Planning . . . . .	11
Doctrine . . . . .	12
CONCLUSION . . . . .	13
NOTES . . . . .	15
BILIOGRAPHY . . . . .	17
APPENDIX A	
Extract from Appendix G, CALL Newsletter 92-4 . . . . .	A-1
Extract from Chapter 8, Figure 8-1, ST 101-5 . . . . .	A-2
APPENDIX B	
Extract from Appendix E, CALL Newsletter 92-1 . . . . .	B-1

## INTRODUCTION

"I detest the term friendly fire. Once a bullet leaves a muzzle or a rocket leaves an airplane, it is not friendly to anyone. Unfortunately fratricide has been around since the beginning of war. The very chaotic nature of the battlefield, where quick decisions make the difference between life and death, has resulted in numerous incidents of troops being killed by their own fires in every war this nation has ever fought. Even at the National Training Center where kills are simulated by lasers and computers, many incidents of fratricide are observed. This does not make them acceptable. Not even one such avoidable death should ever be considered acceptable. And in a war [Gulf War] where so few lives were lost on our side, the tragedy is magnified when a family loses a son or daughter in such a way. We must find a better and safer way to do our jobs. In every after-action report submitted by subordinate commanders, this problem has been highlighted as one that demands immediate attention and action. All the services are dedicated to finding a solution to this long-standing dilemma."<sup>1</sup> **GEN H. Norman Schwarzkopf**

Technologically advanced weapon systems and the increased battlefield tempo caused by this new technology, coupled with the constant existence of the "fog of war" can cause death by friendly fire. Fratricide poses a significant challenge to the operational commander; its impact goes beyond the mere calculation of battlefield losses to personnel and equipment. "As demonstrated by the downing of two US Army helicopters

over Iraq by two US Air Force jets in April 1994, fratricide is a multi-service, joint problem."<sup>2</sup> This paper will examine the issue of fratricide as it applies to the operational commander. It will suggest potential solutions to assist in limiting and managing the risk of friendly fire incidents. It will show that the operational commander must be prepared to deal with the unpleasant reality that the total elimination of fratricide is not likely to occur.

#### DEFINING THE PROBLEM

As a starting point to help the operational commander understand the impact of fratricide, a viable definition is needed. Oddly, Joint Pub 1-02, Department of Defense Dictionary of Military and Associated Terms, does not contain a definition for fratricide. Air Force Manual 1-1 does not define fratricide either.

Perhaps the most useful military definition of fratricide is found in U.S. Army Field Manual 100-5, Operations. FM 100-5 defines fratricide as "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>3</sup> In his article published in 1995, Colonel Kenneth Steinwag argues that "this restrictive definition eliminates accidental weapon explosions and misfires, training accidents, and self-wounding of any kind, whether intentional or not."<sup>4</sup> Colonel Steinwag makes this point to show that it is difficult to place parameters when defining friendly fire.

Charles Shrader argues for a different term than fratricide to define the problem. He contends that the noun amicicide, from the Latin amicus (friend) and cide (killing) better describes the incident in which human casualties are incurred by military forces in active combat as a result of being fired upon unintentionally by the weapons of their own or allied forces.<sup>5</sup>

FM 100-5 is, however, the only source of military doctrine currently available to the operational commander trying to define the problem. The absence of a widely accepted joint definition of fratricide highlights how difficult the operational commanders job is when trying to plan and train to prevent or limit incidents involving fratricide.

Another issue compounding the difficulty of defining the problem has been the way losses to fratricide have been

reported over the years. There are many formulas which manipulate the calculations of battlefield losses. Most studies show U.S. losses due to fratricide from World War I through Vietnam to be around two percent. In Desert Storm this number rose to over 17 percent. The method by which these losses were calculated could be argued in a whole separate analysis. Suffice it to say that modern technology has made computing causes for battlefield losses a much more exact science. For the purposes of this paper, these statistics will be used as the historical data for fratricide casualty rates.

Fratricide can be broken down into four major categories: air-to-surface, surface-to surface, surface-to-air, and air-to-air. For the purpose of this paper, I have chosen to focus my analysis and research to those engagements that involve surface-to-surface, and air-to surface.

#### POTENTIAL CAUSES

The causes for fratricide can be broken down into two broad categories - mechanical and human.

