INTERNET DOCUMENT INFORMATION FORM

A . Report Title: **Urban Combat Operations Tactics, Techniques, and Procedures**

B. DATE Report Downloaded From the Internet: 01/31/02

C. Report's Point of Contact: (Name, Organization, Address, Office Symbol, & Ph #): **Center for Army Lessons Learned**
Virtual Research Library
Fort Leavenworth, KS 66027-1327

D. Currently Applicable Classification Level: Unclassified

E. Distribution Statement A: Approved for Public Release

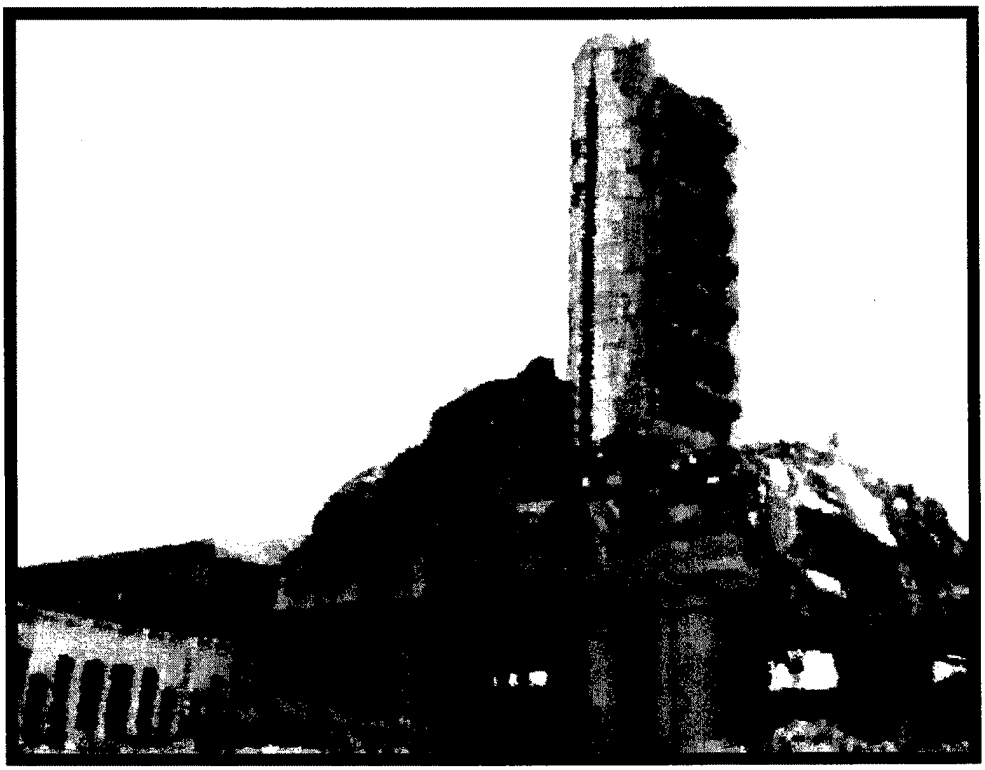
F. The foregoing information was compiled and provided by:
DTIC-OCA, Initials: __VM__ **Preparation Date 01/31/02**

The foregoing information should exactly correspond to the Title, Report Number, and the Date on the accompanying report document. If there are mismatches, or other questions, contact the above OCA Representative for resolution.

NEWSLETTER

No. 99-16 NOV 99

URBAN COMBAT OPERATIONS



Tactics, Techniques and Procedures

CENTER FOR ARMY LESSONS LEARNED (CALL) U.S. ARMY
TRAINING AND DOCTRINE COMMAND (TRADOC)
FORT LEAVENWORTH, KS 66027-1327

20020201 041

FOREWORD

With the Cold War over, it is obvious that many future operations will take place in an urbanized environment. Grenada, Panama, Haiti, and Somalia are recent examples of combat operations conducted under these conditions. The current doctrine for conducting urban combat operations can be found in Field Manual (FM) 90-10, *Military Operations on Urbanized Terrain,* 1979, and FM 90-10-1, *An Infantryman's Guide to Combat in Built-up Areas,* 1993, with Change 1 published in 1995. These doctrinal manuals include many of the lessons identified in this newsletter. However, many more lessons are uncovered daily in conjunction with unit training and at rotations conducted at the Combat Training Centers (CTCs). These lessons in the form of tactics, techniques, and procedures (TTP) can be incorporated into the Army library and vernacular.

The Chief of Staff of the Army, General Dennis Reimer, directed that a new emphasis on Military Operations on Urbanized Terrain (MOUT) be conducted Army-wide to update the FMs and to document new TTP. Since all future operations will be conducted jointly, it is essential that all services be involved in this initiative.

The Center of Army Lessons Learned (CALL) at Fort Leavenworth determined that a focused collection effort would be a valuable tool to gather observations of combat in an urban environment. CALL organized a Combined Arms Assessment Team (CAAT) from various TRADOC schools and the U.S. Marine Corps to gather these observations during a rotation at the Joint Readiness Training Center (JRTC) at Ft Polk, Louisiana. This newsletter includes those observations and the TTP that are the essence of this effort.

This newsletter attempts to open a dialogue and create an opportunity for units to exercise and discuss the TTP developed. In conjunction with current written doctrine, this discussion and anticipated refinement of current TTP will lead to a much better understanding of what is required to fight successfully in an urban environment.

The TTP observed are the result of a great effort on the part of numerous soldiers and qualified civilians. All the participants realized how difficult MOUT operations can be. However, as in any operation, success is dependent on unit leadership, and good prior planning and training. This was all the more apparent as the team made its observations.

The CAAT observed a snapshot of one unit conducting a MOUT at the Shughart-Gordon MOUT complex during a JRTC rotation. However, the TTP gathered represent a melding of the CAAT observations for that unique exercise and the experience and observations gleaned from observer/controllers over an extended period of time. Observations from these subject matter experts would be hard to replicate by any other means. This newsletter can be the catalyst to start the discussion on how to conduct future tactical operations in MOUT. To make this effort worthwhile, it is essential that units and individuals that read this newsletter comment on how to make it better. Only then can we really prepare for future urban combat. Let's start up a "chatter" on the subject.

JOHN F. D'AGOSTINO
LTC, IN
Team Chief, CAAT

URBAN COMBAT OPERATIONS

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	iii
CHAPTER 1: INTRODUCTION	
It's a dirty business, but somebody has to do it. (URBAN COMBAT), *by George J. Mordica II*	1-1
Military Operations on Urbanized Terrain: The 2d Battalion, 26th Infantry at Aachen, October 1944, *by Dr. Christopher R. Gabel**	1-9
CHAPTER 2: INTELLIGENCE	
Intelligence Preparation of the Battlefield (IPB) for Urban Combat Operations, *by Michael Ley*	2-1
Wargaming and Analyzing the Urban Threat, *by David P. Dilegge*	2-20
CHAPTER 3: COMMAND AND CONTROL	
Command and Control, *by MAJ Rex Davis, MAJ David Harper, MAJ William Roka, and CPT David Sizemore*	3-1
CHAPTER 4: COMBINED ARMS MANEUVER	
Combined Arms Maneuver During Urban Combat, *by Arthur A. Durante and CAPT Shenandoah Sanchez*	4-1
MOUT OPERATIONS, *by CPT Nicholas Panagakos* and 1SG Ralph Kluna**	4-11
CHAPTER 5: FIRE SUPPORT	
Fire Support Considerations for Military Operations in Urban Terrain (MOUT), *by LTC Anthony J. Puckett*	5-1
CHAPTER 6: MOBILITY AND SURVIVABILITY	
Planning Engineer Support for an Urban Attack, *by CPT John C. DeJarnette*	6-1
Force Protection in Urban Terrain, *by Stephen R. Reinhart*	6-10
CHAPTER 7: LOGISTICS	
Logistical Operations on Urban Terrain, *by MAJ William Carter*	7-1
CHAPTER 8: COMBAT HEALTH SUPPORT	
Combat Health Support, *by MAJ David Sheaffer*	8-1
CHAPTER 9: FLIGHT OPERATIONS IN URBAN AREAS	
Aviation Operations on Urban Terrain, *by CPT John White and CW3 Michael Scheel*	9-1
APPENDIX A: THE PLATOON URBAN OPERATIONS KIT, *by MAJ Jeffrey A. Bovais*	A-1
APPENDIX B: U.S. MARINE ORGANIZATION, *by David P. Dilegge and CAPT Shenandoah Sanchez*	B-1
APPENDIX C: WEAPON EFFECTS AND EMPLOYMENT IN AN URBAN ENVIRONMENT, *by Tactics Group, The Basic School (USMC), MCCDC*	C-1
APPENDIX D: AIRCREW MAP CONVERSION TECHNIQUES, *by CPT John White*	D-1
APPENDIX E: TASK SUMMARY SHEET	E-1
APPENDIX F: SIMPLE MARKING DEVICES FOR URBAN OPERATIONS, *by Arthur A. Durante*	F-1
APPENDIX G: THE BATTLE FOR GROZNY AND THE BATTLE FOR SHUGART-GORDON: SIMILARITIES AND DIFFERENCES, *by Lester W. Grau*	G-1

Center for Army Lessons Learned

Director	***COL Michael A. Hiemstra***
Managing Editor	***Mr. Rick Bogdan***
Editor plus Layout and Design	***Mrs. Jenny Solon***
Graphic Artist	***Mrs. Cathy Elliott***
CTC Project Analyst	***Mr. George Mordica***

The Center for Army Lessons Learned would like to acknowledge the following members of the Combined Arms Assessment Team:

Team Chief	LTC John F. D'Agostino
Operations Officer	MAJ William Carter
Operations Officer	MAJ Joe Gregg
NCOIC	SFC Timmy Sanders

The authors of the articles contained in this newsletter, except those annotated by an asterisk, were also members of the Combined Arms Assessment Team.

The Secretary of the Army has determined that the publication of this periodical is necessary in the transaction of the public business as required by law of the Department. Use of funds for printing this publication has been approved by Commander, U.S. Army Training and Doctrine Command, 1985, IAW AR 25-30.

Unless otherwise stated, whenever the masculine or feminine gender is used, both are intended.

CALL has many products of interest to the Total Force. A partial listing may be found at the back of this publication. We invite you to visit our web site at:



The intent of CALL publications is to share knowledge, support discussion, and impart lessons and information in an expeditious manner. This CALL publication is not a doctrinal product. The tactics, techniques, and procedures (TTP) observed and reported in this publication are written by soldiers for soldiers. If you have, or your unit has, identified other relevant TTP for the U.S. Army, contact the Managing Editor, Mr. Rick Bogdan, at Coml (913) 684-9581 or DSN 552-9581; FAX DSN 552-9583. E-mail address is: <bogdanr@leavenworth.army.mil>. Articles must be submitted in either Word Perfect or Word format. Graphs, slides, and clipart must be submitted separately from the document in either ppt, pcx, or wpg format.

NOTE: Any publications referenced in this newsletter (other than the CALL newsletters), such as ARs, FMs, and TMs, must be obtained through your pinpoint distribution system.

LOCAL REPRODUCTION OF THIS NEWSLETTER IS AUTHORIZED AND ENCOURAGED!

EXECUTIVE SUMMARY

by LTC John F. D'Agostino

Military Operations on Urbanized Terrain (MOUT) is very complex. Yet, much of the doctrine and tactics, techniques, and procedures (TTP) used in MOUT are the same as in other offensive or defensive operations. The intent of this newsletter is to show, across the Battlefield Operation Systems (BOS), the TTP that work in MOUT. These observations are based on Combat Training Center (CTC) experiences, discussions with CTC observer controllers (O/Cs), and the reading of current doctrine.

Command and control during MOUT requires the same preparation as other operations. Course of action (COA) development, analysis, refinement, the wargame, and rehearsals are conducted as written in current publications. There are unique MOUT-related aspects in the following chapters. As always, rehearsals must be attended by all major subordinate unit leaders and must adequately detail the layout of the built-up area. It is imperative that rehearsals for MOUT operations be held at all levels to rehearse the myriad of tasks that need to be accomplished successfully to ensure mission completion. All participants in the wargame must fully understand the dynamics of the urban battlefield to properly analyze each course of action. The best place for the commander to control the battle, as always, is dependent on the analysis of the situation.

Intelligence preparation of the battlefield (IPB) during MOUT is difficult. When developing the IPB product, battle staffs have to take into account that the MOUT battle is three-dimensional in nature. Failure to realize this courts disaster. Key terrain in MOUT can be buildings whose control by either friendly or enemy forces will affect the outcome of the battle. Situation templates must detail the obstacles and enemy locations in the built-up area.

Certain aspects of MOUT are unique to maneuver. Objectives must be isolated in such a way to preclude enemy reinforcement. The use of obscuration fires can affect both sides in a battle. The use of heavy forces and aviation assets in a MOUT environment present TTP that are special for this nature of war. Especially important is the movement of friendly forces between buildings. The majority of casualties in MOUT operations at the Joint Readiness Training Center (JRTC) do not occur in buildings but in the movement between them. Direct fire planning takes on a whole new meaning in MOUT. Without a detailed direct fire plan, even the best of units will fail. Lastly, the use of friendly snipers can determine the outcome of the battle in a built-up area.

Indirect fire planning in MOUT requires a detailed observer plan that includes positioning of those assets. Target identification and the use of smoke, as previously noted, take on unique aspects in this environment. While planning fires, the Fire Support Officer must take into account collateral damage and the location of friendly forces. Doing this properly will eliminate fratricide and enhance future operations.

Breaching of obstacles within the built-up area presents a severe challenge. Use of the mine clearing line charges (MICLIC) must be carefully planned and executed to meet mission requirements, yet not cause fratricide or collateral damage. The missions and positioning of engineer assets are unique in MOUT. These limited assets play a big part in the success or failure of the mission. Additionally, environmental hazards such as toxic wastes, sewage, and stored chemicals in the city can affect friendly as well as enemy forces.

Logistics take on huge importance in MOUT. Resupply is difficult at best in built-up areas. Refueling and rearming heavy forces must be planned well in advance so as not to impede operations. Casualty evacuation, especially in buildings and open areas, is difficult and must be planned and rehearsed in advance. Ammunition usage must be forecasted and monitored throughout the battle. Huge expenditures of ammunition in MOUT are the norm.

The above should "wet your whistle" as to what is available in this newsletter. The chapters and appendixes that follow represent the fine work done by a group of professionals. Our intent, as stated in the forward, is to start a discussion on the implications of fighting in an urban environment. We look forward to your comments.

CHAPTER 1

INTRODUCTION

It's a dirty business, but somebody has to do it. (URBAN COMBAT)
by George J. Mordica II, Military Analyst, CALL

1. GENERAL.

Since the Middle Ages urban combat has been a dirty business. The effect on the populace has always been traumatic, whether the people were participants or simply bystanders caught in the misery of it all. In earlier times, laying siege to a city and then taking it was the objective. Since World War II and the refinement of maneuver warfare, cities have become a restricted area that are more easily bypassed or reduced than taken. Part of the reason for this gradual change in strategy has been the cost associated with military operations on urbanized terrain (MOUT). The cost, though difficult to calculate, has been excessive and prohibitive.

Recent examples of urban combat, such as the Russian attempt and eventual success in Grozny (the capital of the Republic of Chechnya), demonstrate the current price of fighting under these conditions. This Russian operation was conducted unconstrained by some of the modern-day concerns such as civilian casualties or collateral damage. Yet, the operation demonstrated that urban combat is demoralizing, resource draining, politically costly, and represents the least favorable option of driving the enemy out. More favorable strategies in taking a city include: cutting off the city from enemy reinforcement and supply, thereby letting the defenders collapse; reducing the city by armed force; or bypassing the city altogether and winning the war by other means. Some disadvantages in conducting urban combat are the loss of maneuver space and communications and the loss of any technological edge that U.S. forces possess. Although technology can be put to good use in this type of warfare, the loss in overall advantage seems to outweigh the gain.

The purpose of this article is to discuss the dangers of entering into urban combat operations unprepared. The Russians experienced a hard lesson at Grozny, a lesson the United States experienced in earlier times on a large scale at Aachen, Manila, Hue, and Panama, and recently on a smaller scale in Mogadishu: that urban combat operations are not and cannot be clinical operations.

This article also attempts to form a baseline of knowledge gathered through years of studying military history, from someone who is not an expert in urban combat operations. The thoughts discussed here are the result of reading historical literature, reviewing recent events in the world, and monitoring trends gathered from various U.S. Army training centers. The Center for Army Lessons Learned (CALL) is attempting to observe lessons from MOUT that may help soldiers in a future urban combat contingency. There are concerns by some junior leaders, voiced at the JRTC, that soldiers are not being properly trained, equipped, supplied, and led to meet the challenges of urban combat operations.

2. DOCTRINAL BASE.

OBSERVATION 1: U.S. doctrine on combat operations in urban areas is outdated.

DISCUSSION 1: The primary U.S. Army doctrinal publication on this subject, **FM 90-10, *Military Operations on Urban Terrain*** (a prescription on how the Army plans to fight in the urban environment), was published 15 August 1979. Its focus was on the fast-moving European battlefield of the 1960's and 1970's. An update specifically designed to provide the "how-to pieces of urban combat" was addressed in **FM 90-10-1, *An Infantryman's Guide to Combat in Built-up Areas***, published in May 1993, and the subsequent Change 1 to

that field manual dated 3 October 1995. Change 1 of FM 90-10-1 provided some lessons learned from the Army's experiences in Panama, Haiti, and Somalia. The potential threats described in both these publications have changed the weapons and munitions in our own inventory, as well as tactics, techniques, and procedures. In addition, the technology present on the battlefields of the world has dramatically changed. The types and locales of cities, as well as political and environmental limitations, city sizes, population densities, and changes in demographics in areas where the Army may be committed, need review. The equipment available to the regular infantry for executing doctrine is outdated. Moreover, the training the Army is using to prepare its soldiers for urban combat is not realistic enough to present the full spectrum of command and control, along with the psychological impact, close combat, and logistical problems associated with this kind of combat.

RECOMMENDATION: Tactics, techniques, and procedures (TTP) need to be developed as an interim measure until doctrine can be written that supports urban combat. A new publication, **MCWP 3-35.3, *Military Operations on Urbanized Terrain*,** published 16 April 1998 by the United States Marine Corps, and the Marine Corps current "Urban Warrior" experiment are positive steps which offer a different approach and fresh review of many of the questions the Army needs to address. The Marines are conducting "Urban Warrior" over a two-year period to develop TTP and long-range, over-the-horizon command and control capabilities. An Army experiment called the MOUT TF originated at the Department of the Army and was tasked to TRADOC. This effort was then tasked by TRADOC to the Infantry School at Fort Benning, Georgia. Its mission is to determine what should be done about the outdated FM 90-10/90-10-1 and to develop a training strategy for urban combat in the Army. Another interesting project at Fort Benning is the Advanced Concept Technology Demonstration (ACTD). This project is a joint venture with the Marine Corps, and is focusing on what technology can bring to the urban fight.

OBSERVATION 2: The political realities of urban combat have resulted in the use of terms that tend to place limitations on the conduct these operations. Terms such as surgical MOUT, precision MOUT, and high-intensity MOUT are attempts at making urban combat something that it is not. It is imperative that the correct terminology be used in describing these operations.

DISCUSSION 2: These terms tend to bring civility to urban combat operations. Based again on historical research and examples of how urban combat is fought, there is no method for this type of operation. The distinctions between one phase of urban combat and the others are not precise. The different types of urban combat descriptions give our soldiers and leaders a false sense of security that the operation they are conducting will not escalate; consequently, they do not plan thoroughly for such contingencies.

RECOMMENDATION: It is important that doctrine writers and soldiers who develop TTP use the correct terminology in describing the details and actions necessary in urban combat. The sugar-coated version of urban combat will not reflect the truth. Battles in a city are savage, and many times do not allow for precautions normally taken in the field concerning refugees, civilian casualties, evacuation of friendly and enemy wounded and dead, and prisoners of war (POWs). The intent here is not to desensitize our soldiers to the plight of civilians or friendly and enemy soldiers, but to caution everyone that conventional concerns on the open battlefield may not apply in urban combat. Does this mean the Army cannot hold itself to a high moral code -- NO! The United States is a signatory to the Geneva Conventions and must abide by and uphold its provisions. However, it does mean there is a need to be prepared for a situation where beliefs, moral code, and practices are tested beyond the bounds of current training, and to be prepared to face those challenges on a case-by-case basis. Clearly defined rules of engagement can go a long way in establishing the limitations our forces should use in any given urban operation.

3. PLANNING.

OBSERVATION 3: The manpower resources needed to conduct urban combat is a problem for the U.S. Army. Under the current downsizing agenda, the Army does not have the soldiers to do the job on the scale of the Russian experience at Grozny and meet its two regional war mission. Any urban operation requires the

infantryman, and many of them, not only to clear buildings and fight the fight, one room at a time, but to secure buildings already taken and to guard precarious lines of communication that can be cut by a determined enemy squad. In an urban battle today, the battle for a building may take U.S. forces 24 stories straight up. Battle space cannot be considered in ground area in urban combat.

DISCUSSION 3: A battle fought under these conditions lessens all the advantages the U.S. military possesses on the open battlefield, and requires that soldiers, not machines, fight and die for every corner, set of stairs, soda machine, and hallway. The grim reaper will collect his due, no matter what devices can be developed to improve our advantage. There are just too many corners, stairs, vending machines, and hallways along the way. To anticipate few casualties in this type of operation would not be an honest appraisal.

RECOMMENDATION: The Army needs soldiers in sufficient numbers to fight and support the urban battle and provide service support to those soldiers. The cost of a major urban conflict with the two regional war scenario should be evaluated. Additionally, a streamlined combat organization is needed that allows for easier task organization. A standard organization in combat arms units will help. Infantry units should be organized the same whether they are light infantry, airborne infantry, air assault infantry, ranger infantry, or mechanized infantry. Specialty, in organization, creates unnecessary problems in equipment, weapons, ammunition, and support. The Army in its currently reduced state does not need organizational problems complicated by one-of-a-kind and uniquely organized subordinate organizations. The "keep it simple stupid" (KISS) principle applies here, where "one organization fits all" is the best approach, then organize for combat.

Recently, the Chief of Infantry addressed this last concern. He recognized the problem in the field and reacted to "quick-fix" the organizational problem. The doctrinal development in organizations will follow, and unit training will adjust to the changes over time. The changes will define the basic unit of infantry and lead to its development in the task organization for combat, whether in the urban environment, in the jungle, or in the desert.

OBSERVATION 4: Training in villages will not prepare the Army for combat in large metropolitan areas. The Army has invested a tremendous amount of money and assets in developing a series of first-class MOUT sites at various training centers to train soldiers to operate in the urban combat environment.

DISCUSSION 4: These sites can help a soldier polish the skills he needs to clear a room, isolate a threat, or move up a stairwell, but the present training sites are unrealistic. They suggest the urban terrain can be isolated and cut off. Only in the best of circumstances would this be the case. Cities are too large and too segmented to allow for complete encirclement, and forces are not available to accomplish this task. As in Grozny, the enemy will be reinforced and supplied with open-ended support. Gone are the days when an army can prevent these enemy activities in an urban battle. Even the best weapons in the world cannot isolate the enemy; the example of the Ho Chi Minh trail should tell all military practitioners something. If the enemy is dedicated to his cause, rearming, resupply, and reinforcement will be something our forces must contend with and be prepared for.

RECOMMENDATION: The U.S. Army needs to work with city governments to train under as realistic conditions as acceptable to those cities. Offers of cooperation, funding, and sharing of experiences that could otherwise never be gained with local law enforcement agencies and other emergency services can create an exercise that will benefit all concerned. The Marine Corps "Urban Warrior" provides a model.

4. PREPARATION.

OBSERVATION 5: U.S. forces currently do not have the special weapons needed and lack the quantities of weapons necessary for urban operations. The weapons historically needed to do the job are in many cases either not in the inventory or not available for training in the urban environment.

DISCUSSION 5: In our world today the concern of what weapon is appropriate for the incident may impact on

our ability to fight successfully in urban combat. The enemy can use whatever ruthless means he has at his fingertips to engage our forces, yet due to the prevailing attitude with its image, the press, and concern for the local population, the Army may be prevented from using its most effective weapons. In an historical example (Aachen), the use of 155-mm artillery in direct fire mode offered a tremendous equalizer, yet today, it would create unacceptable collateral damage. Another weapon consistently used in city combat is the flame-thrower. When faced with a bunker or basement where all the firepower in the world is available yet not effective, it has historically been the flame-thrower that got the job done. This weapon, like no other, produces a tremendous amount of psychological effect on a trapped enemy, yet this weapon is not considered an acceptable substitute for firepower. The M202 Flash is the latest generation of flame weapon; however, few infantrymen have trained with this weapon. At present the weapon is in the inventory but not generally available for training. This weapon is much safer than the previous flame-thrower apparatus and also easier to train with and store. Why is this weapon, better described as a round (actually four tubes), not used in training or available in quantities necessary for urban combat? If safety is still an issue, technological improvements in binary weapons might help in the development of an advanced flame-thrower.

RECOMMENDATION: Develop weapons based on the need to defeat the threat, not on political considerations concerning whether such a weapon should be used in a given situation. The concerns for a weapon's use should be: (1) Will it be effective? (2) Is it safe for our troops to use? (3) Will it have the desired effect? Finally, the weapon must be available in sufficient quantities for use in realistic training and for combat.

OBSERVATION 6: Quantity of supplies is another issue that the Army must be prepared to address in an urban combat situation. Previous evidence shows that urban combat uses an inordinate amount of supplies, from ammunition to bandages. This usage is in conventional supplies only. It does not account for specialty equipment such as grappling hooks and rope (described as essential for every soldier) or for the high use of fragmentation, white phosphorus, thermal, and smoke grenades necessary for every move.

DISCUSSION 6: A lack of sufficient supplies and specialty equipment will force our troops to use alternatives and "work-a-rounds" to clear the enemy from certain positions. Because these work-a-round weapons are not supported, they are not in the inventory and will not be available for training or available when needed for urban operations.

RECOMMENDATION: Screen weapons for use in the urban environment, and make weapons effectiveness, easy use, and safety (rather than political acceptability) priorities.

5. EXECUTION.

OBSERVATION 7: Munitions now in the inventory are not suitable for urban combat. In past wars the types of ammunition in the inventory worked for all possibilities. Today, this is not the case. Due to the cost of maintaining ammunition stores and the doctrine that U.S. forces expect to employ, the ammunition is designed to emphasize high-speed maneuver battles (tank-on-tank, infantry-fighting-vehicle on infantry-fighting-vehicle) with little concern about the effects current types of ammunition will have in urban combat.

DISCUSSION 7: Armor Piercing Discarding Sabot (APDS) rounds will not explode against masonry, and armor piercing ammunition will not have the desired effect against brick and wood. The need for a greater selection of ammunition for all our weapons in urban combat is necessary. Infantry operations alone will not succeed. As demonstrated in previous engagements, indirect fires must be used to isolate strong points, and a combined arms team has the best chance of success. The destructive power of tanks, anti-tank, and direct fire artillery weapons can create a foothold in an enemy position that will allow the infantry to close with and destroy them. The ammunition currently in the inventory will not fit the bill. It is designed for a different type of warfare, and to assume it will do the job is a mistake.