Fratricide caused by mechanical failure is, as the term implies, a situation that results from a weapon system that does not perform as designed.<sup>6</sup> The incidents of fratricide caused by mechanical failure are very rare, and by their nature, they are nearly impossible to humanly correct. Most cases of fratricide have resulted from some identifiable human failure.<sup>7</sup>

The tempo of the battlefield is ever increasing, and it is becoming more evident that the human being is one of the primary limiting factors in determining success or failure of a military operation.<sup>8</sup> It is more and more apparent that as the tempo of the battlefield, the need for continuous operations, and the ranges of weapon systems continue to increase, the abilities of human beings to maintain pace has begun to deteriorate. This decrease in ability is caused by such factors as stress, sleep deprivation, and situational awareness.

The effects of stress in a combat situation can cause even the most seasoned veteran's performance to deteriorate rapidly. Include sleep deprivation (effects will take place within about 18-24 hours of implementation of continuous operations) into this formula and the effectiveness of the

individual soldier to make simple decisions is significantly degraded. Tasks requiring complex mental processes decline first in such a situation (e.g. command and control, awareness of orientation to friendly and enemy troops, and target acquisition, designation, and tracking). Seemingly all of the critical functions required not only for a successful operation, but for the prevention of fratricide as well deteriorate first.<sup>9</sup> The operational commander and his staff must be keenly aware of the readiness of troops when planning for and executing today's complex operations. Failing to be aware of human limitations will only increase the possibility of deaths due to fratricide.

#### OPERATIONAL IMPACT AND EFFECTS

The operational impact and effects of fratricide go far beyond the loss of life and equipment. Incidents of fratricide coupled with media coverage which has become nearly "real time" can cause a variety of effects. These effects include but are not limited to excessive command and control, disrupted operations, loss of offensive aggressiveness and needless loss of combat power.<sup>10</sup> Perhaps more important than

all of these to the operational commander are the psychological effects fratricide will have on his troops and leaders.

The psychological effects of fratricide are without a doubt the most important factor the operational commander must consider when determining measures to limit and manage its cause. These factors include: loss of confidence, leader self-doubt, loss of aggressiveness/initiative, hesitation, and degradation of cohesion and morale. The psychological effects of just one incident of fratricide can "rob an operation of its offensive mindset and shake the confidence of everyone from the CINC to the basic soldier, sailor or airmen."<sup>11</sup> Morale can be so disrupted that leaders at all levels begin to doubt the effectiveness of their plans, weapon systems, and methods of employment of both troops and equipment. Commanders and staff officers of affected units are more likely to avoid closely coordinated operations, preferring operations which allow for larger safety margins.<sup>12</sup>

It has been argued that such reactions to fratricide actually cause increased risk in combat operations because commanders impose more restrictive control measures which actually place troops at further risk to harm by the enemy.

This attitude was characterized by a comment made by the Commander, 2d Armored Cavalry Regiment following a friendly fire incident involving his unit during the Gulf War: "people showed a lot of restraint. Everybody came a little closer to the enemy because they wanted to make sure before they fired."<sup>13</sup>

A final factor the operational commander cannot discount when considering the effects of fratricide on operations is the impact of public opinion. "Although common in every conflict, friendly fire has only recently become a household word due to the fulsome attention given by the media to such incidents in the Gulf War."<sup>14</sup> It does not appear there is any means to limit the discontent the civilian populace has had, and will continue to have, concerning fratricide. Perhaps the only solution military leaders can offer is fair and honest reporting of such incidents. It then becomes a joint effort between civilian and military leaders to try to educate the public on how difficult the fratricide problem is to eliminate given the current environment which exists on the modern battlefield. It has been proven time and again that public opinion plays an important role in the operational commander's success or failure.

## CONSIDERATIONS TO CORRECT THE PROBLEM

There are many "tools" available to the operational commander and his staff when trying to derive the best method to manage the risk of fratricide. These include technology, training, planning and doctrine. None of these tools alone will solve the problem of how to limit incidences of fratricide. The smart commander will apply a combination of these tools to his risk assessment and planning process.

**Technology.** The American people are traditionally enthralled with technological advances that will provide a "quick-fix" to correct difficult problems. This is a widely accepted position where fratricide is concerned. Since the Gulf War, the Army and Air Force have been given the lead to develop technology based solutions to fratricide. Most devices are designed to improve combat identification through the use of Identify Friend or Foe (IFF) systems. IFF has been used since World War II on aircraft and air defense weapons systems. The Army has devised an IFF application for ground vehicles. The other area which receives much technological attention are those with designs intended to increase situational awareness.

Systems such as the Global Positioning System are employed to make humans more aware of their surroundings and relative position on the battlefield.

These technologically based systems are effective, but only play a role in assisting in the reduction of fratricide. All of the technologies currently being explored are costly, and they still rely on the human operator to make them effective. This is where I contend that technology must be closely coupled with training, planning and doctrine to make it an effective tool in limiting fratricide.

**Training.** The operational commander cannot be afraid of fratricide. He must however strive to manage it through tough, realistic, combined arms training. This training must emphasize intense, realistic standards that are communicated thoroughly at all levels, from the lowest tactical unit through the highest operational staff.

As the ranges of technologically advanced weapons have increased, the limits of human control over their destructive force have been approached. Human factors are rapidly becoming the vital link between technology and the increased potential for friendly casualties. It is only through

training that commanders will understand the limitations of their people and equipment. Avoiding fratricide is an essential training standard.

It should not be misunderstood or thought that this problem can be "trained - away". Training is the tool which enables the commander to understand the limitations of his troops and staffs. Understanding these limits will provide a baseline the commander can use to manage fratricide risk by giving him the knowledge of when performance will degrade to the point employment of weapon systems becomes a threat to friendly forces.

**Planning.** An integral part of planning at the operational level is the continuous reassessment of guidance, limitations, tasks, and objectives.<sup>15</sup> Inherent to the planning process is the incorporation of risk reduction measures. Joint Pub 5-0, Doctrine for Planning Joint Operations does not provide the operational commander with any methods by which to assess risk considerations for fratricide. At Appendix A, I have provided two examples of a course of action decision matrix which could be utilized by the operational commander when incorporating fratricide risk assessment into his plans. At Appendix B, the

results of a study conducted by the Center for Army Lessons Learned (CALL) is provided to show potential baseline figures which could also be utilized by a planning staff when considering fratricide risk assessment.

The success of any operation starts with effective planning. The planning process is just another of the vital tools the operational commander must apply when attempting to reduce fratricide. He must understand and plan for the inherent risks involved with the modern battlefield

**Doctrine.** Doctrine provides the "how" by which military forces will conduct their operations. To assist in the reduction of fratricide, doctrine must foster an awareness for fratricide by laying down the foundation for the development of subordinate doctrine, directing and facilitating the training required to reduce the risk of fratricide, and driving the technological and material acquisition required to support fratricide reduction efforts.<sup>16</sup>

Fratricide is not a problem specific to any one service. With the preponderance of current operations falling under the joint task force concept, the risk of an inter-service fratricide incident such as that which occurred over Iraq in

April 1994 is significantly increased. Current joint doctrine does not specifically address the fratricide problem. Joint doctrine must identify fratricide risk assessment and management procedures the operational commander can apply to all the services represented in his force. Joint doctrine is the tool which can start the process of resolving this problem at the inter-service level. It will provide the cornerstone for integrating planning, training and technology into the "joint" prevention of fratricide.

#### CONCLUSION

The solutions and preventive measures required to reduce or eliminate incidents of fratricide on the future battlefield are certainly problematic and provide a significant challenge for the operational commander. Given the clear preponderance of human error as the source of most fratricide incidents, it is imperative that the operational commander takes preventive measures directed towards the correction or improvement of human frailties. These factors are unquestionably the most challenging to correct.<sup>17</sup>

The operational commander must foster a command environment where every means of training, planning, and technological alternatives at his disposal are exploited to assist in minimizing fratricide.<sup>18</sup> He must provide leaders at all levels with sufficient time to conduct detailed planning and rehearsals designed to minimize predictable risks. He must make known what is acceptable in terms of risk, and provide leaders with risk considerations to include in their planning process.

Each of the armed services employs measures calculated to prevent incidents of friendly fire. But such measures offer only partial solutions, especially on the modern battlefield where joint and combined forces are often operating under obscure conditions.<sup>19</sup> The operational commander must be prepared to use all of the tools available to him in order to identify potential points in his plans where fratricide may be most likely to occur. He is then obligated to take aggressive steps to reduce the likelihood of its occurrence because, as GEN Schwarzkopf stated "not even one such avoidable death would ever be considered acceptable."<sup>20</sup>