RECOMMENDATION: A high-level review of the ammunition necessary in urban combat must be

conducted. The use of high-explosive, high-explosive plastic, white phosphorus, and flechete rounds need to be evaluated and considered for reintroduction into the inventory in sufficient quantities for effective training. Satchel charges, explosives, and bangalore torpedoes should also be re-evaluated for use in urban conditions. There are numerous cities and towns abandoned along the Missouri and Mississippi Rivers due to the Corps of Engineers buyout in flood plain programs that could serve as perfect targets for experiments of different types of munitions and their effectiveness. Recently, a MOUT Conference was held at Fort Benning, Georgia, and members of CALL witnessed a demonstration of new munitions under consideration by the Infantry school for forced-entry in urban combat conditions. These promising munitions, each with their own unique capabilities, will go a long way in solving some age-old problems for infantrymen in urban combat. The next step is to obtain these munitions as soon as possible and provide them to the field, along with instructions and training devices that give soldiers the tools needed to train. Also a new type of multi-purpose tank ammunition (XM908), using a high explosive shape charge for the 120-mm gun, is currently being tested. Hopefully, this ammunition is being examined for a role in urban combat.

OBSERVATION 8: Specialty communications equipment is now only available to special units. This communications equipment is needed now for regular infantry for training and potential combat operations.

DISCUSSION 8: The communications equipment available over-the-counter in the United States can sustain a tactical squad of any police department in America in force-entry operations. Yet, the U.S. infantryman must rely on systems designed for the open battlefield. Questions related to new communications equipment include whether that item is secure or not, if it is battery operated, how is it recharged, and what is the distribution plan. The appropriate equipment for conducting urban combat is available, but if that equipment is on the shelf, it is not providing soldiers with the tools they need to train and fight in an urban combat contingency.

RECOMMENDATION: Communications problems that can occur during combat in a city environment must be detected and fixed during training NOW. These potential communications problems are not on-the-site problems; they represent a series of complex problems found only in a segmented urban battlefield with electronic interference, dead spots, and anomalies that hinder command and control. The U.S. Army must train with the equipment, weapons, communications, soldiers and leadership to develop the doctrine and TTP needed to win in urban combat.

OBSERVATION 9: Realistic NBC hazards are not incorporated into urban combat training.

DISCUSSION 9: Recent examples of chemical use in Tokyo by a terrorist group should have sent a shock wave throughout the military. This action makes the use of NBC operations in urban combat probable. The enemy our forces are likely to face will be technologically inferior, and, despite our best efforts, will attempt to negate our advantages in conventional weapons and combat operations. NBC represents a tremendous equalizer for any potential foe. The very terrain presented by a city encourages the use of these potent weapons in isolated "no-win" skirmishes as the enemy tries to escape to fight again in the next block or around the next corner. Urban combat creates an opportunity to fight to allow separation and escape to fight again. In some cases, the sacrifice of forces, by the enemy, to create a catastrophic loss on an opponent will probably be a choice. The more friendly forces committed to a fight in a single building allows a determined foe more options to use all the weapons at his disposal. One dreaded enemy option is to neutralize the building using NBC and create catastrophic loss for U.S. forces.

RECOMMENDATION: The U.S. Army must take the threat of NBC in urban combat seriously. This threat is real and presents a dilemma to any force trying to conduct urban operations. The Army needs to conduct liaison operations with all related government and intelligence agencies to gain a better understanding of the threat and to incorporate that intelligence threat into urban combat scenarios, with other government agencies participating.

6. CONSIDERATIONS FOR TTP DEVELOPMENT.

In the research effort necessary for this newsletter and as the result of separate discussions with observer/controllers in round-table discussions at the Joint Readiness Training Center, a number of recurring trends were identified. These trends are supported by observations submitted over time to CALL for inclusion in CTC trends publications published semi-annually. The recurring trends are listed below and are grouped by the battlefield operating system (BOS).

INTELLIGENCE BOS: TA.5

- The intelligence preparation of the battlefield (IPB) is not specific enough for MOUT.
- Lack of a decision support template and timeline preparation hinder the planning process.
- There is limited intelligence focus on routes to the objective.
- The force ratio analysis is rarely done, if done at all.
- Identification of key terrain and fields of fire is not effective.
- Intelligence gathering and development of input for the planning process is not complete.
- Use of psychological operations and civil affairs operations are not planned.
- Identification of decision points and setting conditions for success are not emphasized.
- Units fail to get eyes on the objective to confirm the intelligence template.
- Little thought is given to intelligence collection from and care of civilians on the battlefield.

MANEUVER BOS: TA.1

- The movement plan to the object is usually not well done.
- There is a lack of focus in the movement to the objective, resulting in significant casualties.
- Casualties in the movement prevent units from achieving mass on the objective.
- Units do not achieve mass at other decision points.
- There is a failure to isolate the objective and protect the force from counterattack.
- There is a lack of combined arms TTP for armor, aviation, and close air support for urban combat.
- Uncoordinated maneuver and overwatch are more common in the urban fight.
- An unclear doctrinal base confuses units about correct procedures for clearing rooms.
- Marksmanship at all levels is poor with the exception of some special operations units.
- There is confusion among units as how to delineate inside from outside battlespace.

FIRE SUPPORT BOS: TA.2

- Use restrictive Rules of Engagement in dealing with collateral damage and associated urban combat effects.
- Units have problems with allocation of resources and positioning of fire support assets.
- Poor use of precision-guided munitions in units.
- Suppression of enemy air defense for assembly areas is poorly planned.
- Units poorly use counter battery fires in urban conditions.
- Q36 are not being effectively used against enemy mortars.

MOBILITY AND SURVIVABILITY BOS: TA.6

- Unit movement to the objective is not well done.
- The operation orders do not properly allocate engineer resources for the urban fight.
- There is usually little unity of the engineer effort.
- Units are not effective in suppress, obscure, secure, and reduce (SOSR) at all levels.
- Engineers are attrited prior to the objective.
- Lack of eyes on the objective (scouts/aviation) prevent identification of obstacles.

COMMAND AND CONTROL BOS: TA.4

- There is a lack of synchronization across the board in the battlefield operating systems.
- Units do not effectively locate their command and control nodes.
- Battalion task force is overloaded with requests from higher.
- Wargaming and course of action development for urban combat need work.
- Leaders are unsure how to effectively fight once in the city.
- Communications problems in urban conditions are a major challenge.
- Leaders at all levels have problems with Rules of Engagement and proportionality.
- There is poor use of the Judge Advocate General in the brigade combat teams.
- The fight needs to be defined and clear to each unit level of responsibility.
- Units fail to get eyes on the objective (scouts/aviation) to shape the battle.
- Sniper teams are not properly used in planning and not considered as additional eyes on the objective.
- Confirmation of intelligence template is denied when no one can observe the objective.

COMBAT SERVICE SUPPORT BOS: TA.7

- Allocation of assets to support the urban fight is poor.
- Resupply and casualty evacuation in the urban fight are not conducted well.
- Urban-specific supply items: ladders, knee and elbow pads, and ropes with grappling hooks need to be available to all units preparing for this type of action.
- Units do not plan for urban combat and the high died-of-wounds rate.
- Speed, not haste, in the tempo of urban operations should be the norm.

AIR DEFENSE ARTILLERY BOS: TA.3

- There is a poor allocation of ADA assets to support the urban fight overall.
- Focusing of the correct ADA assets at the proper place and time in the battle is poor.
- Attack aviation vulnerability in battle positions is not taken into consideration in the order.

7. CONCLUSION.

The world in which the Army will fight in the 21st century is even more politically complex and dangerous than just a few years ago. There is a dramatic increase in the lethality of weapons available to hostile elements. The United States must cope with advanced technology that reinvents itself in hours, days, and weeks. The Army now faces a dangerous world without a defined foe. The enemy is nebulous, and the Army is caught between a highly successful (but increasingly outmoded) doctrine and the desire to prepare to meet future adversaries. Urban combat will be a small piece of any new doctrine. The Army cannot wait for the next revision of **FM 100-5, *Operations*,** to be completed. Possibly the best approach is to develop new TTP for future contingencies and conflicts now. Developing and formalizing the TTP may generate broader thought that will lead to new doctrine.

The Center for Army Lessons Learned (CALL) is attempting to develop current TTP to provide a stopgap measure until doctrine is updated and distributed. This method requires the support and contributions of soldiers in the field. CALL is not a doctrine-writing organization. CALL has the mission to support the deployed unit, provide assistance to the follow-on unit, and provide the Army as a whole with the lessons from these experiences. These lessons in the form of TTP can be the first step in revising doctrine, or the first step in recognizing that the Army has a potential problem.

The Army, as an institution, needs to be straightforward in dealing with its leadership, its soldiers, and the American people in addressing these problems, and must begin NOW! Positive leadership is the key ingredient toward success of urban combat operations. The casualties, resource requirements, and collateral damage of

urban combat are now and will always be unacceptable and will remain so unless the Army addresses this subject and prepares for this contingency.

The intent of this newsletter is to inspire a healthy debate and dialogue that will eventually improve the Army's readiness for urban combat. The question may arise as to the need for a specific urban combat doctrinal manual or whether urban combat operations can be considered a combat condition. If this latter approach on urban combat is accepted, then should urban combat be incorporated into field manuals as an appendix or annex or incorporated into the text to address the "how to fight doctrine" for each discipline within the U.S. Army? The problems discussed are real. Those who believe urban combat can be clinical are wrong. The hard truth about urban combat operations is that "it is a dirty business, but somebody has to do it."

The U.S. Army has a legacy in dealing with urban operations. The lessons learned in World War II urban combat are as vital and current today as when they were experienced by veterans of that war. "The old hands at the game go through a town keeping inside the houses," one veteran explained. "They use bazookas to knock holes in the dividing walls as they go, and when they come to the end of the block and have to cross the street to the next block they throw smoke first and cross over under cover of that." The most important things in street fighting is stay off the streets and "keep dispersed, move fast, and keep on moving whatever happens... Keep your head up and your eyes open and your legs moving, and at all costs keep apart."[1] This lesson should not be lost over time, but applied to train soldiers to accomplish a combat mission that will be as difficult, confusing, and intense as the Army will ever be asked to accomplish.

The following historical example shows how Americans can adapt to a new situation when forced to. It is short, well-written, and describes a battle from beginning to end, including the anxiety soldiers experience in urban combat. It also describes the impact of change in ideas concerning organization, weapons, tactics, and leadership that occur regardless of whether soldiers are prepared or not.

* * * * * * * *

Military Operations on Urbanized Terrain: The 2d Battalion, 26th Infantry, at Aachen, October 1944

by Dr. Christopher R. Gabel, Historian, Combat Studies Institute, USACGSC

This article was previously published in Combined Arms in Battle Since 1939, by the U.S. Army Command and General Staff College Press, Fort Leavenworth, Kansas, 1992.

Throughout history, terrain has shaped the conduct of military operations. Traditionally, generals have been concerned with water courses, elevations, depressions, and vegetation in the planning and conduct of battle. With the coming of the industrial age, a new terrain feature--the modern city--became important in the waging of war. In ancient times, a city's military significance resided in its fortifications and its garrison. If these could be overcome, a city ceased to be a military impediment. In modern times, however, an urban area can constitute a major military obstacle. A modern city might be large enough to block a strategic avenue of approach into an enemy's land. Also, its population poses major logistical, administrative, and security problems for the invader. Tactically, a city's closely packed buildings, basements, alleyways, and sewer systems offer cover, concealment, and ready-made defensive positions to the defenders. Masonry buildings tend to muffle the blast effect of the attacker's artillery, and when destroyed, these buildings choke the streets with rubble and broken glass. Offensive movement through urban terrain is further hindered by the canalizing effect of man-made terrain such as roadways, embankments, and cuts.

Generally, a modern city magnifies the power of the defender and robs the attacker of his advantages in firepower and mobility. A city can ingest an invading army, paralyze it for weeks on end, and grind it down to a

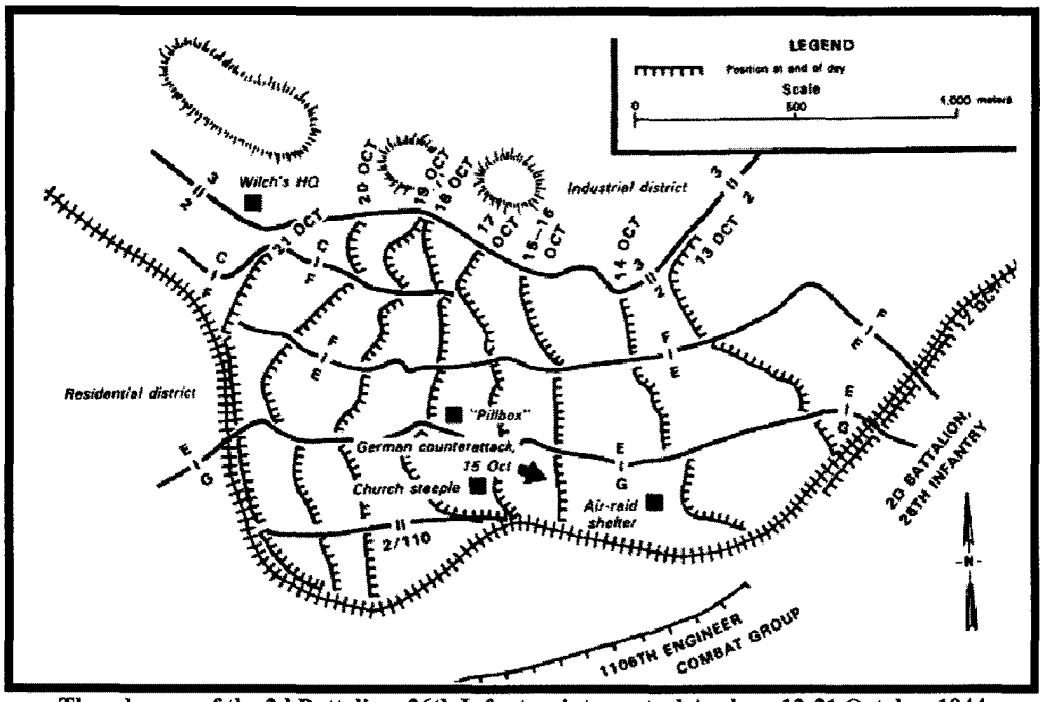
state of ineffectiveness. The German city of Aachen, population 165,000, posed just such a threat to the U.S. First Army in the autumn of 1944.

The First Army reached the German border near Aachen early in September after a rapid seven-week advance across France and Belgium. At this point in the war, the First Army was an experienced, highly respected fighting force, but it had overextended its lines of communication. Its transportation requirements had far exceeded preinvasion planning and were being met only through the efforts of the improvised "Red Ball Express." Units were depleted through the exhaustion of men and materiel. Frontages had become overextended. Moreover, when the First Army entered Germany, it immediately encountered the Westwall, known to the Allies as the Siegfried Line. The Westwall was essentially a giant antitank barrier consisting of obstacles and pillboxes covering Germany's entire western border. Two separate belts of the Westwall protected the Aachen gateway, testimony to the importance of the region. Fortunately for the First Army, many of the German troops that were to defend the Westwall around Aachen had been cut off and captured in Belgium before they could reach their new positions. Even so, the Westwall constituted a significant combat multiplier for the second-rate forces that were pressed into the defense of Aachen.

When the First Army arrived at the German border on 10 September, the Germans expected an immediate assault on Aachen and deployed their meager forces accordingly. Instead, Lieutenant General Courtney H. Hodges chose to attack the Westwall just south of the city, hoping to break through the border defenses before logistical shortfalls brought his operations to a halt. From 13 to 15 September, elements of the 3d Armored and 9th Infantry Divisions penetrated the Westwall and, in the process, outflanked Aachen to the south. But they were unable to press their advantage. The First Army then stood down for three weeks to reorganize and build up strength for a deliberate attack on Aachen itself.

On 8 October, Hodges undertook the encirclement of Aachen, with the 30th Infantry Division of XIX Corps attacking from the north and the 1st Infantry Division of VII Corps from the south. German resistance was stiff and progress slow, prompting Hodges to begin the reduction of Aachen before the encirclement was complete. A surrender ultimatum delivered to the German garrison in Aachen on 10 October brought no response: Hitler had designated Aachen as a "fortress," meaning it was to be held to the last man.

The task of reducing Aachen fell to Major General Clarence R. Huebner's Ist Infantry Division, a veteran of the Tunisia, Sicily, and Normandy campaigns. Since the 1st Division was also responsible for the southern jaw of the Aachen encirclement, only one regiment, the 26th Infantry, could be spared for the assault on the city (see map). The 26th, under Colonel John F. R. Seitz, had only two of its three battalions on hand. It would face a numerically superior foe: some 5,000 Germans, commanded by Colonel Gerhard Wilck, garrisoned the city. (The 1st Division's G2 estimated the defenders at only 3,500.) Adding to his complications, Seitz was ordered not to become inextricably involved inside Aachen while the encirclement battle raged. One circumstance working in the Americans' favor was the relatively low quality of German forces in the garrison, which included overage conscripts, converted navy and air force personnel, and city police.



The advance of the 2d Battalion, 26th Infantry, into central Aachen, 12-21 October 1944

In an attempt to secure a degree of surprise, Huebner elected to attack Aachen from the east rather than from the south, where the 26th Infantry currently occupied lines. Major General J. Lawton Collins provided a corps asset, the 1106th Engineer Combat Group, to man the lines vacated by the 26th. The engineer force consisted of two engineer combat battalions and elements of two bridge companies and was reinforced by an antitank company and a mortar company. Its mission was defensive.

The 26th Infantry's plan of attack called for sending one battalion, the 3d, north of Aachen to capture the high ground commanding the area, while the 2d Battalion cleared the center of the city. Lieutenant Colonel Derrill M. Daniel, commander of the 2d, organized his battalion into three hard-hitting company task forces. Each rifle company was reinforced with three tanks or tank destroyers (tanklike weapons), which allowed company commanders to supply one to each platoon; two 57-mm antitank guns; two bazooka teams to augment the three bazookas organic to each company; a flamethrower; and two heavy machine guns. Daniel also obtained one self-propelled 155-mm gun to augment his firepower. Since his frontage would be two to three times that recommended by doctrine for urban fighting, all three companies would have to participate in the assault; there could be no battalion reserve. On the positive side, intelligence gatherers provided him with maps of Aachen. Furthermore, at least seventy-four batteries of corps and division artillery were in the Aachen sector, giving the Americans a significant edge in overall firepower.

For two days prior to the 26th Infantry's assault, artillery and air power pounded the defenders of Aachen with 160 tons of bombs and 10,000 rounds of artillery. The 1106th Engineers contributed to the preparation by packing a trolley car with explosives (dubbed the "V-13") and rolling it down railroad tracks into the city's center. Apparently, because of the stout masonry construction of the city's buildings, the preparatory fires had little impact on the Aachen garrison. Nonetheless, the infantry assault proceeded on 13 October as planned.

The 2d Battalion's line of departure lay along a railroad embankment fifteen to thirty feet high that bounded Aachen to the east. At H-hour (0930), all the infantrymen threw hand grenades over the embankment and scrambled across, firing all weapons. It took thirty minutes for the Germans to recover and begin returning fire. Meanwhile, two tanks succeeded in passing over the embankment, followed by the rest of the battalion's vehicles, which drove right through a railroad station that was located under the tracks within the embankment itself.

The 2d Battalion deployed with F Company on the right, where it tied in with 3d Battalion; E Company in the center; and G Company on the left, its flank resting on the railroad embankment south of town. Each company zone was roughly three blocks wide, meaning that each platoon within the company worked a separate street. As the battalion advanced, every building was assumed to be a German defensive position until proven otherwise. No German, whether soldier or civilian, was allowed to remain in the battalion's rear. Every room of every building was thoroughly searched before the attack continued to the next. Even the sewer manholes were blocked up to prevent enemy infiltration. To maintain positive control over his companies and prevent flanks from opening up, Daniel used a "measle system"--city maps on which every intersection and all key buildings were numbered. The companies operated within specified zones and halted periodically at checkpoints designated by battalion to establish positive liaison with flank units. In sum, speed counted for less than thoroughness; it took Daniel's battalion nine days to clear downtown Aachen.

Equally noteworthy was the battalion's effective use of firepower, which was in keeping with Daniel's slogan, "Knock 'em all down." His principle was to keep up a continuous stream of fire from every available weapon, ranging from rifle to medium artillery. The division and corps artillery had remained south of Aachen when the assault forces moved to their jump-off points east of the city, misleading the enemy as to the Americans' intended axis of advance and permitting the artillery to shoot parallel to the front of the assault troops. This eliminated the danger of "short" rounds falling on friendly troops and allowed the infantry units to call down fire very close to their own positions. By shelling German lines of communication, Daniel isolated objectives. He also used artillery to drive defenders out of the upper floors of specific buildings. Direct fire from tanks, tank destroyers, antitank guns, and machine guns also chased the enemy away from his firing positions. Machine guns commanded the streets along the axis of advance, ready to cut down any evacuating Germans. Daniel's infantry stayed out of the streets whenever possible, preferring to move from building to building by blowing holes in walls. Ideally, by the time the infantry closed in on a given strongpoint, the Germans would have been driven down into the cellars. Grenades and, if necessary, flamethrowers and demolition charges, finished the job.

Knowing the effectiveness of German antitank weapons, the Americans were especially cautious in employing their valuable armor. Generally, tanks and tank destroyers stayed on the side streets (perpendicular to the axis of advance) and nosed cautiously around corners to fire. They would generally shoot one building ahead of the infantry advance until an entire block was cleared, then advance to the next side street.

Obviously, this method of combat required high expenditures of ammunition. Daniel established a battalion ammunition dump to ensure the steady supply of munitions. Evacuating the wounded also posed special problems, because the rubble and glass in the streets quickly ruined the tires of wheeled vehicles. Therefore, tracked utility vehicles known an weasels were pressed into duty for casualty evacuation. Several incidents called for special ingenuity on the part of the 2d Battalion. Early on 15 October, G Company encountered fire coming from a massive three-story air-raid shelter constructed of concrete fifteen feet thick. Infantrymen quickly drove the German defenders inside and fired on the doors with machine guns. Through an interpreter, the G Company commander issued an ultimatum, which the defenders ignored. At that juncture, a flamethrower was brought forward. When the flamethrower failed to ignite, the company commander lighted it with a match. After one squirt of flame at a baffle-covered door, the defenders gave up. Two hundred soldiers and about 1,000 civilians emerged from the gigantic shelter.

Later that day, the Germans counterattacked G Company with a tank-infantry force, and penetrated the U.S. line to a depth of several blocks. The penetration was quickly sealed off and eliminated. This counterattack was one of the few German offensive actions inside Aachen during the U.S. advance.

On 16 October, U.S. troops spotted what appeared to be a pillbox several blocks ahead of the battle line on the street that served as the boundary between E and G Companies. Since none of the company weapons could destroy it, Daniel decided to employ his precious 155-mm gun. To do so safely, he concocted a rather unique

combined arms effort. While one tank destroyer knocked holes in a building at the foot of the street in question, creating a field of fire for the 155-mm gun, other tanks and tank destroyers fired into the cross streets to keep roving German armor at bay. Meanwhile, riflemen cleared the nearby houses of German infantry. When all was safe, the 155-mm gun fired some twelve rounds into the pillbox and into the intersections along the street. The "pillbox" proved to be a camouflaged tank, which was utterly destroyed. Another German tank was destroyed by one of the 155-mm gun's random shots into the cross streets. After his capture, the German commander of Aachen was said to have denounced such use of a large weapon as being "barbarous."

Two days later, G Company made further "barbarous" use of the 155-mm gun. Despite the Americans' care in clearing all buildings, on 18 October they came under rifle fire from the rear. After two hours of searching, they found that the shots were coming from a church steeple that had not been secured. Tank and tank destroyer fire had no effect on the steeple, which, it was later discovered, had been reinforced with concrete. One shot from the 155-mm gun brought down the entire structure.

As the 2d Battalion advanced through Aachen, its already wide frontages extended even farther. Fortunately, the encirclement battle east of Aachen was won on 16 October, freeing up forces to aid in the city's reduction. C Company from the 1st Battalion, 26th Infantry, joined the assault on 18 October, taking a sector on the battalion's right flank. A battalion from the 28th Division, the 2d Battalion, 110th Infantry, joined Daniel's force on 19 October, occupying a gap between G Company and the engineers south of the city. As welcome as these reinforcements were, the battle in Aachen was already winding down. German resistance became less determined as the defenders realized that they were encircled and had been abandoned by their high command.

On 21 October, Daniel's force reached the railroad embankment that marked the western edge of central Aachen. Daniel staged another embankment assault (like that employed on 13 October to enter the city) and secured the far side of the obstacle. Meanwhile, just to the north of the interbattalion boundary, elements of the 3d Battalion prepared to destroy a bunker with their attached 155-mm gun. Unknown to them, one of the inhabitants of the bunker was Colonel Wilck, the garrison commander. When Wilck recognized his predicament, he radioed a message to his high command and announced his determination to fight to the end; he then promptly surrendered.

For all practical purposes, this marked the end of the battle for Aachen. The operation netted a total of 5,600 German prisoners and cost the 26th Infantry 498 casualties from all causes. Daniel's 2d Battalion and attached units lost less than 100 casualties. By the end of the battle, U.S. forces had destroyed 80 percent of the buildings in Aachen.

Doubtless, the capture of Aachen would have been much more difficult had the defending German forces been of higher quality. Even so, the U.S. forces involved must be credited with fighting skillfully and intelligently. Through their masterful use of firepower, careful control measures, and sound tactics, the Americans defeated a numerically superior opponent who enjoyed all of the advantages of defending in urban terrain. As the first German city captured by the Allies in World War II, Aachen represented a milestone in the destruction of Hitler's Third Reich.

Endnote:

1. Ambrose, Stephen E. ***Citizen Soldiers.*** New York: Simon and Schuster, 1997.

CHAPTER 2
INTELLIGENCE

INTELLIGENCE PREPARATION OF THE BATTLEFIELD (IPB) FOR URBAN COMBAT OPERATIONS

by Michael Ley, Intelligence Analyst, U.S. Army Intelligence Center

1. GENERAL.

> **MOUT: All military actions planned and conducted on a topographical complex and its adjacent natural terrain where man-made construction is the dominant feature. It includes combat in cities, which is that portion of MOUT involving house-to-house and street-by-street fighting in towns and cities.**
>
> **FM 101-5-1,** ***Operational Terms and Graphics***

Throughout history, military planners have viewed cities as centers of gravity. As such, in war, cities are something to either be protected, neutralized, or destroyed depending on one's mission. According to Intelligence XXI: Threat Panel White Paper, August 1998, "the globe of 2015 will contain three distinct worlds."

- Advanced societies with a population of one billion.
- Developing states with a population of five to six billion.
- A chaotic group of failed states with a population of one to two billion.

2. DOCTRINAL BASE.

Since the collapse of the Soviet Union, several conflicts have erupted within the developing and failed states. Some conflicts caused the deployment of American military forces. Missions during these deployments included peacekeeping, NEO, air interdiction, blockade, and combined arms combat. With the exception of the Gulf War, the bulk of these operations occurred in or around major cities. Analysts predict that future conflicts will involve some form of military operation within the urban environment. The U.S. Army must not only consider an increased operations tempo (OPTEMPO), but also the conduct of military operations on urbanized terrain (MOUT).

Current tactical doctrine states that urban combat operations are conducted only when necessary. Built-up areas should be isolated and bypassed rather than risk a costly, time-consuming operation in this difficult environment. Adherence to these precepts is becoming increasingly difficult as urban centers expand. Ports or airfields are essential to expeditionary forces and are mostly found in or around large cities. To secure these key facilities and prepare for follow-on military action, commanders must train their forces to operate within the urban environment.

OBSERVATION 1:

> ***"U.S. forces do not possess the overwhelming high technology advantages in a MOUT environment as they do in virtually all other environments."***
> FY 00 Army/USMC Battle Lab MOUT ACTD Program Description

DISCUSSION 1: Given the quote above, **FM 1-XX2,** ***Army Aviation Military Operations,*** provides a number of recommendations the commander and his staff should be aware of from the onset. One additional recommendation (No. 10) stems from lessons following U.S. Marine operations at Hue in 1968.

TTP:

1. Condition of MOUT	**MOUT is a condition of one or more of the four types of military operations (offensive, defensive, stability operations, and support operations).**
2. MOUT Environment	**The physical characteristics of the MOUT scenario to include its terrain, weather, demographics, associated *threat(s) and population density.***
3. Avoid urban areas when possible.	**Operate in the urban environment only when the mission dictates it.**
4. Get in and out quickly.	**Minimize time spent in the urban environment. This must be tempered, however, by consideration of the threat and obstacles.**
5. Do not be predictable.	**Identify alternate ingress and egress routes.**
6. Minimize your signature.	**Plan and execute the mission with maximum emphasis on maintaining cover and concealment.**
7. Know the current situation.	**Insist on acquiring the most current information available regarding friendly forces, threat, weather and terrain, hazards, obstacles, and mission parameters (the so called "big picture").**
8. Establish communications with all participating friendly units.	**Determine net information requirements for all participating and supporting elements. Establish communications with ground maneuver elements as soon as possible. Understand the commander's intent and current situation and coordinate all actions at the objective.**
9. Think before you shoot.	**Develop a clear understanding of the friendly situation and locations. Understand the rules of engagement (ROE).**
10. Make use of soldiers who have grown up in cities.	**There is no substitute for experience and those raised in *larger cities know many of their peculiarities. Listen to* them.**

OBSERVATION 2: IPB for urban operations.

DISCUSSION 2: While most of the discussion and examples described address the conventional battlefield environment, these same tactics, techniques, and procedures (TTP) can be used to address special operations to include unconventional warfare, non-combatant evacuation operations (NEO), amphibious, nuclear, biological and chemical (NBC) warfare, and urban operations. With the exception of large-scale amphibious assaults, operations in an urban environment and under the conditions presented may be the most complex of all.

TTP: It is critical that the commander and his staff be able to quickly identify the conditions and physical environment.

The key to the success of performing adequate IPB within the urban environment is the planner's ability to think unconventionally or "out-of-the-box." The planner may be required to shift the focus of his analytical efforts away from the traditional and toward the unconventional. For example, urban combat tends to emphasize squad and platoon tactics and use of the unit's short-ranged anti-tank (AT) weapons, booby-traps, and other low-technology systems. This runs counter to the situation on the conventional battlefield where armor and artillery tend to dominate.

Because of the diversity offered under the conditions of urban combat, a firm starting point for the S-2's efforts may be difficult to find. A tool or a set of tools may greatly facilitate the S-2's efforts. Two such tools are the MOUT Environment Framework and the MOUT Analytical Worksheet. Both the framework and the worksheet allow the planner an easy-to-use process while also serving as a checklist of urban concerns.

OBSERVATION 3: MOUT Environment Framework.

DISCUSSION 3: This framework will help assist addressing not only offensive and defensive actions, but the complexities of stability and support actions where political, not military, concerns are paramount. The impact of these concerns falls on the S-2 whose primary responsibility is ensuring his commander possesses the situational awareness necessary to support an accurate military decision-making process (MDMP). This is even more critical when available planning time is short.

TTP: Under the conditions of urban combat, especially in the face of a range of ethnic, cultural and political divisions (such as Beirut), this analytical effort can be challenging. The MOUT Environment Framework is a tool designed to facilitate and focus the S-2's efforts by:

- Addressing very specific MOUT-related concerns.
- Addressing these concerns with a logical and sequential process.
- Obtaining results quickly.
- Establishing the parameters of the S-2's initial analytical effort.
- Allowing the S-2 to enter the mainstream of the IPB process armed with a general knowledge of the environment.
- Providing common reference points for commanders and S-2s.

NOTE: The MOUT Environment Framework is structured around the worst-case scenario, general combat in a major urban area. As such, it can be used to support all other military actions there.

When using the MOUT Environment Framework, the S-2 must first realize that when taken as separate components, the numbered elements of the framework are subordinate to one of the four steps of the IPB process. ***The MOUT Environment Framework is not designed to circumnavigate any component of the IPB process.*** Additionally, for optimum results, the MOUT Environment Framework and the MOUT Analytical Worksheet should be used in conjunction with **FM 34-130,** ***Intelligence Preparation of the Battlefield,*** and **FM 90-10,** ***Military Operations on Urbanized Terrain.***

The MOUT Environment Framework is depicted below as Figure 1. The numbered elements of the MOUT Environment Framework outline the S-2's initial concerns regarding his physical environment, while the identification of the "place" of each of these numbered elements, within the four major IPB steps, is clearly annotated in the subsequent Figure 2 (page 2-5).

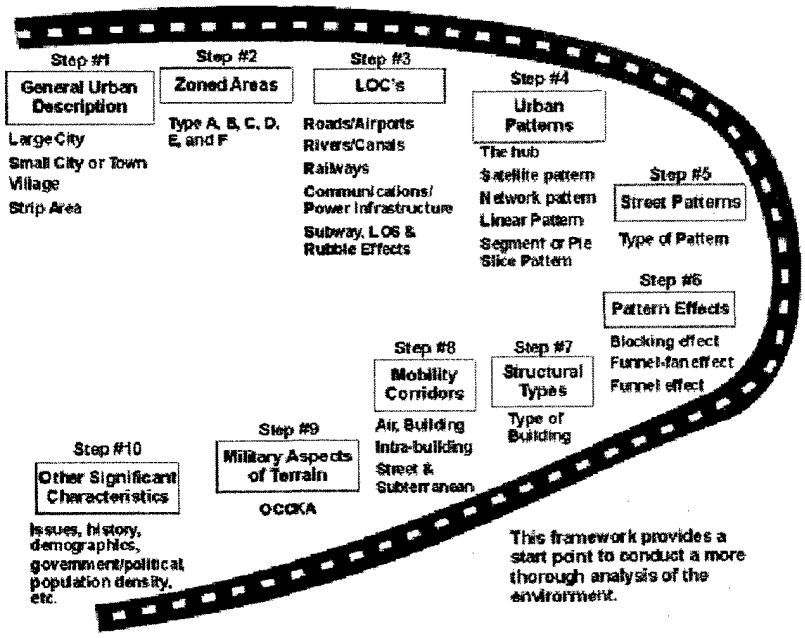


Figure 1

MOUT Environmental Framework Element	Associated IPB Step
1. Mission Orders	#1 Define the battlefield environment
2. Mission Type	#1 Define the battlefield environment
3. Urban Patterns	#2 Describe the battlefield's effects
4. Built-up Areas	#2 Describe the battlefield's effects
5. Building and Street Patterns	#2 Describe the battlefield's effects
6. Lines of Communication	#2 Describe the battlefield's effects
7. Urban Patterns	#2 Describe the battlefield's effects
8. Pattern Effects	#2 Describe the battlefield's effects
9. Military Aspects of Terrain	#2 Describe the battlefield's effects
10. Avenues of Approach	#4 Determine threat courses of action (COAs)
11. The Threat	#3 Evaluate the threat
12. Demographic Concerns	#2 Describe the battlefield's effects
13. Analyst Procedures	Combination of IPB steps

Figure 2

By following the steps outlined in the MOUT Environment Framework, the S-2 is able to focus his IPB effort. Paralleling use of the framework is an example MOUT Analytical Worksheet (Figure 3 on page 2-6). This worksheet is a "fill-in-the-blanks" form and provides the user with a basic profile of the target situation and environment.

Step	CONSIDERATION	ANALYSIS	ANALYTICAL NOTES
1	General Urban Description	Large city	Tobriz: Population 267,000
2	Zoned Areas and Patterns	B, D, and E	Predominantly B, D in sectors 1 and 4, and E in sector 8
3	LOCs	One major highway and two canals	Highway 8 to Fez and #5 and #7 canals
4	Urban Patterns	Hub	Part of a larger satellite pattern in the region
5	Pattern Effects	Funnel-fan	Hilly terrain on both sides of the hub
6	Street Patterns	Central sector Vinus subdivision	Radial Medieval Irregular
7	Structural types	Dominated by large, concrete structures and on the outskirts of the city, numerous shanty towns	Alwah sports stadium Vinus power plant Ford factory
8	Mobility Corridors	Air level Building level Intra-Building level Street level Subterranean level	Sectors 6 and 7 poor (many power lines) Skyscrapers sectors 1 and 4 Highlighted by numerous small rooms Densely packed buildings sectors 2 and 6 Sector 1 with underground tunnels, all other areas subjected to the effects of a high water table
9	Military Aspects of the Terrain	Observation/fields of fire Cover and concealment Obstacles Key terrain	Sectors 3 and 4 poor observation and fields of fire Sectors 3 and 4 mostly good cover and concealment Sectors 1, 4, and 8 have many obstacles (war debris) Sarbin Hills and Kulet Ridge in sectors 1 and 2
10	Other Significant Characteristics	Sectors 1 and 3 Catholic Sector 4 Moslem Tabon political party	Ethnic Kuri and Bari populations make up 89% of the city's population Armed militias are prevalent in Sectors 4 and 6

Figure 3
MOUT Analytical Worksheet

OBSERVATION 4: Through experience in a wide range of combat and peacekeeping environments, the U.S. Army has developed a pattern guide for a number of aspects of urban combat. These aspects include city size, urban environment and city layout, structural classifications, and urban patterns, and are depicted in the MOUT Analytical Worksheet.

DISCUSSION 4: When addressing the analysis of the urban area, the U.S. Army generally classifies built-up areas by size.

- Villages: Populations of 3,000 or less.
- Towns or Small Cities: Populations of 3,000 to 100,000 and not part of a major urban complex.
- Large City: Cities with associated urban sprawl and a population of 100,000 or more. (Source: **USMC MCWP 3-35.3**)
- Strip Areas: Industrialized zones built along roads connecting towns and cities.

Zoned Areas. Another key element is the type of environment. Environment addresses a broad spectrum of concerns and may include such examples as "a typical Korean city with cities within a city, urban sprawl and outlying industry" or "a typical German city with narrow streets, circular configuration, and low terrain location." These environments can be defined as a "zoned area," denoting the "type" of structures, building clusters, or neighborhoods found within a section of the MOUT environment. FM 90-10 provides some of the definitions and designations for the zoned areas of a given city to include–



TTP: ZONED AREAS

Letter Designation and Figure #	Layout (Type)	Defintions
A	Dense, random construction	Typical old inner city pattern with narrow winding streets radiating from a central area in an irregular manner. Buildings are closely located and frequently close to the edge of a roadway.
B	Close-orderly block	Wider streets generally form rectangular patterns. Buildings frequently form a continuous front along the blocks. Inner-block courtyards are common.
C	Dispersed Residential Area	Normally contiguous to closed-orderly block areas in Europe. The pattern consists of row houses or single-family dwellings with yards, gardens, trees, and fences. Street patterns are normally rectangular or curving.
D	High-rise Area	Typical of modern construction in larger cities and towns. It consists of multi-storied apartments, separated open areas, and single-story buildings. Wide streets are laid out in rectangular patterns. These areas are often contiguous to industrial or transportation areas or interspersed with closed-orderly block areas.
E	Industrial-Transportation	Generally located on or along major rail and highway routes in urban complexes. Older complexes may be located within dense, random construction or closed-orderly block areas. New construction normally consists of low, flat-roofed factory and warehouse buildings. High-rise areas providing worker housing is normally located adjacent to these areas throughout the orient. Identification of transportation facilities within these areas is critical. These facilities, especially rail facilities, pose significant obstacles to military movement.
F	Permanent Fortifications and Military Bases	Some unique features include narrow access ways with overlapping firing ports. With the exception of underground bunkers and nuclear fallout shelters, the vast majority of fortifications are made of dirt, wood, concrete, and steel, with the bulk of them being from the period 1870-1914 with steel-reinforced concrete and thick walls. Most are located in and around ports or along national borders. Military bases are not necessarily fortified, but are usually fenced and possess some form of local defense capability.

Lines of Communication. While the size of an urban area varies, in a worst-case scenario it will be quite large and include a vast network of modern highways, railroads, canals and other systems. These lines of communication (LOC) permit rapid access in, across, and out of the city. Frequently these systems bypass the core or center of the city, avoiding the most congested and built-up areas. There is a limitation, however, inherent in these LOC. They are often built across terrain that is relatively impractical for off-road vehicular traffic movement and are heavily dependent on bridges, ramps and overpasses.

Lines of communication are by nature easily subjected to blocking actions, either deliberate or caused by the effects of rubbeling. The S2 must factor in the LOC's accessibility and the size of the force it can support.

Another critical LOC element is line of sight (LOS). The closed-in environment, especially at the street and subterranean levels, will degrade standard Army radio systems. Line of sight also impacts fields of fire, observation, and the use of signal flags, mirrors, lamps and other forms of communications. Finally, LOS constraints within an urban environment are not one but three-dimensional, and must be addressed from all directions and both vertically and horizontally. A key player in making this effort work is the unmanned aerial vehicle (UAV).

During Israel's incursion into Lebanon, the Israeli Defense Force (IDF) used UAVs in many roles, not the least of which was as retransmission platforms. This capability is today being built into the latest American UAVs.

TTP: LINE OF SIGHT CONCERNS

Signal degradation is proportional to structural density, height of the buildings, and urban terrain features. For the purposes of LOS (FM/UHF), the linear distances are of far less importance than the structural density and disruption of the LOS between given points. This, in turn, means that it is very difficult to maintain any form of communications with consistency. Additionally, even when the situation does not involve armed conflict, the obstacles to effective FM/UHF within the urban environment may be hindered by electrical and trolley lines which can generate up to 300 times the interference over normal atmospheric interference on the UHF band. Russian experience in Grozny showed that it was better to dedicate one radio to communicate with a separate subunit, rather than trying to communicate over a net. As for the use of wire-based systems, they are, as they have always been, susceptible to many means of damage or destruction and more so in the city where digging them in is not an option.

Note: The S-2 must be aware of the city's communication infrastructure and that it may be more robust than in the past. The use of cellular phones, computer nets, and fiber-optic cable may significantly supplement or even replace the need for using FM/UHF radios.

Urban Patterns. The layout of an urban area will normally follow one of three easily identifiable patterns and two basic sub-patterns. The identification of the specific pattern or sub-pattern is an integral part of the urban analysis process. These patterns include--

TTP:

Type Pattern	Importance	
Hub Pattern	The hub or built-up area is central to any urban pattern. Although it may vary in size, the effects remain constant. The hub may serve as the pivot point for a defense or as an element of a defense in-depth. The hub is an obstacle which will normally be by-passed. As the attacking force slides off the leading edge of the hub, it becomes vulnerable to flank attacks and fire along its axis of attack. When adjacent terrain is unsuitable for by-pass operations, the hub may be developed as a defensive strongpoint.	
Satellite Pattern	This pattern consists of the central hub and dependent, dispersed smaller built-up areas with linear arrays along the connecting links. Links tend to focus on the central hub, with most taking the form of farm, forest or secondary roads. This pattern provides support to both the attack and defender as shown below--	
	Offensive Operations	Defensive Operations
	Avenues of approach or mobility corridors	Resupply, reinforcement and evacuation routes
	Multiple exit links from the hub	Mutually supporting positions
Network Pattern	Similar in appearance to the satellite pattern but is more complex and diverse. The pattern represents the interlocking of the primary hubs of satellite patterns. Formed primarily of towns and cities, its elements are more self-sufficient and less supportive of each other, although a dominant hub may exist. Major LOCs within a network are more extensive than a satellite and may take on a rectangular rather than convergent form. The natural terrain here may be more diverse than in a single satellite array. The network causes attacking units to fight through a maze of synthetic features that provide defensive obstacles. By-pass is difficult because contiguous terrain is often unsuitable for mounted operations. The pattern provides depth to the defense.	
Linear Pattern	A sub-element of the three basic patterns. The linear array may form one or more rays of the satellite pattern or the connecting links of a network. Most frequently, the basic array results from the stringing of minor hubs along a confined natural terrain corridor. This pattern facilitates the development of a series of strong defensive positions in-depth. It also acts to delay canalized forces and requires repeated deliberate attacks.	
Segment or Pie Slice Pattern	This pattern may occur as a subset of either the satellite or network patterns, or within a major hub. It is characterized by the splitting of an urban area by a dominant natural or synthetic feature (river, roads, etc.). The pattern may influence the assignment of boundaries and other control measures, or of attack objectives. The pattern may also bear directly on the organization of the terrain and on task organization.	

TTP:

Street Patterns. Within the classifications above there are a number of street patterns that should be noted. These include—

Street Pattern	Effect
Rectangular	**Streets are grid-like, with parallel streets intersected by perpendicular streets.**
Radial	**Primary thoroughfares radiate out from a central point. These streets may be extended outward 360 degrees around the central point or within an arc from a point along a natural barrier, such as a coastline.**
Concentric	**Loops or rings are surrounded by successively larger ones. Usually found in conjunction with larger radial patterns.**
Contour Forming	**Pronounced terrain relief influences construction of roadways along lines of elevation. Primary streets run parallel to contour lines, with intersecting roads connecting them.**
Medieval Irregular	**Little or no discernible pattern resulting from expansion and modernization of very old population centers. Older European cities frequently contain an "old city" section which characterizes this lack of pattern.**
Planned Irregular	**Street patterns which have been specifically engineered without geometric patterns for aesthetic or functional reasons. An American subdivision with curving streets and numerous cul-de-sacs are an example.**

Pattern Effects. The patterns identified above are of sufficient magnitude to affect a given combat operation. In addition to the basic blocking action caused by the hub phenomenon, deliberate actions such as fortifying an area along the LOC or rubbeling, accidental or not, can impact pattern effects. The major pattern effects are—

Effect	Importance
The Blocking Effect	**Often the shape and density of the hub as well as the width of major streets and proximity of side streets has the effect of almost completely blocking an operation.**
The Funnel-Fan Effect	**The effect normally occurs when the hub is located between terrain features that are unsuitable for mounted operations. Movement of units into the area results in the concentration of forces, loss of offensive momentum, and canalization. Beyond the hub, forces are required to spread or fan out before full combat power can be developed. This favors the defense because it creates an accordion effect in units moving through the hub, reducing C2 and operating effectiveness. A similar effect occurs when an attacking force must penetrate an urban network on a narrow front between hubs.**
The Funnel Effect	**Funneling or concentration and canalization of forces may occur without immediate fanning. This occurs most frequently when the linear pattern is encountered. It limits the number of maneuver units that may be applied against a series of hubs that must be confronted in succession, and forces a greater reliance on long-range and indirect fire weapons.**

Each of the zoned areas previously mentioned include a wide range of structural types. During the terrain analysis phase of urban IPB, these structures must be identified. Certain "key" structures may be included under "key terrain" which will be discussed later. These structures include but are not limited to—

TTP: STRUCTURAL TYPES

Building Type	Importance
Hospitals and other medical facilities	No-Fire Zone (protected under the provisions of the Geneva Conventions). Also important for both civilian and military casualties during times of conflict.
Sewer systems, subways, underground water systems, elevated railways, utilities, mass transportation routes	Underground systems may provide covered infiltration and small-unit approach routes. Elevated systems and mass transit routes provide mobility between city sectors. Utility facilities are key targets for insurgents, terrorists and others, and their destruction can hinder the capabilities of defending forces.
Stadiums, sports fields, playgrounds	Provide excellent civilian and POW holding areas. May be used as interrogation centers, helipads, sheltered POL and ammunition storage areas.
Public baths, swimming pools, cisterns, and reservoirs	Serve as an alternate water source in case public water supplies break down. Allows water for washing and other sanitary needs.
Construction sites, lumber yards, other commercial operations	Can serve as machine repair, obstacle construction facilities and material, and support general engineer operations.
Hazardous material storage facilities	Present a hazard to both sides in an operation and must be accounted for.
Permanent or purpose-built fortifications	Permanent fortifications can range from fortresses built by the Crusaders through modern underground facilities built to survive the Cold War's nuclear scare. The bulk of these, however, will be of the period 1870-1914, mostly found in coastal cities or along national boundaries and designed to resist the fire of the heaviest guns. These fortifications may also house local defense, air defense and logistics facilities, and present a variety of threats to any maneuver force.

OBSERVATION 5: A thorough understanding of the type and pattern of the target city and good terrain analysis will greatly assist in the analytical effort reviewing multiple mobility corridors and avenues of approach.

DISCUSSION 5: Mobility corridor and avenue of approach development are both common tasks for the S-2, but in a conventional environment normally addresses two tiers or levels the *air* and the *ground*. Levels can serve as mobility corridors for the end objective, usually the taking or holding of key terrain. Key terrain may be defined and located on a map as "Hill 286," "Mount St. Helens," "Yakima Ridge," "Black Swamp," or the "Hocking River." Key terrain may also be a structure such as a stadium, skyscraper or bridge.

In the urban environment, the S-2 will have four tiers of mobility corridors to address. These tiers are spatial in nature and include **air, building, street**, and **subterranean** levels. FM 90-10 addresses buildings within an operational environment as the "vertical" dimension. This dimension extends through three of the four levels--building, street and subterranean. It is the number and diversity of the levels that increase the complexity of the urban mission over conventional operations. Each tier may serve as a single mobility corridor while any combination of mobility corridors may be employed to form an avenue of approach. Additionally, each of these levels possesses its own unique combat characteristic which will be discussed below. Figure 4 relates to the differences in mobility corridors as understood for the conventional and urban operations.

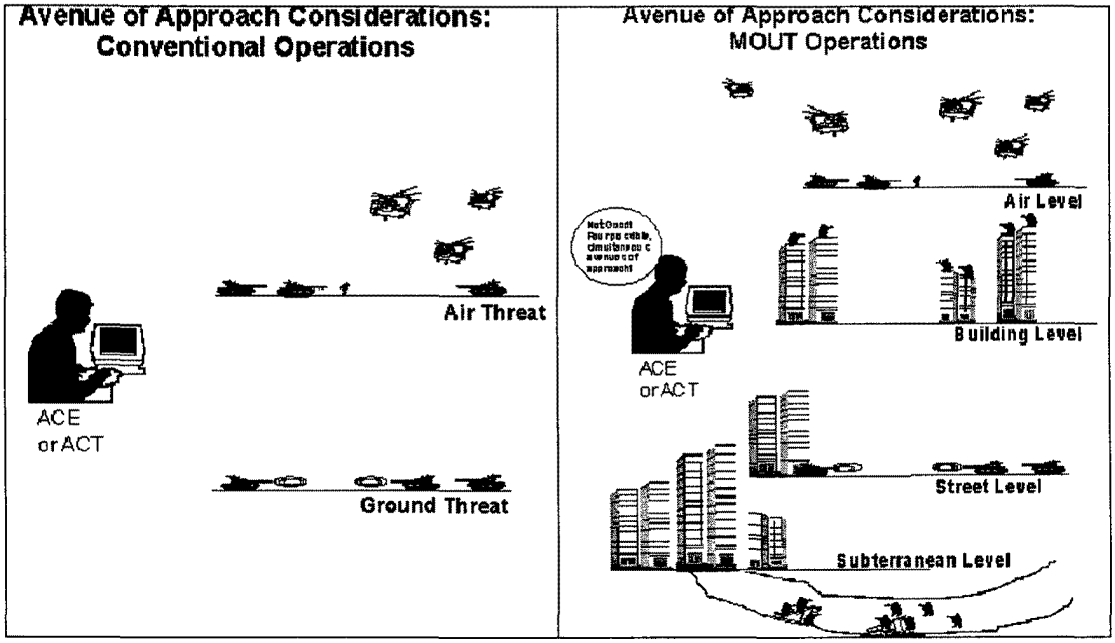


Figure 4

Air Level. The air level reflects the threat posed by airborne and air assault forces or ground attack aircraft. From the air, both friend and foe may be able to engage or observe targets from any obliquity, direction or elevation. Identification of this mobility corridor in urban areas is critical. Aviation assets can be used for high-speed insertion or extraction of troops, for supplies and equipment, to observe enemy movement, or for ordnance delivery.

- Reconnaissance
- Security
- Attack
- Air assault
- Support by fire
- Command and control
- Air movement
- Aerial sustainment
- Electronic warfare

Aviation unit intelligence specialists should immediately focus on the characteristics of the battlefield as seen from the cockpit. While street obstacles do not affect aviation assets, light towers, signs, cables, and power lines do affect them. Additionally, forces using the air avenue of approach in an urban environment are more vulnerable to man-portable air defense missiles, machine guns, and small arms fire because of the height and concealment benefits offered by tall and/or densely packed structures. Some unique aviation perceptions in support of urban operations include a view from—

Building Level. The building level reflects the threat posed by units moving along the roofs of buildings and other structures (elevated trams, bridges, etc.) from one level above that of the street to the highest skyscraper. Buildings provide cover and concealment; limit or increase fields of fire and observation; enhance or degrade LOS; and canalize, restrict or block movement of forces, especially mechanized/armor forces. Tall structures provide optimum perches for snipers and anti-aircraft weapons, and optimize the positioning of light AT weapons for overhead firing. A sub-element of the building level is the *intra-building* strata, floors that range from just below the roof to just above the ground floor.

Street Level. The street level (sometimes called the "ground level") reflects the threat posed by units moving at the street level, from building to building, and along one or more avenues of approach (AA). These routes may include sidewalks, highways, streets, and from building to building. While streets provide the means for rapid advance or withdrawal, forces moving along them may be canalized by large or densely packed buildings and have little space for off-road maneuver. Because they are more difficult to by-pass, obstacles on streets in urbanized areas are usually more effective than those on roads on open terrain.

Subterranean Level. The subterranean level reflects the threat posed by enemy units moving through underground passageways. Subterranean systems are easily overlooked but can be important to the outcome of operations. These areas may be substantial and include subways, sewers, cellars, and utility systems. As examples, the city of Los Angeles alone has more than 200 miles of storm sewers, while Moscow has over 100 kilometers of very deep subway lines. Most other major cities and many smaller ones have similar facilities. Both attacker and defender can use subterranean AA to maneuver to the rear or flanks of an enemy. This was best demonstrated at Stalingrad when Soviet troops constantly reappeared in areas that were supposedly secured.

OBSERVATION 6: While terrain analysis is a common element within the IPB process, operations within the MOUT environment impart a number of concerns not present on the conventional battlefield. The typical concerns regarding the five military aspects of terrain increase dramatically when the same terrain is an urban

environment. Highways, subways, tunnels, elevated railways, tall buildings and the crowded conditions associated with the urban environment all contribute to making it one of the most difficult of all military problems. The five military aspects of terrain, around which an analysis is based, consist of--

- Observation and Fields of Fire (O&FF)
- Cover and Concealment (C&C)
- Obstacles
- Key Terrain and Weather
- Avenues of Approach (AA)

DISCUSSION 6: The items above reflect the most important elements of the five military aspects of terrain when matched against the building and street pattern types previously discussed.

FM 34-130 outlines four steps in the IPB process, with each step including a number of sub-steps. Step 2, "Describe the Battlefield's Effects," includes the sub-step of "*Overlays that depict the military aspects and effects of terrain*" which will be addressed here.

The conduct of operations in a rural environment is difficult enough when the terrain lends itself to the operation or plays a neutral role. The level of difficulty for the friendly commander increases dramatically, however, when the terrain favors the threat. One worst-case scenario might include a major metropolitan area where the advantages presented by densely packed high-rise buildings are enhanced when they lay atop rough or high terrain.

High ground is not the only problem. The geographical location of a given structure might also be cause for an increased intelligence collection effort. Buildings placed along in constricted terrain (mountains, rivers, levees, etc.) would more likely form a higher number of choke points than would be found in a city of equal size lying on a plain or plateau. Finally, the positioning of a structure in a densely populated neighborhood could present the commander with a problem that might be easily solved through use of force, but would create unacceptable political loss should civilian casualties be high. Such concerns force the commander and S-2 to perform a more detailed look at urban terrain analysis than is normally the case.