## NOTES

1. H Norman Schwarzkopf, It Doesn't Take a Hero, (New York: Bantam Paperback Edition, 1992), p.581-582.
2. Kenneth K. Steinweg, "Dealing Realistically With Fratricide", Parameters, Spring 1995, p.4
3. U.S. Army Field Manual 100-5, Operations, Washington, DC: Headquarters, Department of the Army, 1993, Glossary - 4.
4. Steinweg, p.4.
5. Charles R. Shrader, "Amicicide: The Problem of Friendly Fire in Modern War," Combat Studies Institute Survey No.1, (Fort Leavenworth: December 1982), p.viii.
6. Gary J. Bundy, "Not So Friendly Fire: Considerations for Reducing Friendly Fire," Unpublished Research Paper, U.S. Navy War College, Newport, RI, 1994, p. 11.
7. Shrader, p.107.
8. Steinweg, p.13
9. Steinweg, p.14.
10. U.S. Department of the Army, Fratricide: Reducing Self-Inflicted Losses, Newsletter No.92-1, Fort Leavenworth, KS: Center for Army Lessons Learned, U.S. Army Combined Arms Command, April 1992, Appendix F.
11. Bundy, p.8.
12. Charles R. Shrader, "Friendly Fire: The Inevitable Price," Parameters, Autumn 1992, p.41.
13. Julie Bird, "Friendly Fire", Army Times, 19 August 1991.
14. Shrader, p.29.

15. U.S. Army Field Manual 100-5, Operations, p.6-1.
16. William B Garrett, "Fratricide: Doctrine's Role in Reducing Friendly Fire," Defense Technical Information Center, April 1993, p.38.
17. Shrader, "Amicicide: The Problem of Friendly Fire in Modern War," p.108.
18. U.S. Army Department of the Army, Fratricide: Reducing Self-Inflicted Losses, Chapter 2.
19. Shrader, p.forward.
20. Schwarzkopf, p.82

## Bibliography

- Bird, Julie. "Friendly Fire", Army Times, 19 August 1991.
- Bundy, Gary J. "Not So Friendly Fire: Considerations for Reducing Friendly Fire," Unpublished Research Paper, U.S. Navy War College, Newport, RI, 1994.
- Doton, Lawrence C. "Leveraging Technology to Reduce the Incidence of Fratricide," Unpublished Research Paper, U.S. Army War College, Carlisle Barracks, PA, June 1996.
- Garrett, William B. "Fratricide: Doctrine's Role in Reducing Friendly Fire," Unpublished Research Paper, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, April 1993.
- Joint Publication 3-0, Doctrine for Joint Operations.  
Washington, DC: February 1995.
- Joint Publication 5-0, Doctrine for Planning Joint Operations.  
Washington, DC: April 1995.
- Larsen, Henry S. "Fratricide: Reducing the Friction Through Technology," Unpublished Research Paper, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, April 1995.
- O'Connor, Michael P. "Fratricide: A Preventable Technological Disease," Unpublished Research Paper, U.S. Army War College, Carlisle Barracks, PA, June 1992.
- Owskey, Thomas C. "Fratricide: The Result of Undisciplined Aggressiveness," Unpublished Research Paper, U.S. Army War College, Carlisle Barracks, PA, June 1996.
- Schwarzkopf, H. Norman. It Doesn't Take a Hero. New York: Bantam Paperback Edition, 1992.
- Shrader, Charles R. "Amicicide: The Problem of Friendly Fire in Modern War." Combat Studies Institute Survey No.1, (Fort Leavenworth: December 1982).

- \_\_\_\_\_. "Friendly Fire: The Inevitable Price,"  
Parameters, Autumn 1992.
- Steinweg, Kenneth K. "Dealing Realistically With Fratricide."  
Parameters, Spring 1995.
- U.S. Department of the Army. Field Manual 100-5, Operations.  
Washington, DC: June 1993.
- U.S. Department of the Army. Student Text 101-5, Command and  
Staff Decision Processes. Ft. Leavenworth, KS: U.S.  
Army Command and General Staff College: February 1995.
- U.S. Department of the Army. Fratricide Risk Assessment for  
Company Leadership. Newsletter No. 92-3. Ft.  
Leavenworth, KS: Center for Army Lessons Learned, U.S.  
Army Combined Arms Command, April 1992.
- U.S. Department of the Army. Fratricide: Reducing Self-  
Inflicted Losses. Newsletter No. 92-4. Ft. Leavenworth,  
KS: Center for Army Lessons Learned, U.S. Army Combined  
Arms Command, April 1992.
- Von Clausewitz, Carl. On War. Edited and translated by Peter  
Paret and Michael Howard. Princeton: Princeton  
University Press 1984.

APPENDIX A

**COURSE OF ACTION DECISION MATRIX**  
(Generic Example Incorporating Risk Considerations)

<b>SIGNIFICANT FACTORS</b>	<b>COA #1</b>	<b>COA #2</b>	<b>COA#3</b>
Dispositions			
Obstacles			
Terrain			
Surprise			
Flexibility			
Speed			
Mass			
Soldier's Load			
Supporting Attack			
<i>Fratricide Risk</i>			
<i>Operational Risk</i>			
<b>Total</b>			

Although there are many ways of analyzing Courses of Action during the staff planning process, most units develop a standard procedure. In this example the commander determines that operational risk and the risk of fratricide are significant factors with respect to the mission. He will consider them when selecting the best course of action. As with any adverse factor associated with the course of action he picks, the commander will take measures to reduce the likelihood of a precondition of fratricide.

**\*\* Extract from Appendix G, CALL Newsletter 92-4**

APPENDIX A

**RISK REDUCTION/FRATRICIDE PREVENTION MEASURES**

**Assessed Risk Level**

	<b>LOW</b>	<b>Moderate</b>	<b>High</b>
<b>MISSION</b>	Backbriefs Supervision SOP's Synchronization	Limited Visibility rehearsal Restrictive control measure Guides/beacons/vectoring automatic Disseminate intent	Task Force rehearsal Multiple synch rehearsal Converging/adjacent forces rehearse Leaders fwd/Redundant comm Extensive recon/centralization
<b>ENEMY</b>	Review ROE Combat vehicle recognition Exploit enemy weakness neutralize strength Challenge/Password discipline	Making enemy positions Some direct fire units-weapons hold and tight Detailed deception IFF expedients for exposed elements	Clear friendly making Additional recognition signal Challenge/password Enhancements
<b>TERRAIN/ WEATHER</b>	Seasonal hazards Detailed navigation plan Safety discipline	Limited visibility plan Ground guides/Night vision aids Lighten load/review equip list Redundant navigation aids Vehicle hazards considered	Limited objectives Multiechelon navigation Interim halts/assessments Special log/maint actions
<b>TROOPS</b>	Sustainment training Inspections Morale Buddy System	Modified task organization Simplified plan Max use of transport Clear guidance Refresh mission specific skills	Request add't combat power Phased operations Rotate high-stress positions Don't exceed trng proficiency Add intermediate objectives
<b>EQUIPMENT</b>	PMCS Boresight Pre-combat checks	Cross-level/consolidate equipment Combat ID enhancements Review limitations	Modify plan Reduce equipment dependence Provide backups
<b>TIME</b>	Full troop-leading procedures Extensive rehearsals Reconnaissance Sleep plan	Abbreviated troop-leading procedures Simplicity/repetition Controlled pace in execution	Priority of tasks Priority of rehearsals FRAGO only for efficiency

**\*\* Extract from Chapter 8, Figure 8-1, ST 101-5**

APPENDIX B

**TRADOC and CALL FRATRICIDE STUDY**  
(Fratricide Rates by Mission Type, 1986-1988)

**NTC CALL TRADOC Study (1986-1988)**

<b>FRATRICIDE BY MISSION</b>	<b>FRAT/MP</b>	<b>%FRAT</b>	<b>KILLS/MP</b>	<b>%FRAT KILLS</b>
Defend Battle Position	45/639	7.0%	18/639	2.8%
Defense in Sector	123/2190	5.6%	67/2190	3.1%
Hasty Attack	14/154	9.1%	5/154	3.2%
Movement to Contact	92/644	14.3%	45/644	7.0%
Reconnaissance	49/333	14.7%	24/333	7.2%
Counterattack	38/240	15.8%	22/240	9.2%
Deliberate Attack	183/720	25.4%	104/720	14.4%
<b>AVERAGE</b>	<b>544/4920</b>	<b>11.0%</b>	<b>285/4920</b>	<b>5.8%</b>

The NTC instrumentation can 'match' the firer with the target and highlight fratricidal matched pairs (MP) for many engagements (25-40% of the time). This study shows the relative risk of fratricide by mission type. It also shows the relationship between fratricidal engagements that are MILES kills and all engagements to include near misses (525%\*) These fratricide percentages may not apply to all engagements, but even the 544 total recorded friend-on-friend engagements in two years is too high.

**\*\* Extract from Appendix E, CALL Newsletter 92-4**