Three-Dimensional Terrain Analysis. One of the most consistent lessons learned in previous MOUT operations was the inadequacy of conventional military maps and aerial imagery. There are a number of reasons for this; most notably is that military-issued maps are usually not of the required scale, reveal outdated information, lack details about the subterranean level, and reveal only the "flat" or "two-dimensional" (2D) surface of the target.

Perhaps the most critical shortcoming in the MOUT environment is the last element identified. Standard military maps do not allow a three-dimensional (3D) view of the environment. Two-dimensional maps and images of urban terrain reflect only flat surfaces and are incapable of establishing relative structural heights, a critical element of urban IPB. This, in turn, creates problems in determining areas of observation, fields of fire, cover, and concealment. Three-dimensional products are an absolute necessity in the urban combat environment.

Urban Overlay. One of the specialized products provided by the unit's assigned terrain team is the urban overlay. Although usually not a standard product, operations within the larger cities will require such an overlay. The urban overlay can be a valuable tool in assisting the S-2 in the performance of his mission. Elements used to construct the overlay include all steps identified on the MOUT Environment Framework plus maps, aerial/satellite imagery, 3D products, and significant terrain and vegetation features. The continuous effort that is the IPB process should focus on the more critical elements within the MOUT environment. These elements include but are not limited to—

TTP: MOUT CRITICAL ELEMENTS

Outline built-up areas having urban characteristics.	**Outline sub-areas of warehouses and open storage.**
Mark and outline major and minor land and water transportation lines passing through the city.	**Mark recreational areas, cemeteries, religious centers, government buildings, secondary commercial centers, and possible light industrial facilities.**
Mark the principal airports.	**Outline the sections of the residential sub-areas by differing characteristics of the residences and lots and their relative locations to other functional sub-areas.**
Outline types of water bodies, drainage systems, terrain configuration, and natural vegetation.	**Outline primary industrial sub-areas and utilities (both central business district and suburbs).**
Circle locations where there is a change in the type of transportation.	**Outline newer and older parts of the city.**
Outline primary commercial sub-areas (both central business district and suburbs).	

The Global Positioning System (GPS). One cannot underestimate the implications of the use of GPS in urban operations. These systems proved their value in the Iraqi desert in 1991 and today play critical roles in many military and civilian applications, from targeting to search and rescue. As additional and increasingly sophisticated GPS systems are launched, they form a network of inter-linked and overlapping location-positioning systems that, in their latest forms, are accurate to within half a meter. In the urban environment, with its densely packed construction and often maze-like roadways, GPS will play a critical location role that may be expressed at the door-to-door level.

OBSERVATION 7: There are, of course, a number of ***other significant characteristics*** that must be addressed under the conditions of MOUT. These include, but are not limited to, local demographics and history, medical threats, ethnic and religious concerns, population density, and threat forces and actions.

DISCUSSION 7: The most important concern in any environment is the threat assessment and development of threat models. These models are designed to accurately portray how threat forces normally execute operations and how they have reacted to similar situations in the past. Within the IPB process (Step #3, Evaluate the Threat), there are a number of sub-elements that must be addressed, culminating in threat integration. Getting there, however, does not follow a step-by-step process because of the differences from situation to situation. Additionally, the MOUT environment and any special COA concerns (special operations, NBC, NEO, etc.) throw a larger number of variables into any attempt to accurately access the threat.

Understanding the threat's concerns and focus of his effort is critical to the success or failure of a given operation. As an example, during operations in Grozny the rebels occupying the city were allowed a long planning cycle and they made the most of it. They used the time to evaluate possible Russian COA and even rehearse operations within many of the structures. They knew the details of each structure, and every rebel knew the mobility corridors and firing points for anti-tank weapons and machine guns. In contrast, the Russians were hurriedly thrown into the battle, were ill-trained and prepared, suffered from a lack of reconnaissance, and did not evaluate the threats posed by individual structures or crossfires offered by one or more buildings. In the ensuing battle, the rebels were able to inflict a severe defeat on the nominally more powerful Russian units. Some specific concerns in combat operations under the conditions of MOUT include but are not limited to–

TTP: MOUT SPECIAL CONCERNS

Concerns / Are There . . .	Effects / Impact
Underground passageways such as sewers, subways, heating tunnels, water and electrical conduits.	Severely restricted areas which limits maneuver. Poor ventilation enhances the effects of smoke and NBC agents. Near miss by explosive ordnance has increased concussive and ricochet effects. Low light/no light limits the ability to see. Potential for flooding.
Hydrological concerns (water supplies and electrical). Grid or area shutoffs for power, water, gas and other utilities.	Depending on location, it will be easy to cut off water and electricity to other sections of the city. Power grid/sources.
City maps and aerial imagery denoting building heights, overhead obstacles, bridges, hospitals and other specialized buildings.	Military maps do not provide sufficient detail nor adapt to urban construction. Both friendly and enemy forces may suffer from map limitations while local forces will not be hindered because of area familiarity.
Detailed building and bridge analysis and data on building survivability and structural integrity.	Maps and blueprints of major structures will probably not be available. If they are available, then those possessing them may have a distinct advantage.
Demographic concerns such as population density, housing areas, ethnic or cultural neighborhoods, areas of religious focus.	Within the boundaries of a major metropolitan area, there may be any number of political, ethnic, cultural, or religious groups. Mosques, churches, graveyards, and other locations important to the various factions must be identified and occupation/destruction limited when possible.
Medical intelligence (if the area has been the focus of NBC operations or prolonged siege or attack).	Urban areas quickly deteriorate without key services (water, electricity, and sanitation). Such conditions provide breeding places for any number of diseases. Water supplies may be contaminated. Use of NBC agents will only enhance negative effects. Forces initiating NBC operations may be at as much risk as target forces depending on weather, terrain, type of agent deployed, and level of self protection (uniforms, etc.).
Industrial centers such as factories, mills, and producers and suppliers of heavy equipment.	Industrial facilities offer severely restricted and hazardous terrain. Chemical storage areas must be considered before moving into such areas. When occupied, the heavy construction of many structures and equipment offers advantage to the defender.
Highways, rail lines, elevated railways, streetcars, and subways to include structural analysis of traffic loads, bridge load weights and measurements, and the capabilities of secondary roads to include their potential for canalization.	Primary avenues of approach, street level. Will support the heaviest fighting. Forces at this level will be susceptible to tight LOS restrictions, flank attacks, and attacks from above and below.
Airfields and open areas (playgrounds, parks, stadiums, etc.) that could be used for aerial support operations.	Potentially the most important terrain because it can be somewhat secured. Allows limited use of armor and indirect fire weapons. Subject to sniper fire because of improved LOS.
Communication infrastructure that might aid or hinder C2. This includes telephone, telegraph and television exchanges, microwave and satellite feeds, and downlinks and cell phone links.	High and densely packed structures restrict LOS-related systems and observation. Many locations are available where communication lines and facilities can be cut or destroyed. Radio/television stations/transmitters.

Threat Capabilities. The modernization of both conventional and unconventional forces through acquisition of new technologies is a real and dramatic threat to American military forces. Given the funding available to some groups, this equipment may be better than that given to Army units. Projected future threat capabilities that may significantly impact urban operations include but are not limited to—

TTP:

New munitions such as fuel air explosives (FAE), enhanced blast, intense light and improved ballistic technologies.	**Improved communications.**
Precision-guided munitions.	**Improved self-protection (body armor).**
Robotics and miniature UAVs.	**Non-lethal incapacitating agents (NBC).**
Day/night target acquisition systems.	**Improved engineer/breaching systems.**
Elevated guns systems.	**Non-lethal weapon systems (blinding lasers, stun guns, flash grenades, net guns, etc.).**

MOUT REFERENCES

The conduct of urban operations remains one of the most difficult missions for today's Army. The legacy of Stalingrad, Hue, Mogadishu, and most recently, Grozny, ensures that MOUT operations will be taken seriously. To assist commanders and S-2s in the conduct of MOUT operations, a good reference library should be available and should include—

FM 1-XX2, ***Army Aviation Military Operations on Urbanized Terrain (MOUT)***
FM 5-33, ***Terrain Analysis***
FM 34-8-2, ***Intelligence Officer's Handbook***
FM 34-130, ***Intelligence Preparation of the Battlefield***
FM 90-10, ***Military Operations on Urbanized Terrain***
FM 90-10-1, ***An Infantryman's Guide to Combat in Built-up Areas***
TC 90-1, ***Military Operations on Urbanized Terrain Training***
USMC ***Generic Intelligence Requirements Handbook***
"NEOs: The New Mission," ***Armor Magazine,*** March/April 1994
Intell XXI: Threat Panel White Paper

WARGAMING AND ANALYZING THE URBAN THREAT

by David P. Dilegge, Intelligence Analyst, Marine Intelligence Activity

1. GENERAL.

Wargaming is the most valuable step in the course of action (COA) development and analysis during the military decision-making process (MDMP). Trends indicate that few staffs understand how to wargame effectively and that many staff officers are not involved in the procedure. Additionally, threat analysis in support of wargaming typically does not portray a dynamic enemy capable of making sound military decisions.

- The staff takes a COA and develops a detailed plan.
- The staff synchronizes the operations plan by BOS.
- Information recorded during the wargame provides the basis for the operations order.

Due to the importance of wargaming, commanders and staffs generally allocate more time for its conduct than for other COA analysis steps. Wargaming results in task identification, combat power requirements, critical events and priority efforts, task organization and command and support relationships, and decision points. Most importantly, the wargame allows the staff to identify critical points in the COA that require either COA revision or abandonment. For this reason, staffs must prepare and wargame more that one friendly COA. Equally important, the opposing force players, or Red Cell, must prepare more than one enemy COA.

When conducting a wargame for MOUT, the Red Cell must portray and fight a wide spectrum of enemy threats to include:

- Conventional, military operations
- Paramilitary, insurgency, or guerrilla operations
- Terrorist activities
- Organized crime and gang activities

Staffs must recognize that the entire threat spectrum, or portions of it, may be present at any given time on the urban battlefield.

Urban terrain is a unique battlespace that provides both attacker and defender with numerous and varied avenues of approach, strongpoints to either attack or defend, and fields of fire. As such, wargaming and analyzing the urban threat must take into account the unique physical characteristics of urban areas and the three-dimensional nature of urban combat. Of particular importance when wargaming and analyzing urban areas is the need to focus on the enemy's perspective "inside looking out" in addition to the "outside looking in" friendly perspective.

Urban combat operations can be conducted from above ground, on ground level, inside buildings, or below ground. Most urban operations will include fighting on all levels simultaneously. A common mistake in conducting urban wargaming and threat analysis is focusing on the enemy in or on the objective–not on the enemy that can actually defend it. This is especially true when the objective is a building. If the building is important enough for friendly forces to identify it as key terrain or a named objective, it is most certainly key terrain to the enemy and, as such, he will plan his defense in-depth on a three-dimensional plane.

Urban wargaming and threat analysis must also address the constrained battlespace, the close proximity with the civilian populace, the ability of the enemy to blend in with and influence the populace, and the Rules of Engagement (ROE) and how they might influence potential enemy COA.

Of particular importance when preparing to wargame the enemy is the "informal" wargaming that takes place during threat analysis leading to the "formal" wargame. In preparation for wargaming, the G-2/S-2 must concentrate his efforts on the enemy's most probable and most dangerous COA--a constant "what if" look aided by the input and active participation of staff Battlefield Operating System (BOS) expertise.

2. DOCTRINAL BASE.

References: **FM 34-130, *Intelligence Preparation of the Battlefield (IPB)***
MCRP-12A, *Intelligence Preparation of the Battlefield (IPB)*

3. PLANNING.

OBSERVATION 1: Often a Red Cell is not formed prior to conduct of the wargame. Typically, the G-2/S-2 will have sole responsibility for threat analysis and fighting enemy forces.

DISCUSSION 1: A critical wargame function in "fighting the enemy" is the formation of a credible Red Cell. Inclusion of non-intelligence staff members with BOS expertise in the Red Cell or available to advise the Red Cell both prior to and/or during conduct of the wargame is essential. While the G-2/S-2 is the "focal point" for the enemy situation, the intelligence officer and his subordinates do not have the training nor expertise to adequately analyze, portray, and fight each of the enemy's combat, combat support, and combat service support functional areas. It is essential that representatives from each staff section analyze and wargame his functional area from a reverse BOS point of view. Inclusion of BOS expertise lends to raising the "BS" flag when analyzing and wargaming enemy capabilities, vulnerabilities, and possible COA. Examples of reverse BOS include: artillery and mortar men who can provide the principles of effective emplacement and utilization of enemy indirect fires; combat engineers who can analyze the principles of mobility and countermobility from an enemy point of view; aviators who by second nature are the best in analyzing air avenues of approach, enemy air-defense capabilities, and the effects of weather and terrain conditions on friendly and enemy flight operations. During urban operations, civil affairs (CA) and psychological operations (PSYOPS) personnel can be a rich source of value-added analysis on the local population, the enemy's relationship with the populace and how it affects friendly and enemy capabilities as well as vulnerabilities. These are but a few examples of the BOS expertise available to ensure a credible Red Cell and threat analysis prior to and during the wargaming process.

TTP:

- The formation of a credible Red Cell is the responsibility of the commander. He must leave no doubt in the minds of non-intelligence staff members that the Red Cell process is a staff function and not the sole responsibility of the G-2/S-2.
- Unit Standard Operating Procedures (SOP) define the composition and responsibilities of the Red Cell.
- Wargaming training and rehearsals at home station make the wargame process "second nature."
- The G-2/S-2 solicitation of BOS expertise and encouragement of "reverse" BOS analysis of enemy capabilities, vulnerabilities, and likely and most dangerous COA lends credibility to the process.
- Embed in the MDMP timeline a specified event for the Red Cell to continue to develop most likely and most dangerous enemy COAs.

4. PREPARATION.

OBSERVATION 2: The G2/S-2, as the Red Cell commander, must enter the wargame with a detailed analysis of the enemy's most likely and most dangerous COA. He must also be prepared to portray a dynamic and thinking urban threat. At the same time (and often a very difficult task) he must factor in the effects of the urban environment to include the presence of non-combatants on the urban battlefield.

DISCUSSION 2: In addition to the BOS expertise mentioned above, other venues of expertise, especially during urban threat analysis, are often available and must be used when available and appropriate. These include host country and local government officials and agencies such as police, fire, health, and public utilities. These same agencies often maintain infrastructure blueprints and detailed maps as a function of their day-to-day operations. Other non-traditional areas of military relevant expertise reside in the non-governmental organizations (NGOs) or private volunteer organizations (PVOs) that are typically "on the scene" during any complex humanitarian crisis. These groups–often "in country" well before a crisis requires military intervention–can be a rich source of information on the local culture, infrastructure, and critical services.

Tactical threat evaluation during urban operations is critical to mission accomplishment and to saving lives. This evaluation must include three-dimensional analysis of the urban battlefield to include fields of fire along avenues of approach and to the objective(s). The use of enemy maximum range fans and line of site overlays from dominate urban terrain will aid in this analysis and can be as simple as using string on a terrain model or the utilization of a computer program that depicts the three-dimensional urban battlefield.

Using three-dimensional threat analysis can also identify "tunnels of death" along urban avenues of approach where the enemy can engage friendly forces from multiple positions – this includes above ground, ground level and subterranean locations.

Finally, the results of threat analysis must be graphically displayed for use during wargaming. There are many intelligence products that support the wargaming process. Examples critical to the conduct of urban operations include situation and event templates and urban terrain models. The situation and event templates should portray how the enemy will employ and fight his forces, while urban terrain models facilitate analysis and wargaming in three dimension–just like the urban battlefield.

TTP:

- The G-2/S-2 must solicit non-traditional expertise from host country and international agencies to aid in "painting the MOUT battlefield."
- A detailed and complete Modified Combined Obstacle Overlay (MCOO) for terrain analysis is required. The MCOO must take into consideration that urban terrain is subject to extreme changes as the urban battle unfolds.
- At least two situation templates are required: the most dangerous and the most likely enemy COA.
- MCOO must be compatible with the graphic displays. 1:50,000 scale maps lack detail.
- Be prepared to use city maps.
- Event templates for each COA must be prepared and include at a minimum: time-phase lines, named areas of interest (NAIs) and avenues of approach.
- A high-value target (HVT) list for each enemy COA must be developed.
- Graphic displays of the urban battlefield must be produced and be large enough for everyone participating in the wargaming session to see. Event and situational templates must support the large graphic displays.
- Three-dimensional urban terrain model, a generic model created at Home Station updated as the situation unfolds and always available to the staff during planning and wargaming.
- Three-dimensional depiction of the urban area need not be a manually constructed model–use of automated data processing (ADP) systems that can computer generate the three-dimensional urban environment.

OBSERVATION 3: There is a trend for the G-2/S-2 section (and other staff sections as well) to be caught up in the current fight and ignoring the "next battle" while conducting analysis in preparation for wargaming.

DISCUSSION 3: Each staff section must have well-defined roles for each member, and these roles must be defined in the unit's SOP. These roles must delineate between those responsible for current and future operations.

TTP: The roles as defined in the unit's SOP must be rehearsed and enforced so that they are second nature to each staff member.

5. EXECUTION.

OBSERVATION 4: The conduct of wargaming involves fighting the threat, not the plan. Ideally, all enemy COA should be fought against all friendly COA.

DISCUSSION 4: A thorough wargame of a single COA requires approximately two hours. The commander must provide guidance on which COA he wants wargamed. The commander must also ensure that there are wargaming ground rules and the rules are enforced. A wargaming session that lacks ground rules and well-defined roles for the players often deteriorates into a "bull session." This leads to irrelevant branches that do not truly examine the viability of friendly COA.

TTP:

- Remain unbiased; do not allow personality or a sensing of "what the boss wants" to influence the wargaming process. This is especially important for the Red Cell.
- Accurately record COA advantages and disadvantages as they become evident.
- Continually assess COA feasibility; do not "fall in love" with the plan, as this leads to "fighting the plan" and not the enemy. While wargaming, if a COA becomes infeasible, STOP – REJECT IT, and begin the next COA.
- Do not begin the wargame with one COA. This inevitably leads to "forcing" the COA to work regardless of enemy reactions and other battlefield environment variables.
- Avoid comparing one COA with another during the wargame. This leads to a deteriorating cyclic path of "what ifs" – a path that often leads back to the "making a tentative plan" step in the MDMP. Wait until the COA comparison phase, when each COA has been weighted on its own merits.
- Never draw premature conclusions. This tends to create an atmosphere of analysis based on "tunnel vision" or the gathering and processing of information that supports these conclusions.

6. CONSIDERATIONS.

OBSERVATION 5: Wargaming is a team effort. This is especially true when conducting threat analysis and wargaming the enemy. Time constraints during the MDMP will interfere with the process, but every attempt must be made to limit the interference.

DISCUSSION 5: Though the threat analysis process in preparation for wargaming may be accelerated during abbreviated planning (10 to 16 hours from receipt of order to order issue to subordinate headquarters) or accelerated planning (10 hours or less) due to time constraints on the MDMP, it must not be abandoned. A staff that has been well drilled in the formal process and has an understanding of threat analysis as a staff product and not exclusively an intelligence function, will be prepared to successfully abbreviate or accelerate the process. The exclusion of non-intelligence (and at times non-military) personnel in the process and/or an incomplete threat analysis (action – reaction – counteraction) due to time constraints will result in the selection of a friendly COA based on assumptions of enemy doctrine and not of enemy capabilities. This often results in the commander and his staff "fighting the plan" and not the enemy during wargaming.

TTP:

- Conduct formal wargames at Home Station once the staff understands and can execute the formal process. Then drill until wargaming becomes "second nature."
- Home Station wargaming must be dynamic and must interject the unexpected. MOUT wargaming presents the staff with a unique set of battlefield variables, variables that need to be addressed well before executing urban operations.✪

CHAPTER 3
COMMAND AND CONTROL

COMMAND AND CONTROL

by MAJ Rex Davis, Company Team Trainer,
MAJ David Harper, Training Analyst,
MAJ William Roka, Deputy Team Chief O/C,
and CPT David Sizemore, Doctrine Writer
U.S. Army Armor Center

1. GENERAL.

Command and control is arguably the most essential element of the art and science of warfare, yet there is no single doctrinal manual devoted to the topic. There is probably a valid reason for that – no other subject covers such a broad spectrum and is so integral to everything the Army does. **FM 101-5,** ***Staff Organization and Operations,*** states that the focus of command and control is the commander while "the object of command and control is forces." It sounds simple enough. History proves time and again that it is not, especially during hours of limited visibility.

1st platoon, Alpha Company began to take devastating direct fire from a two-story building in an isolated rural village. The village was surrounded on all sides by densely wooded terrain; the enemy was able to move freely inside and outside of the village because the battalion had failed to isolate the objective area. The battalion's mission was to clear the village of insurgent forces and stabilize it for handover to the host nation government. The night fight had been raging inside the village for over three hours with an American battalion pitted against a well-organized company-size guerilla force, when 1st platoon, Alpha, began to receive fire from the two-story building. The building had not been marked as cleared, and 1st platoon began to fire and maneuver toward the enemy located on the second floor. The fight within the village lasted another hour and a half as 1st platoon, supported by second platoon, engaged the enemy machine gun on the second floor. Casualties mounted as both platoons tried unsuccessfully to maneuver to a position where they could gain entry and clear the building. Eventually, 2nd platoon, supported by the one squad left in 1st platoon, was able to get two squads into the building. A firefight ensued that left most of those two squads either KIA or WIA, but the enemy element was finally effectively destroyed. The problem was that the enemy element was 3rd platoon, Alpha Company. The company had lost control of its maneuvering platoons and the enemy had withdrawn from the village an hour and a half earlier. The battalion had failed to isolate the objective, and the companies had not properly rehearsed clearing and marking buildings. 3rd platoon had cleared the building hours earlier, had not marked it, and then began to engage what they thought was an enemy platoon. The ensuing casualty intensive firefight was a loss of positive control and situational awareness at all levels of command

This is a modified version of scenarios that have taken place in JRTC's Shugart-Gordon on more than one occasion. A trip to the library can provide similar historical examples in urban fighting that occurred in numerous engagements in the towns and rural villages of Europe in World War II.

The urban environment provides a unique challenge as the commander attempts to array, maneuver, and control his forces. Regardless of the commander's view of urban combat as a distinct type of operation or as a unique set of conditions, urban operations require the commander and staff at all levels to expand their thought processes during mission analysis. MOUT thinking needs to go beyond simple attempts to classify it as an operation or a condition. In theory, it may be one or the other. In actuality, it is both. Offensive, urban combat requires application of the fundamentals of the offense just like any other deliberate attack, and it requires detailed intelligence preparation of the battlefield (IPB) just like any other unique condition. But the total expanse of the urban environment covers a variety of tactical and non-tactical considerations that are difficult to grasp.

Urban combat missions require IPB that goes beyond simply evaluating terrain that happens to have buildings on it. Urban operations mission analysis has to consider the political and psychological implications of both enemy and friendly actions. It has to consider civil affairs, civilians on the battlefield (COBs), and collateral damage control. It has to consider threat analysis that may reveal a wide range of enemy activity including paramilitary forces and terrorists. The question still remains how the commander and staff will control their forces once they enter urban areas.

2. DOCTRINAL BASE.

The most extensive doctrinal discussion on command and control appears in FM 101-5 on pages 1-1 through 1-3. It clearly defines the distinct characteristics of command and control as two seemingly separate entities, but states that in practice they are unified. *The commander cannot command effectively without control, and he, with or without the staff, cannot exercise control without command.*

The three primary aspects of command--**authority**, **responsibility**, and **accountability**--are critical, and the focus of urban combat command and control (C2) is the commander. This chapter will highlight those items in an offensive urban combat environment that will help the commander control the object of C2: his forces. **FM 90-10-1, *An Infantryman's Guide to Combat in Built-Up Areas***, provides a minimal discussion on C2 considerations in urban combat, but it does state that offensive urban combat planning is centralized and execution is decentralized. Decentralized execution is precisely why the staff must develop a detailed and synchronized plan that will meet the commander's intent and provide subordinate units with the means to accomplish the mission.

3. PLANNING.

OBSERVATION 1: During the urban combat mission analysis, battle staffs sometime focus on generically filling out the selected wargaming tool (synchronization matrix) as opposed to conducting a detailed wargame that focuses on the wargaming methodology (box technique) and the desired outcome.

DISCUSSION 1: *The brigade commander originally directed the brigade staff to develop two distinct courses of action (COAs) for the urban combat mission. It was not quite clear as to why the brigade staff chose to disregard that guidance, but they only developed one COA. At the end of the mission analysis briefing, the brigade commander directed the staff to wargame the single COA they had developed by utilizing the box technique. Instead of conducting the wargame according to the box technique outlined in FM 101-5, the staff conducted the wargame according to the sequential phases that they had developed for the single COA. The staff did not address actions on the objective. The staff used a wargaming process that was driven by a synchronization matrix similar*

to the one contained on pages 5-20 and 5-21 of FM 101-5. The staff became more focused on completing the wargaming tool as opposed to actually wargaming the course of action. The wargame never developed a tempo that facilitated visualizing the enemy, the battlefield, and friendly forces' actions. Although the brigade S-2 presented the enemy's reactions to the BLUEFOR's actions, the wargaming process followed a slow, tedious, lock-step routine that allowed every primary and special staff member to state what actions his section or element would be taking at that particular time. The wargame quickly lost focus on what the brigade commander had directed – a wargame that focused on the critical aspects of the operation by using the box method.

TTP:

- Pay particular attention to the commander's initial planning guidance. If time permits, develop multiple courses of action in accordance with the doctrinal process outlined in FM 101-5.
- The S-2 and S-3, along with those other staff members who represent "killer" systems, conduct the wargame, while medical, logistician, communications, and other supporting staff members listen. Next, integrate combat support and combat service support assets into the fight. As with any technique, consider the pitfalls. Do not allow the "killers" to develop an action in support of the overall COA that is not supportable. That is why it is imperative that all staff members actively participate in the wargame, though not necessarily in a round-robin fashion where every primary and special staff member feels obligated to address something at every action, reaction, counteraction point during the wargame.
- Develop a script to guide the wargame. Develop a standard list of questions that must be answered to derive the desired details for the plan. Too often during the wargaming process, staffs get lost in generic statements such as "artillery continues to provide counterfire during this phase" or "maneuver elements will continue to move along Route Texas." A script with standard questions that must be addressed is a viable TTP to prevent "generic" wargaming.

OBSERVATION 2: During urban combat mission analysis, staffs sometime fail to develop a plan that is focused on the enemy as opposed to buildings in the built-up area. In other words, the plan is terrain-oriented (buildings) as opposed to enemy-oriented. The S-2 often fails to play the uncooperative and free-thinking enemy, frequently bending to the will of the S-3 or XO to fight the battle in the way they want.

DISCUSSION 2: *During the orders process, S-2s at both the brigade and battalion level had a fairly accurate picture of the enemy template in the built-up area. However, during the wargaming sessions, little to no emphasis was given to developing a detailed scheme of maneuver that focused on the enemy and would thus facilitate control of forces. The plan was geared more towards sequential building clearing. The S-2 seldom looked at the fight from the enemy side. This "fight" then gives the commanders and staff the false impression that everything will go the way they want it to go. This leads to the battalion producing a de-synchronization matrix as opposed to what they started out to do which is synchronization the operation.*

TTP:

- For a deliberate attack, develop a detailed plan for fire and maneuver consistent with doctrine.
- Focus the scheme of maneuver to attack the enemy.
- Determine the enemy's location and develop a plan that defeats his direct and indirect fire systems.
- Focus the direction of attack on the enemy's weakness. This becomes the point of entry. Isolate the objective area and establish a foothold at the point of entry. Use the foothold to fire and maneuver from.
- Sequentially number buildings from the point of entry. Develop the scheme of maneuver from this numbering system.
- The brigade and battalion maneuver plans directly affect the company scheme of maneuver. Every company within the brigade must know what enemy targets will be engaged by brigade and battalion assets to develop the company scheme of maneuver.

An infantry battalion receives the mission to attack a small village consisting of 20 buildings. The staff develops an objective sketch and sequentially numbers each building from the point of entry. The lead company is tasked to clear and secure buildings 1, 2, and 3. In building 3, the S2 templates a heavy machine gun that has direct line of sight and sectors of fire covering both buildings 1 and 2. The lead company's objective area consists of three buildings; however, the company must first suppress or destroy the enemy machine gun in building 3. The company commander develops a scheme of maneuver to clear building 3 first, followed by buildings 1 and 2. Later, the commander learns that the brigade plan calls for an attack aviation platoon to suppress building 3. The company commander consequently changes his

OBSERVATION 3: Brigade and battalion staffs need to develop the components of Commander's Critical Information Requirements (CCIR) to facilitate the commander's ability to make decisions that impact the plan during urban combat.

DISCUSSION 3: FM 101-5 and **FM 101-5-1, *Operational Terms and Graphics,*** provide the doctrinal definitions for the three components of CCIR--priority intelligence requirements (PIR), essential elements of friendly information (EEFI), and friendly forces information requirements (FFIR). PIR are simply those intelligence requirements for which the commander has a stated priority. EEFI is defined as "the critical aspects of a friendly operation that, if known by the enemy, would subsequently compromise, lead to failure, or limit success of the operation, and therefore must be protected from enemy detection." A logical deduction is that EEFI should address the enemy commander's PIR. FFIR is defined as "information the commander and staff need about the forces available for the operation." A logical deduction is that FFIR should be items that cause the commander to make decisions that impact the plan.

TTP: An easier format for use in a battle book or "smart book" to summarize the discussion points above would be as follows:

- **PIR** = what the commander wants to know about the enemy and his plan.
- **EEFI** = what the enemy commander wants to know about us to negatively affect our effort. We need to protect that information.
- **FFIR** = critical information on forces and assets that may affect the ability to accomplish the mission in a negative or positive manner. It is information that will cause the commander to make a decision that impacts the plan.

The following are some examples of PIR, EEFI, and FFIR that do not necessarily help the commander in an urban combat scenario because they do not fit the criteria and logic discussed above:

PIR

- How many noncombatants are in the town? (not useful unless we know where they are, etc).
- How many platoons does the commander have? (not useful unless we know how they are arrayed).
- Where is the counterattack force? (not useful unless we know how it will be employed).

EEFI

- Location of assembly areas (the enemy is more interested in our movement method/route).
- Attack time (the enemy is more interested in exactly where we are coming from, than when).
- Compromise of LZs (that is an FFIR, not an EEFI).

FFIR

- Loss of artillery pieces (does not cause the commander to make a decision/change the plan).
- Loss of Q36 (does not cause the commander to make a decision/change the plan).
- Loss of MICLIC (does not change the plan/ an alternative breach plan/equipment).

Conversely, below are some possible examples of PIR, EEFI, and FFIR that would be more likely to help the commander in an urban environment:

PIR

- Will the commander use noncombatants as protection and how?
- How much force does the commander have inside and outside the town?
- What will cause the commander to commit his counterattack force and how long will that force take to get there?
- How will the commander reinforce weakened positions that BLUFOR is about to exploit.

EEFI

- Method of movement toward the objective (air, truck, or foot infiltration).
- Breach point location.
- Number of companies or battalions the commander plans to send into the village.
- Will all heavy forces be up front at the breach or will there be a heavy team reserve and where?
- Location of assault positions.
- Attack aviation FARP, air attack routes, and battle positions.
- During the attack, will the enemy withdraw to keep a tactical advantage?
- If the enemy is forced out of the city, where will he go and how can we influence or affect his decisions?
- Rehearsals--branch and sequel development and reaction.

FFIR

- Scouts captured or compromised.
- Main bridge locations along ground route that have been blown.
- OPORD compromised.
- Expected personnel and equipment replacements that did not arrive.

OBSERVATION 4: Commanders often do not develop task organizations that support their scheme of maneuver for urban operations.

DISCUSSION 4: Task organization is the means by which commanders organize their units to accomplish specific tasks. Urban operations provide one of the few situations where infantry and armor elements may be effectively task organized below platoon levels.

TTP:

- Consider all phases of the operation from movement to the built-up area through consolidation and reorganization when developing task organization. Consider the capabilities and limitations of maneuver and combat support elements as related to specific tasks.
- An armor team with mechanized infantry and engineers is effective in route clearance to assault positions, breaching obstacles, seizing the initial foothold into the built-up area, defeating enemy armor counterattacks, and isolating the built-up area.
- Infantry companies are best suited for clearing built-up areas. Consider task organizing armored sections or platoons to infantry companies to support infantry movement when clearing buildings.
- Effect task organization as early as possible to allow units maximum time for combined arms rehearsals at the lowest levels.

4. PREPARATION.

OBSERVATION 5: After developing a thorough, well-synchronized plan, units should conduct combined arms rehearsals down to platoon and squad level and include all phases of the operation. Failure to rehearse is a consistent problem of units in the MOUT attack. Units rehearse to the wire or breach and then stop.

DISCUSSION 5: Urban combat requires closely synchronized actions of combined arms teams at all levels. Armor, artillery, engineer, chemical, aviation, close air support, information operations, and psychological operations units support the infantry. Effects of the combined arms team must be applied at the right time and place. Rehearsals should include all phases of the operation: isolation of the objective, clearing, consolidation on the objective, resupply, and casualty evacuation. When conducted properly, combined arms rehearsals identify potential problems in the synchronization of the plan between combat arms, combat support, and combat service support elements.

Rehearsals provide a means for units that seldom operate together to train collective skills. In urban operations, infantry squads and tank sections often work together during movement and clearing buildings. Since infantry squads and tanks seldom work so closely together, they need an opportunity to train together. This happens during rehearsals.

The key to effective rehearsals is to have participants perform the tasks they must accomplish under conditions that are as close as possible to those expected for the actual operation. Participants may maneuver their actual systems, models, or simulations while interactively verbalizing their elements' actions. Other types of rehearsals, such as backbriefs, are not as effective. **FM 17-15, *Tank Platoon,*** states, "*A rehearsal is different from the process of talking through what is supposed to happen.*" Rehearsals at the platoon and squad level are also critical in terms of tanks and infantry soldiers familiarizing themselves with each other's unique characteristics. An observer/controller's recent statement said it best: "Soldiers will not understand what they are supposed to do if they don't get a chance to do it. Talking about it just will not do it."

TTP: Conduct combined arms rehearsals at the lowest level of integration. Rehearsals should include:

- Communications procedures. Rehearse primary and alternate means of communications. Include use of visual signals. Also, when and where retransmit capability (retrans) move.
- Direct fire plan and control: sectors of fire, engagement criteria, methods of designating targets, and signals for lifting and shifting fires.
- Indirect fires: targets, triggers, observers, and signals for lifting and shifting fires.
- Breaching operations: mechanical, explosive, and manual breaches. Include clearance procedures prior to detonation, lane marking, and assault through the breach.
- Maneuver: movement to the assault position, movement between buildings (including use of armored vehicles to shield infantry), staging units.

- Casualty evacuation procedures.
- Start rehearsals early in the troop-leading procedures process. Some rehearsals can start shortly after receipt of warning orders. Units can rehearse drills such as breaching, clearing buildings, and moving between buildings before receiving a detailed plan. Infantry units can also rehearse aspects of operating in close proximity to armored vehicles.
- Rehearsals at all levels need to be stressed and executed.

5. EXECUTION.

OBSERVATION 6: Although urban combat operations execution is extremely decentralized and the control of units at all levels is difficult at best, the existing doctrine provides a more than adequate framework for successful operations in built-up areas. In the fight of Shugart-Gordon, is it typical to see the BLUFOR identify the location of critical enemy systems and fight everything around those systems.

DISCUSSION 6: A group of company and platoon observer/controllers were recently asked the following question: "Given the fact that urban operations requires a detailed plan for fire and maneuver, good graphic control measures, and a plan to deal with possible degraded communications ability, what unique command and control techniques have you seen implemented by units that have been able to efficiently maintain control of their subordinate elements during urban engagements?" The group hesitated for a moment and then in unison said "Nothing." They all agreed that the doctrinal principles as outlined in FM 90-10-1, especially Appendix K, "Close Quarters Combat Techniques," are solid and provide a good doctrinal base for clearing buildings. Also, most platoons and squads generally do well in accomplishing that task. The problem area continues to be movement between buildings, but that there is no mystical technique that will improve a unit's capability to do that. It all comes down to a detailed plan for fire and maneuver that is enemy focused, as opposed to having the lead element clear buildings until it is combat ineffective, and the next element coming in to pick up where the first element left off. The former will lead to success and the latter leads to what one senior observer/controller described as "the pencil sharpener effect." Each unit is a pencil and they get fed into the pencil sharpener one at a time until they are ground down to the eraser.

TTP: There is no magical formula for maintaining positive control of maneuvering units, but observer/controllers and existing doctrine agree that the following components are required:

- A detailed plan for fire and maneuver outside and between buildings.
- In order to mass and maintain momentum inside an urban fight one might apply the attack technique of penetration. Massed supporting fires on the critical location will likely provide the element entering the building the ability to reach it with enough force to overwhelm the enemy quickly.
- Platoon and squad rehearsals of both movement between buildings and clearing actions inside buildings.
- A detailed direct fire plan that is oriented on specific sectors (suppress windows A1-A5 on building 1) as opposed to random, undirected, unfocused suppression on anything that just happens to move.
- Known marking procedures for rooms and buildings that have been cleared. These markings must be rehearsed during platoon and squad rehearsals. One of the functions of the rehearsal is that it should be used to conduct pre-combat inspections (PCIs) of the required marking equipment. (What are we using to mark, who is carrying it, and does every element have it?)
- Known friendly identification markings that are rehearsed. *What is it and does everyone have it*? How are the riflemen going to be marked and how are the tanks/Bradleys going to be marked during hours of limited visibility?
- A detailed plan for the use of indirect fire and all other supporting combat arms, combat support, and combat service support systems.
- A communications exercise (COMMEX), either in conjunction with or in addition to rehearsals. There are unique communications challenges between mechanized and light elements, yet few units conduct any type of COMMEX to ensure they can talk.✪

CHAPTER 4
COMBINED ARMS MANEUVER

COMBINED ARMS MANEUVER DURING URBAN COMBAT

by Arthur A. Durante, Deputy Chief of Doctrine, U.S. Army Infantry School
and CAPT Shenandoah Sanchez, Tactics Instructor, Basic School, USMC

1. GENERAL.

The Air Assault brigade assisting the Cortinian government in its struggle against the insurgent Cortinian Liberation Force (CLF) was faced with a daunting task. It was to retake Shugart-Gordon from a CLF main force battalion and return the city to Cortinian government control. The commander knew from experience that fighting in the city against the fanatical CLF would be difficult. The city presented many different conditions that his soldiers had not faced in earlier combat in the forests and swamps of Cortina.

The commander reviewed the forces at his disposal: a powerful maneuver force of three infantry battalions and a tank company team, armed helicopters, two artillery batteries, and all the combat support and combat service support units of a modern army.

How would he meld these forces into a team to accomplish his mission? How would he use this combined arms team to wrest Shugart-Gordon from the CLF with the least amount of friendly and non-combatant casualties? How would he avoid destruction of the vital parts of the town so that the Cortinian government could return life to normal for its citizens in as short a time as possible?

All these questions went through his mind as he began to formulate commander's guidance for his staff. He knew that urban combat at the brigade level, something the American Army had not done since operations in Panama City, was different from other operations. It was his job to determine how different, in what way it was different, and to lead his brigade to victory.

2. DOCTRINAL BASE.

U.S. Army doctrine is consistent when describing the steps a commander must take to conduct successful offensive operations.

In each of the doctrinal manuals, such as **FM 100-15,** *Corps Operations*, and **FM 7-10,** *The Infantry Rifle Company*, the steps of a deliberate attack include isolation of the objective area and seizure of the objective. This doctrinal guidance applies to deliberate attacks on all terrain, but isolation of the objective area is particularly important during urban combat. Unfortunately, due to the nature of urban combat, it is particularly difficult to achieve.

Deliberate attacks are fully synchronized operations that employ all the assets and forces available to a unit. At echelons above the brigade, the corps and division prepare for deliberate attacks by employing operational security measures, engaging in deception, and selecting a time and location for the attack to achieve tactical surprise.

The corps uses maneuver combined with firepower and information operations to isolate the division's objectives. The corps and division commanders ensure full integration of joint assets, particularly the effects of joint fires and joint acquisition systems, to isolate the close battle area.

It is at the brigade level, however, that true isolation of the objective area first becomes possible. This is especially true of urban objectives.

3. ISOLATION OF THE BRIGADE OBJECTIVE.

OBSERVATION 1: Isolation of the brigade objective. The brigade commander planning to attack an urban area must carefully determine how much isolation of the objective area his forces can accomplish, and how they can accomplish it. Regardless of the technique chosen, effective isolation of a brigade objective in an urban area is a difficult task.

DISCUSSION 1: Although the doctrinal principle of isolation of the objective is a constant, the brigade commander must consider each of the factors of METT-TC (mission, enemy, terrain, time, troops available, and civilian considerations) when planning isolation actions. Just as every urban area is different, the factors of METT-TC combine to make every operation in an urban area unique.

This does not mean that doctrinal principles do not apply, but it does mean that a set of tactics, techniques, and procedures (TTP) appropriate for one urban attack with its unique set of METT-TC conditions may be completely inappropriate for another attack a few miles away. This is the challenge the commander and his staff faces every day in an urban area: to recognize the differences and to apply the established doctrinal principles to determine the appropriate TTP.

The degree of isolation the brigade can achieve is completely different if the objective is a small-to medium-sized town with a clearly definable boundary than it is for one part of a built-up area that is connected directly to a larger metropolitan complex. Commanders must not allow themselves to become prisoners of the mind-set that sees isolation of the objective as something that is as clean and neat as a line drawn on an overlay. Sometimes isolation is more psychological than physical or more relative than absolute.

TTP: Isolation begins with the efforts of the division and corps psychological and civil affairs operations to influence enemy and civilian actions. The brigade commander should consider using PSYOPS (psychological operations) teams to broadcast surrender solicitations to the enemy forces and to deliver pamphlets directing the civilian populace to move to a designated safe area. These actions must be coordinated with the overall PSYOPS plan for the theater and must not sacrifice surprise.

There are drawbacks to this technique. By themselves, PSYOPS are seldom decisive. They take time to become effective and their effects are difficult to measure until after the actual attack, but they have proven to be successful in the past. Under some METT-TC conditions, they have achieved results far outweighing the effort put into them.

TTP: Sensor and reconnaissance units, to include air force assets, prove to be useful only if ground forces in the areas have control of those assets. Reconnaissance elements such as a squad or a platoon must be able to directly interact and communicate with all reconnaissance elements. Too often units use an information buffer, such as an S-2, to intercept information.

The most common isolation is to use a combination of sensors and reconnaissance units along avenues of approach to detect significant enemy forces as they attempt to enter the objective area. The brigade can engage

these enemy forces with indirect fires, aerial fires, or a combination of the two. This TTP may be effective in detecting and stopping large enemy units from entering, but the cover and concealment the urban area provides makes it very difficult to totally seal off the urban objective.

To be successful, this technique requires skillful reconnaissance units and responsive fires. It may not be possible for the brigade to observe all avenues of approach, and enemy units may escape detection by infiltrating. It may be difficult to tell the difference between enemy personnel and non-combatants moving in the urban area. Indirect fires may cause unacceptable damage to key parts of the city.

TTP: The most effective method of isolating an urban objective may be by using a combination of sensors, reconnaissance elements, and maneuver forces. The brigade commander moves platoons and companies into positions where they can dominate avenues of approach with observation and direct fires. This is much easier to do where the urban area is small and has clearly defined boundaries than in large urban areas. Large urban areas will prevent a maneuver force from gaining access to a position from which to stop enemy movement into the objective area.

TTP: In some instances, intense indirect and aerial fires are the sole techniques to isolate. This is the most destructive technique; it demands large amounts of ammunition and it may only last for short periods of time. In many urban areas, it may not be completely effective, but it may be the only choice left to the commander.

Brigade fire planners can improve the effectiveness of this technique by careful selection of targets. Mortar and light artillery fires falling onto large buildings are not as effective in preventing enemy movement as fires falling in open areas. Targeting them against larger avenues, parks, and other open areas will force the enemy to move only within buildings.

Heavy artillery and aerial fires can be directed against buildings that the enemy is using for movement or observation. This will greatly slow his movement but not stop it. It will hinder his resupply efforts and make it difficult to reinforce units under attack. Targeting obvious choke points such as bridges or main road junctions can improve the isolation effect.

Smoke can be used to isolate the objective from enemy observation, but it is difficult to predict what smoke will do in the urban area, and obscuration rounds may cause uncontrolled fires in the city.

TTP: Specific isolation TTPS should be considered in the effort to isolate a village, town or city. Friendly minefields delivered by air or truck may be the answer to isolating an objective. Delivered volcano could isolate the objective from possible enemy reinforcement or any mechanized threat. Consider the use of air defense assets to counter enemy aviation from disrupting friendly forces momentum once it is established.

TTP: Brigade commanders can also offer another type of isolation--political. In peacekeeping operations, these commanders can influence counterparts via the Joint Military Commission (JMC) or by civilian bilateral meetings. The commander provides resources when there is cooperation and denies is when there is a lack of cooperation. The commander uses the targeting synchronization meeting to identify political objectives and assigns responsibilities to units to accomplish these objectives.

4. ISOLATION OF THE BATTALION OBJECTIVE.

OBSERVATION 2: Isolation of the battalion objective. Isolation of the battalion objective involves limiting enemy fires, movement, and observation not only from ground level, but also from the upper stories of buildings and below ground level.

DISCUSSION 2: Isolation of the battalion objective is critical in urban combat because of the close ranges and limited sight distances of the city. Enemy units occupying buildings outside the battalion's objective area may be in other buildings so close that they can quickly reposition to counterattack or can bring direct fire to bear on friendly forces.

TTP: Often, the most effective tactic for isolating the battalion's objective is for other units of the brigade to conduct supporting attacks directed against buildings on the flanks while indirect aerial fires strike buildings to the rear. These supporting attacks can be tied into the brigade's deception plan as feints, but they must include at least attacks by fire. In some cases, the supporting attacks must actually assault buildings bordering on the battalion's objective.

Once again, smoke may be useful in isolating the objective. As in any use of smoke in an urban area, it is difficult to predict how smoke will obscure, and the mortar or artillery rounds may start uncontrolled fires that hinder further friendly actions. If an urban area adjacent to the battalion's objective is semi-detached from the area around it, fires to deliberately ignite the buildings should be considered. Although perhaps not desirable because of other considerations, a fire can make the buildings unusable for quite some time, up to three days for a large fire.

Field artillery-delivered mines can be used to deny the enemy the use of parks or other open areas, but the effect of those munitions on non-combatants and the brigade's future operations must be considered. Short-term self-destruct mines are normally the most useful.

Isolation of the battalion's objective may become a detailed, ammunition-intensive effort, but it is important to allow the brigade's main effort battalion to operate unhindered.

TTP: Isolation of the battalion objective includes controlling access in and out of the area of operations. Commanders need to assign responsibility for security zone operations while the main effort is conducting the MOUT attack. All efforts must be synchronized for the main effort to succeed. This security zone force has to be equipped with adequate forces in order to prevent an enemy counterattack. Cordon of the urban area may prove to be unattainable; thus commanders either request additional assets or focus on the most probable enemy avenues of approach into the objective area.

5. COMBINED ARMS ASSAULT OF THE COMPANY OBJECTIVE.

OBSERVATION 3: Combined arms assault of the company objective. The enemy force on the company's objective must be fully suppressed before a successful ground assault can be launched.

DISCUSSION 3: Historically, most assaulting unit casualties occur as the unit departs covered and concealed positions and moves into the open area between buildings. For a company to maneuver its main effort platoon onto the objective, it normally requires a combined arms effort by all the other units in the company.

Although an all-infantry force can be successful in urban combat (especially against light resistance), it lacks firepower and mobility under small arms fire. A truly integrated combined arms team is the most effective urban combat force. This means infantry working as a well-oiled team with tanks, armored fighting vehicles, engineers

and engineer vehicles, armed helicopters, and field artillery. It is at the company level that all these different units come together under fire in a very small area. Infantry needs to be cross-trained by engineers in demolitions and engineers need to be trained in room clearing techniques by the infantry. They must all work together.

Individual and small team initiative, audacity, and aggressiveness commensurate with the commander's intent will make the plan successful. Small unit leaders need to be aware of the operations plan and know the intent of their higher commander. Crossing a danger area in order to gain a foothold in a building becomes a significant emotional event. Leaders at all levels need to show courage, candor, and confidence in the conduct of their operation. Doubt in mission success and lack of confidence in leader ability will prevent soldiers from responding aggressively in time of intense stress. Mission rehearsal and small unit discipline will build confidence in the plan and in the leader.

TTP: Task organize the tank platoon into two sections of two vehicles each, and assign each section to a rifle platoon. A squad of infantry is needed to protect tanks which ultimately depletes the platoon of vital manpower and firepower. The protection needed should come from a uncommitted unit if possible.

TTP: Depending on the urban environment, a platoon located in a building may not be able to effectively control a tank section. The platoon leader will already be over tasked with requests for indirect fire, CASEVAC, clearing rooms, and EPWs. An infantry company may be able to command and control a tank platoon if the urban area does not consist of high-rise or multiple story buildings. A squad that is dedicated to protecting tanks from ATGMs can assist a tank section in support to lead squads or platoons, but the command and control should remain with the company commander. The issues that need to be addressed to change this type of relationship are communications tank to ground, considerations of the physical and mental challenges of urban combat, and the limited maneuver space available for tanks to properly support operations.

OBSERVATION 4: The first and most fundamental lesson from recent U.S. and allied operations in built-up areas is the value of the fully integrated combined arms team.

DISCUSSION 4: In spite of the critical value of light infantry forces during urban combat, combat in urban areas should never be considered a pure infantry task. Such fighting by units composed entirely of infantrymen is a historical anomaly. Across the spectrum of combat action in urban areas, powerful combined arms teams produce the best results. Light infantry units operating alone suffer from critical shortcomings that can only be compensated for by the creation of teams containing the appropriate mix of mechanized infantry, armor, and engineers. These teams must be supported by closely integrated aviation, fire support, communication, and logistical elements.

Combat in some urban areas is decentralized and the avenues of approach so channeled that massed armored vehicles cannot be employed. The heavy firepower, mobility, and armor protection of the tank or BFV are still needed; however, urban combat often calls for fewer armored vehicles deployed over broader areas.

TTP: Task organize by attaching a tank platoon to an infantry company with the tanks of the platoon further sub-attached on the basis of two tank sections to each of the lead rifle platoons. Individual tanks can be employed, but sections are preferable. Each of the tanks attached to a platoon should have a rifle squad designated to work with it. This TTP must be used carefully. Attachment is a doctrinal relationship that carries with it the requirement to provide logistical support for the attached unit. An infantry rifle company cannot provide all the logistical support a tank platoon needs. Special accommodations must be made for fuel, ammunition, and maintenance support.

TTP: Use anti-tank (AT) systems, mortars, attack aviation or close air support (CAS) to destroy or suppress enemy AT positions that might hinder mechanized movement into the objective area.

TTP: Use AT assets to isolate the objective. The use of AT can provide building direct fire breaches with TOW shots and suppressive fires to upper floors with the MK-19 and the M2 machine gun. The idea of task organizing a TOW company or platoons with primary crew-served weapons mounted for the fight is worth considering.

TTP: Combined arms breaching must consider the use of MICLIC with sappers in support. Infantry and engineer use of demolition (demo kits) to create holes in buildings to facilitate covered movement through the objective is necessary. Shadowing infantry with a tank is not the only method proven to work in urban street fighting.

OBSERVATION 5: Sniper employment in urban combat. The value of the sniper to a unit operating in an urban area depends on several factors. These factors include the type of operation, the level of conflict, and the rules of engagement. When the ROE allows destruction of a building, snipers may not be needed since other weapons systems available to a mechanized force have greater destructive effect. However, they can contribute to the fight. When the ROE prohibit collateral damage, snipers may be a valuable tool to the commander.

DISCUSSION 5: Sniper effectiveness depends in part on the terrain. Control is degraded by the characteristics of an urban area. To provide timely and effective support, the sniper must have a clear picture of the scheme of maneuver and the commander's intent.

- Observation and fields of fire are clearly defined by roadways, but surveillance is limited by rooftops, windows, and doorways; each of these require constant observation. Also, the effects of smoke from military obscurants and burning buildings can degrade what appears to be an excellent vantage point. The requirement for all-round defense must be met because the enemy can fire from many directions and because enemy infiltration attempts must be countered.

- Cover and concealment are excellent for both the attacker and the defender. However, the defender has a decisive advantage; the attacker normally must expose himself during movement through the area.

- Avenues of approach that remain inside buildings are best. Movement there is less easily detected than movement through the streets. The sniper must be conscious of ALL avenues of approach and must be prepared to engage targets that appear on any of them.

Snipers should be positioned in buildings of masonry, concrete, or stone construction. These buildings should also offer long-range fields of fire and all-round observation. The sniper has an advantage because he does not have to move with, or be positioned with, lead elements. He may occupy a elevated position to the rear or flank and some distance away from the element he is supporting. By operating far from the other elements, a sniper avoids decisive engagement, but remains close enough to kill distant targets that threaten the unit. Snipers should not be placed in obvious positions, such as church steeples and rooftops, since the enemy often observes these and targets them for destruction. Indirect fires can generally penetrate rooftops and cause casualties in top floors of buildings. Also, snipers should not be positioned where there is heavy traffic; these areas invite enemy observation as well.

TTP: Snipers should be free to operate throughout the area of operations, moving with and supporting the companies as necessary. Some teams may operate independent of other forces. They search for targets of opportunity, especially for enemy snipers. The team may occupy multiple positions. A single position may not afford adequate observation for the entire team without increasing the risk of detection by the enemy. Separate positions must maintain mutual support. Alternate and supplementary positions should also be established in urban areas.

TTP: Snipers may be assigned the following tasks:

- Conducting counter-sniper operations.
- Killing targets of opportunity. The sniper team prioritizes these targets based on their understanding of the commander's intent--for example, enemy snipers first, then leaders, vehicle commanders, radio men, sappers, and machine gun crews, in that order.
- Denying enemy access to certain areas or avenues of approach (controlling key terrain).
- Providing fire support for barricades and other obstacles.
- Maintaining surveillance of flank and rear avenues of approach (screening).
- Supporting local counterattacks with precision fire.

TTP: Snipers can be valuable to commanders in operations other than war. Since excessive collateral damage and civilian casualties are normally restricted by the ROE, snipers can selectively engage key individuals who pose a threat to friendly forces. This selective engagement avoids unacceptable civilian casualties or collateral damage. Enemy personnel may hide in the midst of the civilian populace. Engaging these targets would probably cause innocent casualties. This puts U.S. forces at a disadvantage. The soldiers must first identify the gunman (this may be nearly impossible from their vantage point). Then, without hurting innocent bystanders, they must stop him from continuing to fire or from fleeing. This is an easier task for a sniper than for the infantry on the ground. The sniper can look down on the crowd, use his optics to continuously scan, and employ precision fire to eliminate the identified threat without harming bystanders. Though other unit optical systems may supplement the surveillance effort (Dragons and TOWs from the ground or from the upper floors of buildings), they cannot engage the target for the previously stated reasons. The sniper rifle provides the commander with the ONLY system that can both identify and engage the target. Also, after identifying the target, Dragons and TOWs still need time to guide a precision weapon or maneuver unit to the target to deal with it.

OBSERVATION 6: Observation and fields of fire. Estimate of the situation and urban terrain analysis are crucial at squad and platoon level. Because of the complexities involved in urban combat, leaders at all levels should use OCOKA as a guide when conducting an estimate of the situation and analyzing the urban terrain in detail. OCOKA stands for:

Observation and fields of fire.
Cover and concealment
Obstacles
Key Terrain and weather
Avenues of approach

DISCUSSION 6: Observation and fields of fire are usually restricted to the lanes established by structures, alleys, and streets. Observation is further restricted by smoke, dust, and debris created by intense fighting. Due to limited visibility, fighting is often at close range, and the outcome largely depends on the initiative and aggressiveness of small unit leaders. Engagements historically occur at ranges less than 50 meters. Fields of fire may or may not be restricted based on the type and height of building construction. Because of these restrictions, increased importance is placed on seizing or securing the taller buildings and structures for use as observation posts. Rubble and debris created by the destruction or damage of buildings can severely obscure observation and, in some cases, restrict existing fields of fire.

TTP:

- Defenders may consider deliberately reducing selected buildings to rubble, or partially destroying buildings to improve observation and fields of fire.
- Attackers should employ smoke and suppress likely enemy OPs to facilitate movement.
- Rubble also reduces mobility and increases the vulnerability of tanks, armored personnel carriers, and other vehicles to ambushes by dismounted forces.

OBSERVATION 7: Cover and concealment.

DISCUSSION 7: Built-up areas can provide excellent cover and concealment for both the attacker and the defender. However, the defender has an important advantage in that the attacker must eventually expose himself to move through the built-up area.

TTP:

- The defender increases his advantage by preparing defensive positions in solidly constructed buildings offering good fields of fire.
- The defender may also rubble or partially rubble buildings likely to be used by the enemy for cover and concealment and place obstacles to deny the enemy access to cover.
- The effectiveness of cover depends both upon the density of the buildings (i.e., a city block versus a housing suburb) and the nature of their construction (wood, cinder block, reinforced concrete).
- Buildings constructed of flammable materials can prove to be death traps for those using them.
- Stone and masonry buildings with thick walls offer excellent cover even when bombardment has reduced them to rubble.
- Buildings with basements or cellars and those with two or more stories offer increased overhead cover.
- Attackers can better capitalize on cover and concealment by conducting good reconnaissance and by using city maps or building blueprints if available.

OBSERVATION 8: Obstacles.

DISCUSSION 8: MOUT offensive operations include getting combat power to the objective. Existing obstacles are abundant in MOUT, and they can easily be strengthened with reinforcing obstacles to enhance counter-mobility. Buildings set close together in geometric patterns present obstacles to both troops and vehicles. This is particularly true in areas of block-type construction, such as that found in a downtown area of a city. The commander should assign engineer mobility assets and breach elements in order to secure routes into the objective area. Obstacle reduction becomes a task force effort and not the sole responsibility of the attached engineer elements.

TTP:

- Streets are relatively easy to barricade and cover with fire, thereby adding effectiveness to the obstacles.
- Rubble caused by artillery, air, direct-fire weapons, and explosives create further obstacles that disrupt, fix, or block movement.
- Obstacles are also extremely effective inside buildings.
- Stairwells, hallways, doors, and windows can all be easily barricaded or booby-trapped to kill, delay, or harass an attacking force.
- Both attackers and defenders alike will depend on extensive engineer support to fight in the urban environment.
- Increased amounts of obstacle material for buildings, breaching equipment, and material will be needed in the built-up area.

- Suppress, obscure, secure, and reduce (SOSR) needs greater emphasis on securing the far side of the obstacle 100 to 250 meters out.
- Assign priority of fires to the breaching unit.
- Conduct squad and team level breaching rehearsals.

OBSERVATION 9: Key terrain.

DISCUSSION 9: Key terrain is key structures and critical public areas that dominate an urban area and have strategic, operational, or tactical value. Key terrain in a built-up area includes areas such as: heavily constructed or fortified buildings covering large or important avenues of approach, major intersections, electric power plants, water supply and water purification plants, transportation centers, communication centers, buildings with historical or religious significance, government buildings, and bridges. Terrain surrounding the urban area that facilitates entry or denies escape can also be key terrain.

Decisive terrain consists of a critical public area or key structure, the control of which provides a decisive advantage to the attacker or defender. In Mogadishu, Somalia, for example, the "21 October Road," which runs the length of the city and is the major thoroughfare, was considered by some to be decisive. Failure to control this road meant that the warlords controlled the major transportation route and line of communication in Mogadishu.

Critical public areas are locations within a built-up area that may require special coordination to seize or defend, or to avoid damage. Hospitals, for example, may be critical areas because the laws of war prevent their attack when not used for military purposes other than caring for the wounded. Civil defense facilities, air raid shelters, and food supply locations may be critical in dealing with the civilian population.

TTP:

- Use all intelligence gathering and reconnaissance/surveillance assets as much as possible to identify key terrain, decisive terrain, and critical public areas as early as possible in the planning process for the initial attack.
- Thereafter, key terrain, decisive terrain, and critical public areas will continue to change with the situation; the important thing is to keep identifying and updating these areas continuously.

DISCUSSION 10: Avenues of approach.

DISCUSSION 10: The most obvious avenues of approach within built-up areas are streets, alleys, and other open areas. The defender may have many of these avenues barricaded and covered by fire.

TTP:

- Often the best avenue of approach is through existing buildings, across roofs, or in subterranean tunnels, sewers, and drainage systems.
- Avenues of approach are considered in terms of their suitability for both day and night.
- Both attackers and defenders may need to consider avenues of approach to the urban area, as well as within built-up areas.

OBSERVATION 11: Weather plays a significant role in urban combat.

DISCUSSION 11: Considerations for weather in an urban environment are generally the same as for those in any other environment. Extreme temperatures, both hot and cold, may convince units to occupy the interior of structures as opposed to securing both the interior and exterior. Precipitation (heavy rain, snow, sleet or ice) may preclude mechanized/motorized use of certain avenues of approach. Likewise, sewer and tunnel systems that offer dismounted avenues of approach into the urban area may be impassable. In large cities with block-type

construction, wind direction and speed may be altered and may affect the employment of smoke, riot control agents, and white phosphorous. Air inversion layers over cities may cause smoke and dust to linger longer than normal and reduce visibility. Illumination percentage for the time of month will affect the overall effectiveness of NVGs if there is no electric power in the city. If electric power remains, building and street lights will increase visibility at night but also reduce the effectiveness of NVGs.

TTP:

- Do not undervalue the effect of weather during your estimate of the situation.
- Weather effects can provide both friendly and enemy forces with certain decisive advantages and disadvantages in any given situation.

OBSERVATION 12: Close Quarter Combat (CQC). CQC techniques employed by special operations forces significantly enhance regular light infantry marksmanship techniques and room-clearing procedures, and provide a preferred movement and clearing method when enemy forces are intermingled with noncombatants.

DISCUSSION 12: Precision MOUT, such as those conducted in Mogadishu, place a premium on limiting collateral damage and non-combatant casualties. In addition, the urban combat environment is extremely Class V intensive. For these reasons, the importance of well-aimed fire is critical. The battle drill outlined in **FM 7-8, *Infantry Rifle Platoon and Squad***, to clear a building or room is effective, but not always feasible. Units deployed in Somalia trained using two techniques--the battle drill and the CQC technique used by Special Operations Forces. They prefered the CQC technique.

The CQC technique teaches soldiers how to engage targets with well-aimed accurate fire and instinctive fire methods, as well as the importance of operating as a team. This method, coupled with the use of "stun" and "stinger" grenades, saves many lives, reduces needless ammunition expenditures, and minimizes collateral damage.

TTP:

- Close quarter combat marksmanship (CQCM) and room-clearing techniques should be incorporated into infantry doctrine and training. This addition should not totally replace the battle drill, but should be used in appropriate tactical conditions.
- CQC techniques are referenced in FM 90-10-1, change 1.
- The close quarter combat marksmanship techniques in FM 90-10-1, change 1, refer to reflexive shooting as a simplified technique in urban combat. These techniques were oriented toward the standard M-16 Rifle and considerations that in time have changed. The new **FM 23-9, *Close Quarter Marksmanship Training, DRAFT,*** which is now being staffed, incorporates many of the references used in the **Ranger Training Circular RTC 350-1-2**, June 1991, that is now obsolete. The new CQMT Manual will reflect changes in techniques developed and perfected since the FM 90-10-1, change 1 publication and will include new weapons such as the M-4 Carbine.

OBSERVATION 13: Units at all levels must exercise tactical patience. One reason urban fighting is so difficult is the time it takes to execute tasks in this environment. If the "team" is not synchronized in the time phasing of one element as it maneuvers in front of the other, the result will be fratricide. If follow-on forces move too quickly they could bottleneck all units behind the lead forces and stagnate their fight, or worse, get engaged in a fight they had not planned on fighting. The result would be unnecessary use of valuable assets (ammunition, demolitions, fuel, and personnel) which the unit needs for its primary tasks at the objective.

TTP: Commanders and leaders at all levels must understand the need for tactical patience, augmented by a clear reporting of status, location, and the situation. This will provide the situational awareness the commander needs to make sound decisions under duress.

MOUT OPERATIONS

by CPT Nicholas Panagakos, (SME) Company Commander
and 1SG Ralph Kluna, (SME) Company 1SG
25th ID

1. GENERAL.

Military operations on urban terrain (MOUT) provide units with multiple challenges different from other combat operations. However, wherever war breaks out, it is most likely that some of the combat will take place in urban areas as diverse as huge metropolitan cities or remote villages. Regardless of the specific site, certain doctrinal fundamentals will remain valid if urban combat is to be successful.

The fog had begun to move into the low-lying areas surrounding objective "Gloria." Gloria was the name of the small village when it became an objective for the infantry company to clear. Intelligence reports had identified the village as a possible safe haven for the enemy to cache supplies and lager their troops. You could feel the anticipation throughout the company as H-hour was growing near. RTOs conducted final communications checks on the company net, and squad leaders were continuing to conduct final backbriefs with their soldiers. At H-30, the company would move out.

At H-30 the high-pitched whine of the M1 tanks' turbine engines could be heard. This alerted the company to form for move out. Tank section one, assigned as support by fire, would move first. The infantry could hear the crunching of trees as the tank section maneuvered its way into position. All could hear as the tank section halted, then waited for the radio message of "SBF one in position." When the message came in, it was time to move.

First platoon would be a supporting effort and move first. The lead squad had identified a dry creek bed on an earlier reconnaissance and was using it now to infiltrate the platoon up to the village. Tank section two would be moving with the platoon, positioning one tank on each flank along the high ground. First platoon's task was to breach any obstacles that could delay the tanks from moving into the town. The platoon had been task organized with an attached tank section and an attached engineer squad. The tank section would provide close support up to any obstacles and then pass the mission on to the second platoon and support the main effort in gaining a foothold. The engineer squad would execute any breaches necessary en route to the objective.

As the platoon moved along the creek, tank section one, at the support by fire position, began to report movement in the village. The enemy had begun moving much earlier than anticipated. If the enemy had detected them, it would become an exercise in reaction and possibly result in numerous casualties. The latest developments were unexpected, but would not hinder the company's mission, First platoon continued to move, now with a greater sense of urgency.

Tank section two spotted an obstacle, and it was time for first platoon to go into action. Second squad began to move slowly into a support-by-fire position. When the squad leader could see the obstacle, he called the platoon leader with "second in position." The platoon leader moved the first squad forward with the engineer squad to execute the breach. The obstacle appeared well built; it had triple-standard concertina with both anti-tank and anti-personnel mines in and around it. It stretched as far as the squad leader could see; there would be no by-pass of

this obstacle. The engineer squad had prepared the demolition charges while in the assault position. All they needed to do now was place the charges under the wire obstacle to form the breach necessary to move the tanks through and onto the objective. With the assistance of first squad, the engineers moved forward to place the charges. First squad threw smoke forward of the obstacle to obscure it; there was no need for suppressive fire because they had not yet been engaged. This would not be the case much longer.

With a thunderous roar, machine-gun fire erupted, penetrating the smoke barrier at the breach. Two soldiers become casualties instantly from the automatic fire. Tank sections one and two immediately returned fire with their machine guns. First squad leader rushed forward to evacuate his casualties and assist the engineers with placing their demolition charge, but was wounded en route. Bravo team tried to assist the engineers and continue with the breach, but received a casualty as well. First squad and the engineers had received seven casualties in less than thirty seconds.

Third squad, the platoon reserve, immediately sprang into action. The squad leader fired and maneuvered his squad forward and completed placing the breaching charge, while the first squad evacuated their casualties to the platoon's casualty collection point (CCP). The platoon sergeant was forward now and began requesting for MEDEVAC over the command net. It would be two hours before first platoon could evacuate the casualties.

After third squad had set the charge, the platoon pulled back and blew the breach. The blast was deafening, and debris fell all around the soldiers of first platoon. The smoke and dust caused confusion, but the infantrymen were able to press on. Third squad moved forward to proof and mark the breach, then reported when it was ready.

Second platoon, the company main effort, started moving through the breach towards the first building. Their task was to gain a foothold for the company and clear buildings one and two. With squads using tanks from section two as shields, first and second squads moved toward their objective. When the two squads moved within 25 meters of the building, second squad started throwing smoke. The smoke was going to obscure the enemy from seeing them enter building one.

First squad of second platoon would enter the building through the back door. The Alpha team leader aggressively maneuvered his team into position. They were stacked on the left side of the door, when the team leader turned to kick the door in. In a flash of fire and vaporous smoke, the team leader had disappeared. The door had been booby-trapped. Immediately the squad leader pushed first squad through the door and continued with their mission to secure building one. Once the building was secured, the platoon passed second squad through the building and on to building two, second squad's objective.

The infantry company would be able to accomplish their mission and secure objective Gloria. Their ability to move into the village and gain a foothold ultimately ensured their success. The company paid a heavy price in accomplishing their goal, and would not be combat ready for another 72 hours.

OBSERVATION 1: Using armor as a shield effectively reducing casualties from small arms and indirect fires. Use of a doorway to enter an enemy-held building is a bad idea.

EXAMPLE: In the vignette above--

TTP:

- By executing the breaching fundamentals of SOSR (suppress, obscure, secure, and reduce) while placing the attached tank section *between the enemy and the dismounted infantry to form a shield*, some of the casualties from small arms could have been prevented.
- Do not use the door of an *enemy occupied building* as the entry point. The doors most likely will be booby-trapped. Create an entry point while simultaneously clearing the enemy from that room. Otherwise, use a window as an entry point (less dangerous than doors).

2. DOCTRINAL BASE.

For such risky and potentially complicated operations, what does doctrine tell us about planning, preparing, and executing MOUT operations? What these manuals **do not provide** are techniques for employing tanks with infantry during MOUT *in a role other than support by fire.*

> ***"The increased population and accelerated growth of cities have made the problems of combat in built-up areas an urgent requirement for the U.S. Army; this type of combat cannot be avoided..."***

The concept of using tanks and infantry as a combined arms force in built-up areas is not new. However, the organization of the heavy infantry division places mechanized infantry and armor together. This does not give light infantry the opportunity to habitually train with tanks. The addition of the Bradley Fighting Vehicle further reinforces the armor relationship with mechanized infantry.

Throughout modern military history, planners combined tanks with infantry to accomplish specific tasks. The last time U.S. tanks and infantry were combined and used extensively in an urban environment was 30 years ago during the battle of Hue. In 1968, U.S. forces had the mission to clear the city of Hue. The enemy resistance was so strong that the infantry could not do it alone. The Marine Corps combined the efforts of infantry and tanks to accomplish their goal and clear the city.

In 1993, while conducting operations in Somalia, U.S. forces operated in an urban environment (Mogadishu) without the support of armor. The Ranger Battalion did not properly coordinate for this support. When the enemy had decisively engaged the infantry, U.S. ground forces were initially unable to move into the area and extract them. This resulted in 18 hours of intense combat, leaving 18 American soldiers dead and dozens of others wounded. These forces were eventually extracted by elements of the 10th Mountain Division using borrowed tanks and armored personnel carriers (APCs). The lack of prior coordination by the Rangers was a calculated risk taken to maintain operational security. The addition of armor might have allowed for quicker reaction and possibly fewer casualties.

A more recent incident, not involving U.S. forces, occurred during the Russian invasion of Chechnya in late 1994. The Russian attack on Grozny was led by a motorized rifle regiment (roughly 2,000 troops), with the goal of seizing the train station. The infantry and tanks were not prepared for the resistance they encountered. Russian infantry rode on top of the tanks during movement into the city. This made them easy targets for the Chechen rebels. The rebels simply used machine-gun fire to engage the infantry and RPG-7s to engage the tanks. The

covering infantry either was separated from the tanks or dismounted too late. At the end of the battle, the attacking Russian brigade lost 20 of its 26 tanks, 100 of its 120 APCs, and half of its 1,000 men were either killed, wounded, or missing in action. The lack of combined arms training and a poor plan combined for devastating results during the assault on Grozny.

3. PLANNING.

Planning provides the cornerstone to success. Military plans must be simple yet provide enough detail to allow subordinates to execute with minimal guidance. Plans should identify main and supporting efforts as well as the *decisive point.* These help the commander shape a plan maximizing the effectiveness of his combined arms force. What follows are some experiences based on MOUT planning considerations for combined arms employment.

OBSERVATION 2: Task organization for urban combat operations and an unclear chain of command and control.

DISCUSSION 2: The result of inappropriate task organization and lack of a clear chain of command resulted in confusion and lack of control during mission execution.

TTP:

- The task organization should reflect where elements will be assigned for a given mission; more importantly, the *senior maneuver element leader* should be in control of each element.

EXAMPLE: There are three traditional ways to task organize *a tank platoon into an infantry company.*

- Put the tank platoon under company control (see Figure 1). The tank platoon leader *should be responsible* for maneuvering the tanks in accordance with the *commander's intent.* With this task organization, tanks would most likely be used in *support-by-fire* and *overwatch* missions. This task organization is **the most difficult to maneuver tanks with the infantry**. However, the tank platoon leader can choose to maneuver the platoon by sections to execute the mission. This would provide greater flexibility in supporting the infantry during the close fight.

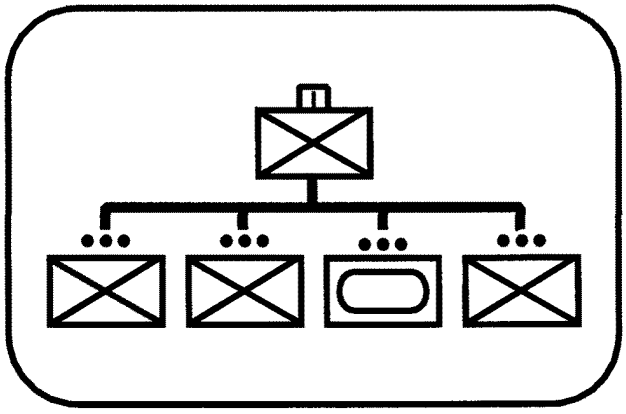


Figure 1

■ Break the tank platoon into two sections, each under control of one infantry platoon (see Figure 2). The commander relinquishes direct control of the tank maneuver to the infantry platoon leaders. This technique is **very effective in keeping the tanks at the same rate of progress as the infantry.** However, infantry platoon leaders burdened with the additional command and control responsibilities often *have a difficult time maneuvering the tank sections* because of a lack of experience with tanks and overall battlefield focus. Typically, the infantry platoon leader is focused on clearing a building and on his maneuver squads. This results in his *forgetting* the tanks and failing to maneuver them forward.

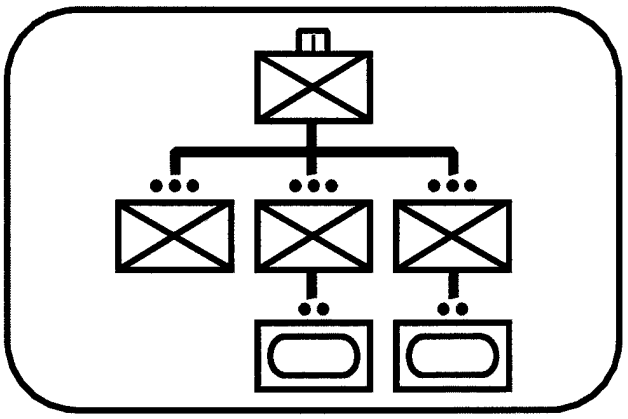


Figure 2

■ Break the tank platoon into two sections: one under company control and one under platoon control (see Figure 3). The maneuver infantry platoon has a tank section available to support the close fight. As stated in the previous option, the infantry platoon leader would still face the difficulties associated with this additional element to command and control. However, the **commander has a tank section to deploy at the critical place and time,** as he determines. This task organization technique still allows support to the infantry close fight while keeping additional support options in reserve for the commander to employ. There are *drawbacks* here as well. The tank platoon leader is not maneuvering his tanks--an infantry platoon leader is. The number of tanks directly available to the company commander is reduced by half.

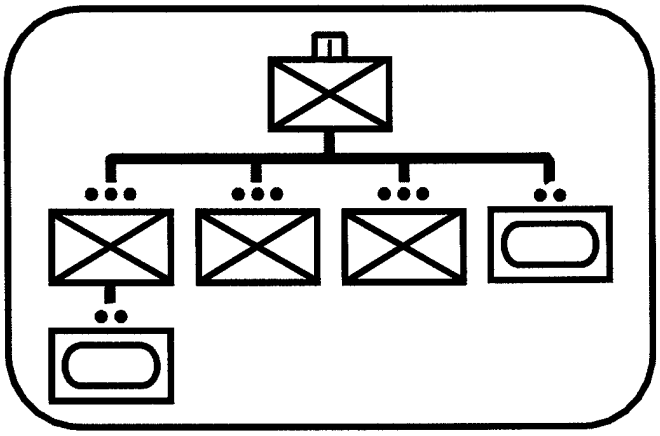


Figure 3

None of these techniques are inherently better than the others. The task organization has to be tailored to best suit the given mission. Regardless of the technique selected, what follows are some rules of thumb to remember during planning, preparation, and execution:

- If using tanks to shield squads and teams from building to building as part of the maneuver, *the leader of the forward element needs to control the tanks.*
- Infantry using tanks as shields must remain in constant contact with the TC. If the tank identifies a threat and moves in reverse, infantryman can be killed.
- If the commander is controlling the tanks, *he needs to move forward* to a position where he can effectively maneuver the tanks in support of the infantry.
- The task organization should *support the span of control.* If the commander is going to control the tanks, then there is no reason to task organize the tanks by section under infantry platoons.

OBSERVATION 3: Use of Intelligence Preparation of the Battlefield (IPB) products during the development of the plan is essential for company-level planning.

OBSERVATION 4: Unit leaders fail to consider *mounted avenues of approach* portrayed in the Modified Combined Obstacle Overlay (MCOO).

DISCUSSION 4: Commanders devise plans without adequate consideration of *how the enemy fights.* An enemy will react differently to an armor threat than to an infantry threat. However, when such reactions are not considered, *tanks are often left vulnerable to enemy anti-tank weapons and obstacles* because of **planning oversights.**

The failure to effectively use the MCOO gives specific examples of planning oversights. For example, mounted avenues of approach encompass far more than the road network. Road networks will be the first place that the enemy will emplace mobility obstacles.

TTP:

- In many cases, the integration of IPB products into the planning process would have eliminated the oversights that do not often show up until mission execution.
- In planning, pay close attention to available terrain that will support tank cross-country movement. The pace may be slower, but by using terrain for concealment, far greater security is possible.
- Infantry commanders must fully understand the capabilities and limitations of the tanks attached to their company.
- Involve tank platoon leaders and platoon sergeants in the infantry company-level IPB process; their tank expertise will hasten the understanding of what tanks can and cannot do and aid the infantry commander in making the best employment decisions.
- At every level of IPB, **always** address enemy capabilities and limitations.

OBSERVATION 5: Employ tanks as a load-carrying platform. This usually means infantry fails to consider tanks as a readily available mobile platform.

OBSERVATION 6: Light infantry units are unable to resource the Class III, IV, and overall maintenance requirements associated with attached tanks.

TTP:

- Light infantry elements can use attached tanks to carry water and ammunition as well as other supplies. This obvious benefit to the dismounted infantryman is too often overlooked, especially when operations are extended or require the expenditure of large amounts of ammunition. Units should guard against placing mission-critical equipment on tanks, and should monitor impact of this decision on mission accomplishment.
- To keep attached tanks *mission capable* requires planning for refueling and rearming of the tanks. Additionally, there may be a requirement for recovery of one or more tanks because of maintenance problems or the tank being disabled during contact. Light infantry logisticians need to ensure they understand the planning factors for fuel and ammunition consumption, and then make the necessary arrangements for adequate resupply, maintenance support, and recovery capability. Failure to do so can result in unnecessary loss of attached tanks. *Push the necessary support packages well forward on the battlefield.* Put them under the control of the company XO to provide the most immediate support reaction. This will shorten the recovery period.

4. PREPARATION.

The preparation phase of any operation is critical to the success of the operation. Steps taken prior to mission execution can greatly impact the ultimate success or failure of the mission during the execution phase. MOUT operations are no exception. The addition of tanks to the battle mix of light infantry gives even greater necessity to thoroughly prepare for operations.

OBSERVATION 7: Pre-combat inspections (PCIs) and pre-combat checks (PCCs) lack the necessary thoroughness to be useful.

OBSERVATION 8: Units fail to sufficiently rehearse operations; backbriefs take the place of full-force rehearsals. While backbriefs have their place, they pale in comparison to the value of rehearsals conducted in greater detail, particularly with tasks related to *actions on the objective.*

OBSERATION 9: Soldiers are not aware of the contingencies involved when operating with tanks in close combat. The addition of tanks to a light infantry task organization inherently implies the necessity for thorough and detailed preparation. For example, Rules of Engagement (ROE) may be very specific about collateral damage in an urban area, and failure to understand the destructive power of tanks can make ROE compliance difficult.

OBSERVATION 10: The presence of civilians provides very unpredictable challenges for elements executing close combat in urban areas, challenges which too often are glossed over during mission preparation and which prove detrimental to successful mission completion.

TTP:

PCIs--

- The addition of tanks to the light infantry task organization does not change the basic requirement for PCIs--tanks simply increase the amount and type of inspections necessary. The PCIs are still geared to ensuring the unit can *move, shoot, and communicate.* However, it is advisable that the commander initially use infantry personnel to inspect infantry equipment, and that tankers inspect the tanks. THEN, the two elements can help inspect each other, particularly with equipment directly involved with support.

EXAMPLE: Use infantrymen to inspect the *external phone box* on each tank, since the infantry relies on these phones as a means of communication during close combat supported by tanks. This helps ensure the equipment is serviceable AND that the infantry knows how to use the phones.

- Commanders must specifically set aside time for PCIs and sub-divide the time to include cross-over inspections; for example, joint PCIs with tanks and infantry, as described above.

- Commanders must ensure PCI *standards* are briefed and then *enforced.*
- Commanders should develop PCI checklists as a tool to assist leaders at all levels to effectively inspect their equipment and the equipment of attached elements.

Rehearsals--

- Conduct a combined arms rehearsal, time permitting, *at the level tanks are task organized.*
- The following aspects of the combined arms operation need to be rehearsed:
  - Graphic and fire control measures
  - Communications
  - Direct fire plans
  - Breach drills
  - Procedures for infantry *riding on tanks*
  - Techniques for using tanks as infantry shields
- Try to replicate conditions for mission execution during rehearsals; i.e., day, night, civilians on the battlefield, and host-nation personnel, as well as ROE.

5. EXECUTION.

As with any other combat operation, the ultimate success or failure of the mission is determined by how well the units execute the mission. Obviously the planning and preparation for any given mission are key to any subsequent success or failure. However, regardless of the plan or the level of pre-mission preparation, a soldier's and an officer's ability to execute the individual and collective tasks inherent in the mission clearly determine the likelihood of mission success. This task ability is a direct result of disciplined training and repetition. If soldiers can execute their tasks to standard, then it is up to leaders to position their soldiers for success.

OBSERVATION 11: Light infantry fails to properly employ tanks to reinforce the infantry's attempts to *gain a foothold* during urban combat operations, a critical step in achieving mission success.

DISCUSSION 11: To gain a foothold to access a village or a town, use tanks to reinforce light infantry. Gaining a foothold is executed under one of two basic conditions: detected or undetected. Obviously, being undetected by the enemy is preferred. Additionally, the following task organization conditions exist: supporting the infantry will be armor, engineer, and field artillery elements. Each element will combine their efforts to gain the foothold.

TTP:

- Use of tanks in a *support by fire* for the infantry.
  - Employ tanks as a *support by fire element.*
    - Employ *stand off* to maximize the effectiveness of the tanks' weapon systems.
    - Stand off allows for greater coverage of the objective.
  - Use **clearly understood** control measures (graphic, visual and direct/indirect fire) to mark the progress of the infantry.
  - Maintain enough maneuver flexibility that tanks can reposition their support-by-fire positions *based on and relative to* the infantry advance.
  - **All** the tanks in the combined arms force **should not** be dedicated to support by fire.

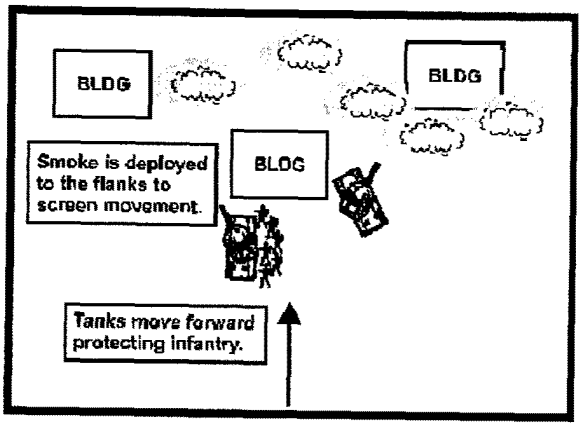


Figure 4

- Use tanks to maneuver infantry squads into the village.
  - With some tanks in the support-by-fire role, the remaining tanks can move infantry soldiers into a position to gain the foothold.
  - Tanks can provide a *mobile shield* for dismounted infantry, protecting them from small arms fire and shell fragments. This allows an infantry squad to move behind a tank all the way forward to the targeted building. The tank also provides immediate direct fire support for any threat to the infantry squad. Tanks can move a **maximum** of nine personnel.
  - After gaining the foothold, continue to use tanks to move infantry.
  - Maintain communication between tanks and infantry throughout mission execution.
  - Establish Identification of Friend/Foe (IFF) to prevent fratricide.

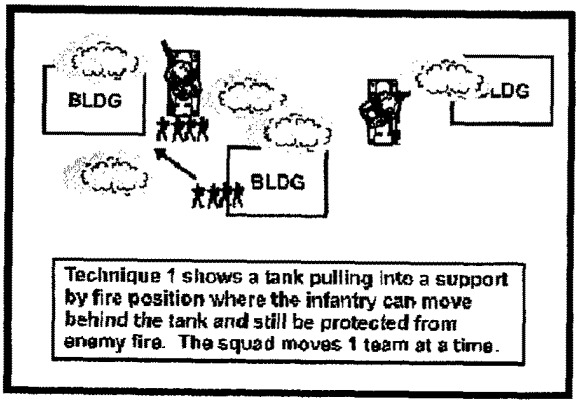


Figure 5

- Use smoke to *screen movement* from those areas that tanks cannot block. Use the smoke to obscure *the vision from other buildings, not between the infantry and the building they wish to enter.*

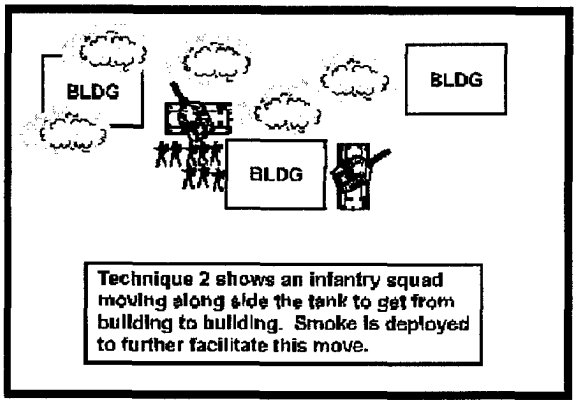


Figure 6

OBSERVATION 12: The majority of casualties occur as units move outside of buildings or move between buildings.

TTP: To minimize casualties when moving outside or between buildings:

- Cover all possible threat locations with either *observation or fire.*
- For those areas it is not possible to cover with observation or fire, use *smoke* to set a screen to block enemy observation of friendly movement.
- Move tanks *forward* to support infantry moves. Properly position the tanks **before** the infantry begins moving, whether the tanks are supporting by fire or being used as shields, or both.
- Pre-plan the positions if possible, but devise a marking system and communication signals to designate situationally dependent positions to help maintain momentum.
- When using tanks as a shield for the infantry, move the tanks *as close as possible* to the start point to allow the infantry the freedom of movement when exiting the building.
- Tanks need to *move at the infantry's rate of movement.*
- When the distance between buildings is short, tanks can position themselves to *block the open area from enemy fire.*

OBSERVATION 13: Company commanders do not position themselves where they can best command and control all of their elements. They are either too far back and unable to see the fight, or they get too far forward and get decisively engaged in squad- or platoon-level fights.

DISCUSSION 13: The commander is unable to effectively maneuver forces he is responsible to synchronize, unable to mass direct and indirect fires at critical points, or position key elements under his control. This results in a failure to ensure the main effort is at the decisive point with the overwhelming combat power necessary to be successful.

TTP: Use graphic and other type control measures, widely disseminated and **clearly understood** by all elements in the task organization, to assist the company/team commander's command and control. The following control measures are particularly useful in MOUT:

- Phase lines
- Number and lettering systems for buildings
- *Tentative* support-by-fire positions
- No-fire areas

These control measures can assist the commander to visualize the battle, which is critical for those portions of the battle he may not be in a position to actually see (see Figure 7 on page 4-22).✪

This article has been previously published in CALL Newsletter No. 98-10, Fighting Light/Heavy in a Restricted Terrain, Apr 98.



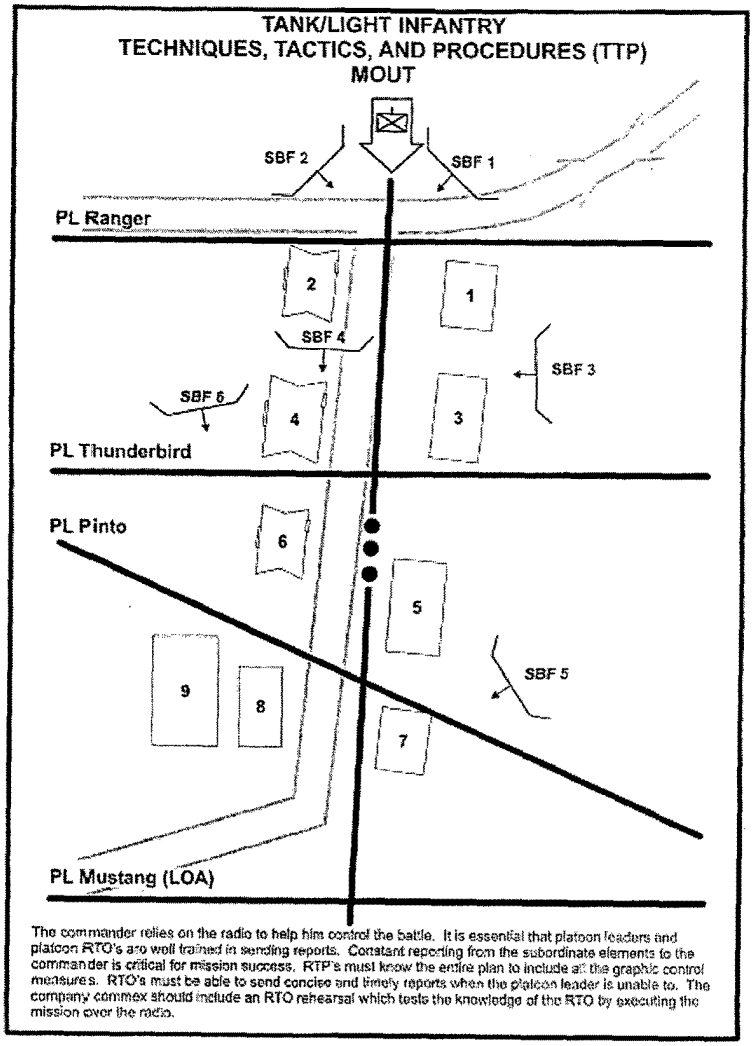

TANK/LIGHT INFANTRY
TECHNIQUES, TACTICS, AND PROCEDURES (TTP)
MOUT
SBF 2
SBF 1
PL Ranger
2
1
SBF 4
SBF 3
SBF 6
4
3
PL Thunderbird
PL Pinto
6
5
SBF 5
9
8
7
PL Mustang (LOA)
The commander relies on the radio to help him control the battle. It is essential that platoon leaders and platoon RTO's are well trained in sending reports. Constant reporting from the subordinate elements to the commander is critical for mission success. RTP's must know the entire plan to include all the graphic control measures. RTO's must be able to send concise and timely reports when the platoon leader is unable to. The company commex should include an RTO rehearsal which tests the knowledge of the RTO by executing the mission over the radio.

Figure 7

CHAPTER 5
FIRE SUPPORT

FIRE SUPPORT CONSIDERATIONS FOR MILITARY OPERATIONS IN URBAN TERRAIN (MOUT)

by LTC Anthony J. Puckett, Chief of Doctrine, U.S. Army Field Artillery School

1. GENERAL.

The mission flow for a brigade combat team (BCT) conducting military operations in urban terrain (MOUT) generally includes moving some distance from a line of departure to an urban area. This mission includes breaching obstacles to enter the urban area, gaining a foothold, defeating enemy forces and seizing a designated area, and conducting a follow-on mission. For Field Artillery (FA) units supporting the BCT, this may mean integrating fires into a scheme of maneuver involving a battalion task force or larger BCT. This maneuver may include movement to contact or air assault (or combination of the two), breaching operations, a deliberate attack to seize objectives in a city or town, and providing fires for a follow-on mission. For the fire support system, the fight begins with fires setting the conditions for interdiction fires 24 hours prior to disrupting enemy forces in preparing their defense. This fight continues when units cross the line of departure (LD) rather than at the breach site or in the city or town. Fire support planning for missions involving a deliberate attack on urban terrain objectives must include synchronization of fires during the fight from the LD to the breach site. Battle calculus must determine ammunition requirements for sustained fires while units suppress, obscure, secure, and reduce obstacles. During combat in the city, fire support planning must address unique challenges created by urban terrain, buildings and structures of varying heights, rules of engagement restricting use of indirect fires, and observer inability to locate and observe enemy targets. Planning and integration of supporting fires for MOUT is not routine for fire support planners. The military decision-making process (MDMP) and the fire support planning process (task, purpose, method, and endstate) are essential tools. Effects rather than endstate must be used to ensure fire support planning adequately supports each phase or mission and defeats the challenges presented by urban terrain.

2. DOCTRINAL BASE.

The Field Artillery does not have a MOUT manual. The current FM 6-series manuals address a few considerations for fire support in urban combat. But these manuals do not provide many TTPs for fire support planning and FA employment in urban operations. The current draft of **FM 6-20-40, *Fire Support of Brigade Operations***, does include a discussion of fire support considerations for MOUT.

3. PLANNING.

OBSERVATION 1: Fire support should be planned through the depth and breadth of the zone of attack for each branch and sequel. For fire support planners (primarily the fire support coordinator [FSCOORD]), brigade and battalion fire support officers (FSOs) and the FA battalion S-3 and/or XO can provide good assistance during the planning process. MOUT requires additional considerations beyond those normally addressed.

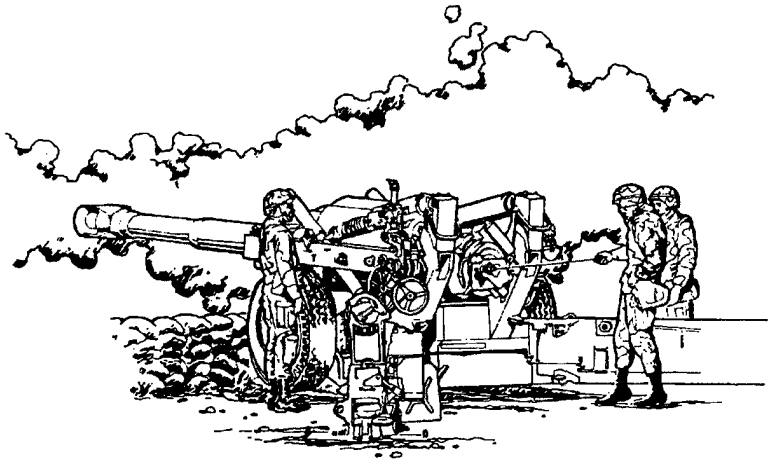
DISCUSSION 1: Planning and coordinating fire support for a complex scheme of maneuver must be completed before units cross the line of departure (LD) to conduct air assaults or a movement to contact or approach march enroute to the final objective. Planned and synchronized fire support during the movement to

contact/approach march toward a town are as important as the fires provided during the attack into the town because they enable the commander to arrive at the objective with maximum maneuver combat power. During the fight in the city, positioning of FA units, counterfire radar, and observers becomes critical. Ammunition resupply for special munitions (Copperhead) and sustained fires could possibly exceed the FA unit transportation capacity. And planning should also include actions necessary to rapidly transition to the follow-on phase or mission.

TTP: A good technique for planners to use to address considerations of urban combat missions is to organize their planning efforts and coordination as follows:

- Preparation - mission analysis and battle calculus.
- The fight from the line of departure (LD) to the breach site.
- The breaching operation.
- The fight in the city.
- The follow-on mission.

Review checklists in Figures 1-4 on the following pages. These four figures provide urban planning considerations.



BRIGADE FIRE SUPPORT OFFICER

MISSION ANALYSIS/BATTLE CALCULUS

_____What is the mission flow for maneuver units' movement to contact, air assault, breaching operations, deliberate attack into city for each COA?
_____FA organization for combat?
_____Other assets available (mortars, attack aviation, CAS, NGF, AC-130)?
_____Prepare asset matrix listing all artillery and other assets, ranges of each, ammunition available, time available, controlling HQ.
_____Essential fire support tasks (EFSTs) by mission for each COA? Refine "method"of EFSTs--highlight special ammunition requirements: FASCAM, dimensions/duration of smoke, preps, destruction/reduction fires.
_____HPTs? According to S-2 collection plan, what will find each HPT?
_____Calculus--are more assets needed to accomplish all EFSTs and attack each HPTs? (By mission for each COA)
_____By mission for each COA, draft Fire Support plan = Fires paragraph___, FSEM___, Tgt List scheme of fires and priority of fires worksheet___.
_____Does the S-2 R&S plan cover each HPT by mission for each COA?
_____Plan critical friendly zones (CFZs).
_____Brief draft Fire Support plan for each COA during wargaming and COA selection.
_____Upon COA selection, send fire spt WARNO (fires paragraph, FSEM, tgt list, TSM) to subordinate FSOs and DS battalion S-3.
_____Finalize plan/clean up products/add to order.
_____Rehearse

FIGHT FROM LD TO BREACH SITE

_____Disseminate the friendly scheme of maneuver and EFSTs for this phase to FS and FA leaders.
_____Identify all fire support assets available for this phase.
_____What are probable locations and azimuths of fire of enemy indirect fire systems?
_____Identify counterfire radar positions that give the best aspect to detect enemy indirect fire.
_____What FA unit has the counterfire mission?
_____Are maneuver forces tasked to locate and destroy enemy mortars?
_____By shell/fuze type, how much FA ammunition is needed to fire scheduled/pre-planned fires? How much is available for emergency missions?
_____What is the communications link to each asset tasked to assess effects on each HPT attacked by FA or another fire support asset?
_____Will FA units displace during this phase? What is the trigger?
_____Positioning of DFSCOORD/Bde FSE/ALO/COLTS during this phase.
_____Other information needed by the battalion FSOs and DS FA, S-3 from the brigade FSE?

BREACHING OPERATIONS

_____What are the indirect fire Rules of Engagement?
_____Disseminate the friendly scheme of maneuver and EFSTs for this phase to FS and FA leaders.
_____What fire support assets are available?
_____By shell/fuze type, how much FA ammunition is available for SOSR fires? How much is needed to fire all scheduled/pre-planned fires?
_____Specify who is controlling SOSR fires. Specifically at the main breach point, have a primary and alternate observer.
_____Where are COLTs positioned? TACPs?
_____Is there a deception breach?

THE CITY FIGHT

_____What are the indirect fire Rules of Engagement? What is on the restricted target list?
_____Disseminate the friendly scheme of maneuver and EFSTs for this phase to FS and FA leaders.
_____Determine FS assets available for this phase. Who controls each?
_____Specify who positions COLTs.
_____Where will FA units and counterfire radar be positioned?
_____Determine radar zones and cueing agents needed in the objective city.
_____Identify the locations of underground fuel and industrial storage tanks, gas distribution lines, storage tanks, and gas lines above ground (locations needed for friendly unit warning since below-MSD fires may produce secondary explosions).
_____Determine how the enemy is reinforcing buildings–sandbagging rooftops and upper floors, adding internal bracing/structural support, sandbagging walls.
_____Determine which maps will be distributed to FS and FA personnel. Map references must be the same as numbers assigned to specific buildings.
_____ Determine how fire support personnel determine 8-digit grid coordinates with altitudes to targets in built-up areas.
_____Identify the general construction or composition of buildings, road surfaces, and barrier obstacles that require breaching. Identify buildings that have basements.
_____Identify buildings or structures requiring large-caliber weapon/howitzer direct fire before assaulting.
_____Locate the dead space areas where tall building masking prevents indirect fire from engaging targets. Locate "urban canyon" areas where aircraft cannot engage targets between tall buildings.
_____Identify buildings that provide the best OPs for enemy and friendly observers. Identify buildings providing vantage points for employment of laser designators.
_____Locate possible firing points for 81/82/107/120mm mortars, for towed howitzers, for SP howitzers. Which positions permit 6400-mil firing?
_____Identify enemy mortar capability. Does enemy have a large number of 60mm of smaller "knee" mortars?
_____Identify areas of the city that are likely to be affected by the incendiary effects of detonating artillery and mortar rounds.
_____Determine the best positions outside the objective city for employing G/VLLDs and other ground designators.
_____Identify targets and trigger points for blocking fires outside the city.
_____Have the effects of certain weapon systems and munitions available. Hellfire, Copperhead, maverick, 155 dpicm, vt, CP, etc.
_____ Integerate TF mortars into the scheme of fires.
_____ Plan and refine CFZs.

THE FOLLOW-ON MISSION

_____Disseminate the friendly scheme of maneuver and EFSTs for the follow-on mission (or sustained combat and occupation in the objective city) to FS and FA leaders.
_____Identify fire support assets available for follow-on missions.
_____Identify ammunition requirements for follow-on missions.
_____Determine optimal FA and radar position areas to support follow-on missions.

Figure 1

BATTALION FIRE SUPPORT OFFICER

MISSION ANALYSIS/BATTLE CALCULUS

_____Review the brigade fire support WARNO.
_____What is the mission flow for the battalion – movement to contact, air assault, breaching operations, deliberate attack into city?
_____What fire support assets are available to support the battalion (FA, mortars, attack aviation, CAS , NGF, AC-130)?
_____Prepare a fire support asset matrix (non doctrinal) listing all artillery and other systems, ranges of each, ammunition available, time available, and controlling HQ.
_____Identify essential fire support tasks (EFSTs) for battalion fire support personnel for each phase of the mission.
_____What are the HPTs? What asset is tasked to find each of the HPTs? What asset is tasked to assess effects when an HPT is attacked?
_____Determine how much ammunition by shell/fuze type is needed to accomplish all scheduled or pre-planned fires. How much is available for emergency missions?
_____Determine if enough fire support assets are available to attack all HPTs and provide on-call fire support during each phase of the mission. What additional assets are needed?
_____Identify special ammunition requirements (FASCAM, Copperhead, dimensions/duration of obscuration fires, DPICM, concrete piercing fuzes, preparations, reduction/destruction fires).
_____Develop a communication plan to defeat range and compatibility problems between fire support personnel and FA units or other assets during each phase.
_____Identify special equipment needs, especially for breaching operations and the fight in the city--COLT or other laser designator, climbing rope, wire gloves, axes or sledge hammers, kneepads, goggles.
_____Determine what types of maps fire support personnel will use. (During the fight in the city, fire support personnel must be able to locate targets by 8-digit grid coordinates.)
_____Develop observer plan for each phase--observer positioning and observer/target link-up that should include primary, backup observer and trigger.
_____Develop and disseminate products (fires paragraph, FSEM, target list, TSM) to subordinate FSOs, battalion mortars, DS FA battalion S-3, and other supporting fire support elements.
_____Conduct fire support rehearsal, and participate in FA technical rehearsal.

FIGHT FROM LD TO BREACH SITE

_____Disseminate battalion scheme of maneuver and EFSTs to FS and FA leaders.
_____Identify all fire support assets available, and method of control of each.
_____Does the battalion have priority of fires? Allocate priority targets and FPFs to companies.
_____Plan targets on known and suspected enemy positions and obstacles along the route (SEAD if conducting an air assault).
_____Ensure all reconnaissance elements are included in the fire support plan.
_____By shell/fuze type, how much FA ammunition is needed to fire scheduled/pre-planned fires? How much is available for emergency missions?
_____What is the communication link to each fire support asset supporting the battalion?
_____What is the communication link to each asset tasked to assess effects on each HPT attacked by FA or another fire support asset?
_____Will FA units displace during this phase? What is the trigger?
_____What is the battalion mortar employment plan?
_____Positioning of the battalion FSE/ALO.
_____Other information needed by the Co FSOs, DS FA battalion S-3, FSE, and brigade FSE.

THE BREACHING OPERATION

_____What are the indirect fire Rules of Engagement?
_____Disseminate the battalion scheme of maneuver and EFSTs for this phase to FS and FA leaders. Is the battalion mission inside (breach, clear, and secure in city) or outside (isolate) the objective city?
_____What fire support assets are available?
_____What type of breaching operation is being conducted? Time required?
_____Specify who is initiating and controlling SOSR fires.
_____By shell/fuze type, how much FA ammunition is available for SOSR fires? How much is needed to fire all scheduled/pre-planned fires? What are the dimensions/duration of obscuration fires?
_____Develop the air/ground observer plan to adjust obscurants.
_____Positioning of the battalion FSE/ALO or TACP/COLT if under battalion control.
_____What is the communication link between all FA units or fire support assets and the observers controlling the assets?
_____Is the control of any fire support asset being handed over from one observer to another? What is the trigger point to initiate the handover?

THE CITY FIGHT

_____What are the indirect fire Rules of engagement?
_____Disseminate the battalion scheme of maneuver and EFSTs for this phase to the FS and FA leaders.
_____Determine who controls each fire support asset.
_____Exchange fire plan and observer plan with adjacent battalions.
_____Determine exact locations for battalion mortars; submit to brigade FSE.
_____Develop observer plan; identify special requirements (laser designator positions, observer positions to overwatch trigger points, observer positions in tall buildings).
_____Disseminate maneuver graphics to FS and FA leaders to preclude fratricide.
_____Identify uses of obscurants in city.
_____Identify targets and trigger points for interdiction fires against counter-attack force.
_____Identify the locations of underground fuel and industrial storage tanks, gas distribution lines, storage tanks, and gas lines above ground (locations needed for friendly unit warning because below-MSD fires may produce secondary explosions).
_____Determine how the enemy is reinforcing buildings, sandbagging rooftops and upper floors, adding internal bracing/structural support, sandbagging walls.
_____What maps are battalion fire support personnel using? How is the maneuver building numbering system going to be translated into 8-digit grid coordinates for building locations?
_____Identify the general construction or composition of buildings, road surfaces, and barrier obstacles that require breaching. Identify buildings that have basements.
_____Identify buildings or structures requiring large-caliber weapon/howitzer direct fire before assaulting. Will an escalating response matrix be used?
_____Locate dead space areas where tall building masking prevents indirect fire from engaging targets. Locate "urban canyon" areas where aircraft cannot engage targets between tall buildings.
_____Identify buildings providing the best OPs for friendly and enemy observers. Identify buildings providing vantage points for employment of laser designators.
_____Locate firing points for battalion mortars and supporting howitzers. Which positions provide 6400-mil firing capability?
_____Identify areas of the city most likely to be affected by the incendiary effects of detonating artillery and mortar rounds.
_____Identify routes/roads in the objective city that permit/do not permit artillery convoy (prime mover, howitzer, ammunition carrier) travel.

_____Identify buildings/structures capable of hiding artillery prime movers, howitzers, and ammunition carriers.
_____Do enemy forces in the city use or have access to laser designators, pointers, spotlights, or other light sources that may be used to incapacitate observation devices and NVGs?
_____Where are radio communications deadspaces? Is a communications visibility plot available?
_____Determine where use of obscurants will favor friendly forces. And, where it will favor the enemy.
_____Determine where building masking, overhead power lines, structures or towers will degrade GPS accuracy.
_____Will electrical lines in the objective city be "hot?"
_____Will dense/congested structures containing metal and electrical lines affect compasses and gyro-based directional equipment?
_____Determine weather effects in and around the objective city--low industrial fog and smoke; updrafting winds caused by tall, congested buildings; temperature increase caused by buildings/pavement/industrial activity.
_____Will there be a need for artillery illumination?
_____Determine likely enemy azimuths of fire for indirect systems.
_____Will friendly local or U.S./allied personnel with in-depth knowledge of the objective city layout be available to accompany/assist fire support personnel?
_____If required, could observers conduct howitzer/mortar registration?
_____What is the sniper threat against fire support personnel, especially those occupying OPs in tall buildings? What is the mine/booby trap threat?
_____Will buildings or structures require fire support personnel to carry/use equipment not normally carried–field expedient antennas, climbing rope, wire gloves, axes or sledge hammers, kneepads, goggles, or B/LPS?
_____Will enemy forces attempt to limit friendly use of indirect fires by using civilians as "human shields?"

THE FOLLOW-ON MISSION
_____Disseminate the battalion scheme of maneuver and EFSTs for the follow-on mission (or sustained combat and occupation in the objective city) to FS and FA leaders.
_____Identify fire support assets available and ammunition requirements for follow-on missions.

Figure 2

COMPANY FIRE SUPPORT OFFICER

MISSION ANALYSIS/BATTLE CALCULUS

_____What is the mission flow for the company–movement to contact, air assault, breaching operations, deliberate attack into city?

_____What fire support assets are available to support the company (FA, battalion and company mortars, attack aviation)?

_____Prepare a fire support asset matrix listing all artillery and other systems available, ranges of each, ammunition available, time available, and controlling HQ.

_____Refine essential fire support tasks (EFSTs) for company fire support personnel for each phase of the mission.

_____Where are the HPTs in the company sector? What asset will find each HPT? What asset will assess effects when an HPT is attacked?

_____Determine if enough fire support assets are available to attack all HPTs and provide on-call fire support during each phase of the mission. What additional assets are needed?

_____Determine how much ammunition by shell/fuze type is needed to accomplish all scheduled or preplanned fires. How much is available for emergency missions?

_____Identify special ammunition requirements (FASCAM, Copperhead, dimensions/duration of obscuration fires, DPICM, concrete piercing fuzes, preps, reduction/destruction fires).

_____Develop radio plan to talk to platoon FO parties, the battalion FSE, supporting FA units, mortars, and other assets. This plan must defeat range and compatibility problems. Is planning digital and execution voice?

_____Identify special equipment needs for fire support personnel, especially for breaching operations and the fight in the city–COLT or other laser designator, climbing rope, wire gloves, axes or sledge hammers, goggles or B/LPS.

_____Determine how observers will locate targets by 8-digit grid coordinates during the fight in the city.

_____Develop observer plan for each phase--observer positioning and observer/target link-up.

_____Participate in fire support and FA technical rehearsals.

FIGHT FROM LD TO BREACH SITE

_____Disseminate company scheme of maneuver and EFSTs to FS and FA leaders.

_____Identify fire support assets available and method of control.

_____How many priority targets and FPFs does the company have?

_____Plan targets on known and suspected enemy positions and obstacles along the route.

_____By shell/fuze type, how much FA and mortar ammunition is needed to fire scheduled/pre-planned fires? How much FA and mortar ammunition is available for emergency missions?

_____What is the communication link to each fire support asset supporting the company?

_____What is the communication link to each asset assessing effects on each HPT in the company sector?

_____What are the battalion and company mortar employment plans?

_____Positioning of the company FIST.

_____Other information needed by platoon FOs, company and battalion mortars, DS FA battalion S-3, and FSE.

THE BREACHING OPERATION

_____What are the indirect fire Rules of Engagement?

_____Disseminate company scheme of maneuver and EFSTs for this phase to the FS and FA leaders.

_____What fire support assets are available?

_____What type of breaching operation is being conducted? Time required?

_____How are SOSR fires initiated and controlled?

_____By shell/fuze type, how much FA and mortar ammunition is needed for SOSR fires? For all scheduled/pre-planned fires? What are the dimensions/duration of obscuration fires?
_____What is the communication link between FA units and mortars and the observers controlling the assets?
_____Is the control of any fire support asset being handed over from one observer to another? What is the trigger point to initiate the handover?

THE CITY FIGHT

_____What are the indirect fire rules of engagement?
_____Disseminate the company scheme of maneuver and offsets for this phase to the FS and FA leaders.
_____Determine who controls each fire support asset.
_____Exchange fire plan and observer plan with adjacent companies.
_____Determine how company mortars will be employed (direct lay or deliberate emplacement), firing points, and azimuths of fire. Pass to battalion FSE for consideration during development of the radar deployment order.
_____Develop observer plan–OPs in specific buildings, location of laser designators, overwatch of trigger points, etc.
_____Identify locations of hazardous sites--below and above-ground fuel and industrial storage tanks, gas distribution lines, etc., that may produce secondary explosions caused by detonating mortar or artillery rounds.
_____Identify which buildings or structures the enemy is fortifying--sandbagging the rooftop or upper floors, adding internal bracing/structural support, sandbagging walls.
_____Identify method fire support will use to identify targets using 8-digit grid coordinates (city map of maneuver building diagram versus military tactical map with UTM grid coordinates). 8-digit grid coordinate accuracy is needed for engaging targets in a city.
_____Identify the general construction or composition of buildings, road surfaces, and barrier obstacles that require breaching. Identify buildings with basements.
_____Identify buildings or structures requiring large-caliber weapon/howitzer direct fire before assaulting. Will an escalating response matrix be used?
_____Locate dead space and "urban canyon" areas where tall-building masking prevents indirect fire and aircraft from engaging targets.
_____Identify buildings providing the best OPs for friendly and enemy observers and employment of laser designators.
_____Locate firing point for company mortars and howitzers. Do they allow 6400-mil firing capability?
_____Identify areas of the city where incendiary effects of detonating artillery and mortar rounds will start fires.
_____Identify routes artillery convoy (prime mover, howitzer, and ammunition carrier) travel, and buildings capable of hiding this equipment.
_____Does the enemy posses laser designators, pointers, spotlights, or other light sources capable of incapacitating observation devices and NVGs?
_____Where are radio communication deadspaces?
_____Where does building masking, overhead power lines, structures, or towers degrade GPS, gyro-based directional devices, and compass functioning?
_____Will use of obscurants and artillery or mortar illumination favor friendly units or the enemy?
_____Will friendly local or U.S./allied personnel with in-depth knowledge of the objective city layout accompany or assist fire support personnel?
_____If required, could observers observe howitzer/mortar registrations?
_____What is the sniper threat against fire support personnel occupying OPs in tall buildings? What is the mine/booby trap threat?

_____Will buildings or structures require fire support personnel to carry/use equipment not normally carried–field expedient antennas, climbing rope, wire gloves, axes or sledge hammers, kneepads, goggles?
_____Will enemy forces attempt to limit friendly use of indirect fires by using civilians as "human shields?"

THE FOLLOW-ON MISSION
_____Disseminate company scheme of maneuver and EFSTs for the follow-on mission (or sustained combat and occupation in the objective city) to FS and FA leaders.
_____Identify fire support assets and ammunition available for follow-on missions.

Figure 3



DIRECT SUPPORT FIELD ARTILLERY BATTALION S-3

MISSION ANALYSIS/BATTLE CALCULUS

_____Review the brigade fire support WARNO.
_____What is the mission flow for maneuver units--movement to contact, air assault, breaching operations, deliberate attack into city - for each COA?
_____What is FA organization for combat?
_____Essential field artillery tasks (EFATs) by phase for each COA.
_____Calculus -how much ammunition by shell/fuze type is needed for each EFST?
_____Determine special ammunition requirements--FASCAM, Copperhead, DPICM, concrete piercing fuzes, smoke and WP, RAP, Charge 8, or Red Bag. Coordinate ammunition resupply as early as possible. Ammunition resupply is an EFAT!
_____What are the radar zone and cueing requirements by phase?
_____Determine artillery position areas required by phase. Will they be secure? Coordinate for position areas, movement times, and security support (if needed).
_____Determine radar position areas required by phase. Will they be secure? Coordinate for position areas, movement times, and security support (if needed).
_____Artillery and radar positioning should facilitate rapid transition from one phase to the next or to a follow-on mission. Targets for the next phase or mission should be within range of firing units according to ammunition available.
_____Develop communication, MET and survey plan. How will extended ranges and communications dead spaces in the objective city be defeated?
_____Develop and disseminate FASP.
_____Participate in fire support rehearsal (maneuver rehearsal if conducted), and conduct FA technical rehearsal.
_____Are missions planned and executed digitally, planned digitally, and executed by voice communications, or a mix?

FIGHT FROM LD TO BREACH SITE

_____EFATs for this phase.
_____Ensure firing units in position ready to fire in support of scheme of maneuver.
_____Rehearse all scheduled/preplanned fires. Ammunition for SOSR fires (suppression, reduction or obscuration fires during obstacle breaching) must be available and readied for sustained fires.
_____Ensure inactive firing units follow active missions, or are laid on priority targets that support the scheme of maneuver.
_____Determine triggers for ammunition resupply and repositioning of firing units during this phase.
_____Positioning of battalion TOC/TAC during this phase of the operation.
_____Identify communications links to all supported unit observers during this phase.
_____What unit is the counterfire HQ?
_____Determine radar zones and cueing schedule for this phase? Who are cueing agents? What are their triggers?
_____Determine other information required from DFSCOORD, brigade and battalion FSEs.

THE BREACHING OPERATION

_____EFATs for this phase.
_____Ensure firing units in position ready to fire in support of breach.
_____Ensure required ammunition for SOSR fires is ready to sustain scheduled suppression or smoke fires.

_____Are registrations required to assure accuracy of SOSR fires?
_____Determine if amount of ammunition is available for emergency fires.
_____Identify triggers for ammunition resupply or repositioning of firing units during this phase.
_____Is counterfire radar positioned at the optimum aspect angle to detect enemy indirect fire trajectories?
_____Determine and identify triggers for activation/deactivation of radar zones. Are radar zones activated to protect the breaching forces and prevent fratricide of friendly mortars?
_____Are observer/designators at proper observer target angle (Angle T) to designate for Copperhead?
_____Location of TOC/TAC during this phase.
_____Other information needed from the DFSCOORD, brigade and battalion FSEs.

THE CITY FIGHT
_____EFATs for this phase.
_____Is the brigade system to clear fires in place and functioning?
_____What are the communications links to supported unit observers?
_____Position areas must adequately cover the objective city and blocking targets outside the city to interdict reinforcement/escape.
_____Identify routes for artillery convoy travel in and around objective city.
_____Determine triggers for ammunition resupply and repositioning of firing units.
_____What unit has the counterfire mission?
_____Determine and identify triggers for activation/deactivation of radar zones.
_____Determine the sniper/mine/booby trap threats to firing units, if position in or very near the objective city. Are firing unit howitzer sections identified to fire "Killer Junior" or direct fire, self-defense missions?
_____Are all inactive firing units laid on priority targets to support the scheme of maneuver?
_____Are registrations required to ensure accurate fires into the objective city?
_____Does MET data collection account for atmospheric conditions in and around the city--updrafting winds around tall buildings, temperature increases caused by smog, buildings and pavement, industrial activity?
_____Is survey available to give accurate firing unit positions, and, when possible, accurate building/landmark locations in the objective city?
_____Location of battalion TOC/TAC during this phase.
_____Other information needed from the DFSCOORD, brigade and battalion FSEs.

THE FOLLOW-ON MISSION
_____EFATs for the follow-on mission (or sustained combat and occupation in the objective).
_____Determine triggers for ammunition resupply and repositioning of firing units.
_____Determine trigger for repositioning of radar and for activation/deactivation of radar zones.
_____Location of battalion TOC.

Figure 4

OBSERVATION 2: Ammunition.

DISCUSSION 2: Use of illumination and obscuring fires on MOUT objectives favor the defender. He may not have many night-vision goggles (NVGs), so illumination helps him. Also, his defensive fires are planned and laid in for limited visibility. There is a valid argument concerning whether obscuration favors the defender or attacker. An opposing view is the attacker would expect the enemy to have a defensive fire plan for selected breach sites, but they must be tied to a trigger. Obscuration can help delay or confuse the initiation of those triggers. Multiple breach points obscured as well as a deception breach may facilitate a successful primary breach point. Use of illumination and obscuration must be considered situational dependent if you consider the alternative view.

TTP: Illuminating or obscuring an enemy position degrades the ability to see him more than his ability to employ his weapons. Other ammunition considerations are:

- Mortar smoke is White Phosphorous (WP) - incendiary.
- Variable Time (VT) fuzes help clean off building tops. But varying heights of surrounding buildings may cause premature detonation. Observer-adjusted time fuzes may be better against targets among buildings of varying heights.
- Currently, concrete piercing (CP) fuzes only exist in emergency stocks in Korea. The MK399 CP fuze is now being produced for availability to all units. Point detonating (PD) fuzes on delay only allow penetration of the first wall or roof.
- Calculated Minimum Safe Distances (MSDs) are no longer accurate. Buildings provide cover that reduces MSDs to a few meters. Inaccurate or stray fires can be attributed to projectiles careening or skipping off tall buildings, towers, cables, etc.
- During suppression, obscuration, securing, and reduction (SOSR) or preparation fires, accurately adjusted, concentrated artillery fire (high explosive [HE] fuzed with quick and delay) at breach sites **is** effective in obstacle reduction. These fires significantly weaken wire obstacles with mines and booby traps. They will not significantly affect metal tetrahedrons or concrete dragon's teeth.

OBSERVATION 3: Forward Observer Plans.

DISCUSSION 3: If Copperhead and other laser-guided munitions are used, OH-58Ds, AH-64s, and Combat Observation Lasing Teams (COLTs) need a series of well-defined, numbered aerial attack-by-fire (ABF) positions or observation posts that meet angle-T requirements (800 mils for Copperhead, 1065 mils for Hellfire, etc.) for key buildings and terrain features (bridges, parks, military installations) throughout the city. (See Figure 5 on page 5-14.)

- Observers with maneuver elements will encounter ground obstacles - broken glass, rubble piles, burning buildings, smoke, downed electrical lines, mines, snipers, to name a few - that will impede movement. They cannot rapidly reposition and will have limited visibility. Observers maneuvering outside the city can help fill gaps.
- Observers will locate targets by the maneuver unit building numbering system for a particular city. Building numbers must be translated into grid coordinates for FA units and mortar fire direction centers (FDCs). City tourist maps, inaccurate 1:12.5K, and smaller scale maps may be used. This increases the difficulty of determining accurate target grid coordinates.
- Global Positioning System (GPS) functioning is greatly degraded in cities with tall buildings (since these buildings mask satellite coverage).
- Observation Posts (OPs) should be positioned to observe these fires, and trigger points must be identified.
- Tactical Air Control Party (TACP) and Enlisted Tactical Air Controller (ETAC) positions require visibility, not just on the target but also of the surrounding terrain and sky to allow for terminal control of close air support (CAS)/ground attack aircraft.

• Air and Naval Gunfire Liaison Companies (ANGLICOs) have been inactivated. Elements designated to observe and adjust naval gunfire and control Navy and Marine CAS/ground attack aircraft have the same positioning requirements as TACPs and ETACs.

Observer Positioning For Laser-Guided Munitions

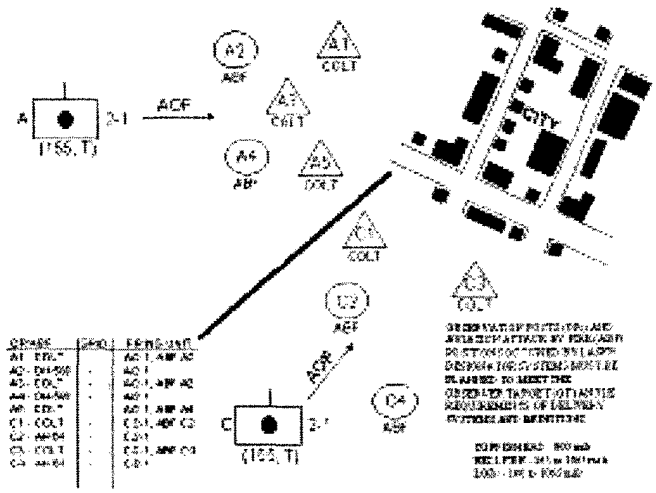


Figure 5

4. PREPARATION.

OBSERVATION 4: Artillery and radar positioning.

DISCUSSION 4: To ensure full coverage of a city by artillery fire, artillery units should be positioned outside of the city. This precludes "sanctuaries" around a battery firing position where that battery cannot fire. It also precludes battery vulnerability caused by traveling, displacing, or emplacing in firing points in cities.

• The current tactic is to position artillery units in airports outside cities. If airports do not exist, industrial parks often have land suitable for battery positions. Athletic fields may be suitable. Cultivated fields are least desirable due to soil instability, mud, and crop damage.

• Position FA units so the city or town is well within the median range of the artillery systems. SOSR fires, destruction missions, and blocking or fixing fires are often sustained for long periods. Firing these missions at or near maximum ranges creates exceptional ammunition requirements for Rocket Assisted Projectiles (RAP), 105-mm propellant Charge 8, or 155-mm propellant Red Bag. High-angle fires may be required to effectively attack targets in built-up areas. Units positioned at or near their maximum range cannot reach the city with high-angle fires. If artillery units are positioned at or near their maximum range from a city or town, enemy mortars outside the city may be able to fire into the city while out of range of counterfire from the artillery units.

- Individual howitzer sections may be required for direct fires against the upper floors of tall buildings. Positioning these sections in buildings provides protection from small arms fire and fragmentation. However, overpressure caused by firing inside buildings will create a noise hazard and may further weaken an already damaged building structure.

- To maximize counterfire radar coverage, position radar systems outside cities. Placing them on high ground overwatching the city reduces the masking caused by tall buildings.

- During movement to contact and breaching operations, radar systems must be positioned so their aspect angle is not the same as the azimuth of fire of enemy mortars.

OBSERVATION 5: Meteorological (MET) and survey requirements.

DISCUSSION 5: MET conditions in cities are different than surrounding terrain (ambient heat radiated from buildings, industrial smog conditions common to cities in developing countries, and deviation in winds to extremely high altitudes caused by large built-up areas). The precision for indirect fires during urban combat may increase the need or frequency of MET measurements.

Survey datum from geodetic markers around cities, especially in developing countries, is considered unreliable (different datum, different calculation techniques, geodetic markers that have been moved or tampered with).

TTP: If Survey Control Points (SCPs) cannot be extended from known, reliable surveys, use hasty techniques before using datum found around the cities.

5. EXECUTION.

OBSERVATION 6: Artillery used in direct fire in urban combat.

DISCUSSION 6: Maneuver commanders may direct the employment of individual howitzer sections into built-up areas. A howitzer may be used against enemy forces in tall buildings. Tanks and other direct fire systems may not be able to elevate their firing systems or range the target in these circumstances. In this condition a howitzer may be used to fire in accordance with an graduated response matrix (GRM) or to destroy fortified positions when other systems are not available.

TTP: The commander's intent must be clearly understood to develop the ammunition requirement "Killer Junior" for maximum fragmentation, PD fuzes set on delay or CP fuzes to penetrate structures, WP for incendiary effects, etc. The most proficient direct fire sections must be pre-designated for such a mission. Force protection (shielding crews on towed howitzers from direct fire) must be accomplished.

OBSERVATION 7: FA units should develop TTPs for urban operations that are tailored to their maneuver support requirements.

DISCUSSION 7: Until FA doctrine includes more comprehensive TTPs for urban combat, FA units should strive to develop SOPs that address the unique requirements of the urban battlefield. Many installations either do not have MOUT sites or have sites that are limited in size.

TTP: FA units can conduct tactical exercises without troops (TEWTs) in installation cantonment areas or in cities to identify terrain aspects that alter their normal tactics, techniques, and procedures. TTPs can then be developed to "defeat" the challenges of urban combat.✪

CHAPTER 6
MOBILITY AND SURVIVABILITY

PLANNING ENGINEER SUPPORT FOR AN URBAN ATTACK

by CPT John C. DeJarnette, Engineer Observer Controller, JRTC

Today's soldiers must be prepared to fight on increasingly diverse terrain, including terrain containing man-made features found in urban areas. These elements are viewed as obstacles to maneuver. Military operations on urbanized terrain (MOUT) encompass all military actions planned and conducted on a terrain complex where man-made construction impacts on the tactical options available to a commander.

This article provides considerations for engineer planners and leaders to employ when battalions and brigades attack built-up areas. It is intended to amplify current doctrine outlined in **FM 90-10-1, *An Infantryman's Guide to Combat in Built-Up Areas*** (with change 1). Lessons are drawn from observing attacks on the Shugart-Gordon MOUT training facility at the Joint Readiness Training Center.

MISSION ANALYSIS

Mission analysis sets the conditions for planning and ultimate success of MOUT operations. All planners must identify specified, implied, and essential tasks as well as constraints and limitations. Well-prepared engineer battlefield assessments (EBA) and terrain analysis products are essential to successful MOUT planning. Answering the following questions will help engineer planners, in conjunction with the principal battle staff, develop an effective MOUT offensive mission analysis.

- **S-2, S-3, Engineer, FSO:** Where is the key/decisive terrain? Identify this terrain for the approach march and for seizing buildings. Conduct a line-of-sight analysis along the route and compare it to the enemy template. Identify the most likely sites for enemy sniper and observer positions. Target these positions for deliberate reconnaissance to confirm or deny enemy presence. Plan obscuration and suppression to facilitate friendly movement.

- **S-2, S-3, Engineer, FSO:** Where are the best obstacle reduction sites and support-by-fire positions for securing a foothold? Consider the terrain, the enemy force template, and massing fires. Determine the minimum engineer force required to seize a foothold, seize essential facilities, and provide mobility support to mounted forces, such as how to sequence engineer tasks and change the engineer task organization to accomplish essential tasks. Identify the key leaders required to facilitate command and control of critical events and task organization changes. Decide how to best integrate cannon-delivered smoke, hand-emplaced smoke, and smoke generators to conduct breaching operations.

- **S-3, Engineer, S-4:** How should subordinate units execute in-stride versus deliberate breaching operations based on the enemy template and results of reconnaissance and surveillance (R&S) efforts? Decide where to use the mine-clearing line charge (MICLIC), tank-mounted countermine equipment, and manual breach techniques. Balance exposure of the breach force to enemy fires with the probability that a system may be killed before it can be employed. Determine acceptable collateral damage when employing the MICLIC. Plan for resupply of Class V (explosives, smoke, machine-gun ammunition) items after initial foothold is seized.

- **S-3:** Decide how reconnaissance forces link up, guide, or mark obstacles for bypass/breaching operations.

- **S-2, Engineer, FSO:** What are the counterattack routes of the enemy force? Consider the terrain and weather. Determine if enemy counterattack routes can be used to move friendly combat service support assets based on the enemy event template and time phasing of the counterattack. Determine what situational obstacles (rapid mining, scatterable mining) the enemy counterattack force has available.

- **Engineer, FSO, S-2:** What is the safety zone and trigger for using scatterable mines? Ensure that this information is disseminated at all rehearsals.

- **Engineer:** What is the composition of the buildings to be attacked? Determine the effects weapons will have on these structures (this drives the selection of fuze/shell combinations and aircraft attack munitions).

- **S-2, Engineer:** What is the "layout" of the town both above and below ground? Determine the protected areas, such as churches, hospitals, and museums. Sources for this information are imagery from the division, gun camera tapes from OH-58/AH-64 helicopters, Michelin road maps, and tour books.

SUPPORT PRODUCTS

The engineer staff planner uses the following products developed to support the military decision-making process (MDMP). All of these products must be developed in conjunction with the S-2. These products are updated based on the results of reconnaissance and surveillance.

Engineer Battlefield Assessment

The EBA feeds many of the subsequent products. Clearly articulate the enemy engineer capability based on the most likely and most dangerous courses of action. Consider past experience with this enemy, his current strength, anticipated barrier material basic loads, expected resupply rates, and locally available materials he can use to prepare his defense. This information will support development of the situation template (SITEMP).

Identify friendly engineer capabilities for mobility, countermobility, and survivability operations. Explicitly state the number and types of breaches each engineer unit is capable of executing based on its personnel, equipment, and logistical status. Leader proficiency and audacity impact on this estimate, so plan two levels down based on the particular unit. Use this information to develop the task organization later in the MDMP.

Estimate the impact of terrain and weather on both friendly and enemy capabilities. Line-of-sight, hydrology, cross-country movement, and line-of-communication overlays are helpful and can be provided by the division terrain detachment or quickly approximated from maps.

SITEMP

Know the enemy capability based on an estimated unit basic load of Classes IV and V materials and anticipated resupply. The time available to prepare the defense is essential. Reconnaissance assets should observe the delivery and emplacement of barrier materials. The S-2 and the engineer template enemy obstacles and counterattack routes based on terrain and weather conditions. Determine what resources are available in the MOUT area (ammonium nitrate, acetylene, propane, lumber yards, jersey barriers, vehicles, and construction equipment) that can contribute to enemy defensive preparation.

Based on this analysis, the engineer and S-2 jointly template the enemy engineer countermobility/survivability capability on the SITEMP. It should include minefields, tactical and protective wire obstacles, and vehicles and

other barriers in roads. This overlay is used to plan the engineer task organization, because this and the friendly scheme of maneuver determine the number of sapper squads needed and where mobility assets are placed in the movement.

Time and materials will impact enemy defensive capability. The force array in the security zone and main defensive belt impacts the amount of defensive preparation. Indirect-fire systems can only service one priority target and must shift to cover other targets, which may help with refining the obstacle template. Locations and movement of mounted weapons may indicate usable lanes for friendly infiltration of vehicles.

Event Template

Determine what triggers the commitment of enemy counterattack forces. The engineer planner can assist the S-2 in determining what situational obstacle capabilities he has, where and for what purpose the capabilities will be committed, and what the triggers are. Determine the structures likely to be set for destruction (such as petroleum and natural gas storage facilities).

Friendly Forces Survivability Time Line

The engineer and the S-4 plan to construct positions to support the forward displacement of combat support and combat service support assets and limited command and control nodes. The survivability effort should be an essential part of the maneuver deception plan.

Breach Execution Matrix

This matrix helps the task force allocate engineer assets and determine when in-stride and deliberate breach techniques are required. Specify where to use MICLIC, hand-emplaced explosives, armored combat earthmover (ACE), armored vehicle-launched bridge (AVLB), and tank-mounted counter-mine equipment to reduce enemy obstacles. It is important to keep in mind that rubble can be a more significant obstacle than conventional mines and wire obstacles.

Decision Support Template/Decision Support Matrix

Help the S-3 identify and plan viable branches and sequels to the plan. It is essential to know where engineers will culminate and how rapidly engineer platoons can be consolidated, reorganized, and put back into the fight.

Execution Checklist/Operations Schedule

Develop with the S-3 the operations schedule (OPSKED), which is a combination of key events from the synchronization matrix and associated code words. This product supports the decision support template and helps the battle captain and maneuver commander track the battle and make decisions. Prepare a rough execution checklist after receiving the warning order and continue to refine it during mission analysis. Finalize the checklist during wargaming and provide "bootleg" copies to task force engineers and squad leaders.

Troop-Leading Procedures Timeline

Ensure that adequate time is available for engineers to both prepare the task force rehearsal site and conduct their own internal rehearsals.

ENGINEER STAFF PLANNING CHECKLIST
(Brigade and below)

Plan

General

- Identify and resource all mobility/survivability essential tasks.
- Address all the breach tenets during planning and rehearsals.
- Request terrain products, MOUT layout diagrams, and data on building composition from higher headquarters.
- Study available terrain products to determine which sub-surface routes to use and how to defend against enemy use of these systems.
- Study available maps and photos to determine the best routes to use when approaching the city and within the city. Determine where to establish casualty collection points, aid stations, and ammunition and water resupply points.
- Use scatterable mines to support engagement areas that block mounted counterattack routes. Disseminate this plan to critical maneuver and combat service support leaders.
- Establish essential engineer friendly forces' information requirements and no-later-than report times.
- Nominate engineer-specific PIR and associated NAIs to support the reconnaissance plan. Ensure that the latest time information is of value (LTIOV) is clearly understood. Decide what actions to take if the PIR are not answered before LTIOV.
- Disseminate the enemy obstacle template to all engineer leaders.
- Task organize engineers to support essential mobility/survivability reconnaissance missions.
- Determine how much and what types of obscuration smoke are available. Determine the wind direction and speed, which will impact the effects of smoke. Coordinate with the fire support officer for recommended uses of white phosphorus (both mortar and artillery delivered) and handheld smoke. Coordinate with the smoke platoon leader for duration of smoke and level of obscuration.
- Designate and clear routes for mounted forces and reserve forces.
- Identify the "conditions" and a decision point for initiating deliberate breaching operations during each critical event of the operation.

Approach March

- Designate routes for ground convoys and allocate engineers to clear them.
- Determine the clearance method and acceptable risk.
- Ensure that all vehicles have lane and by-pass marking materials on board.
- Designate ground CASEVAC routes.
- Determine the decision point for using alternate routes.
- Determine when to establish TCPs/guides at critical obstacles on the route.
- Establish NAIs along the ground route to confirm or deny the enemy obstacle template.

Secure the Foothold

- Designate the best reduction site and technique based on enemy force array, terrain, and trafficability.
- Nominate NAIs for breaching operations.
- Designate one lane for each simultaneously assaulting platoon and the engineers needed to reduce it.
- Explain the lane-marking system.
- Establish a traffic-control plan for dismounted and mounted traffic.
- Establish a vehicle route and a dismounted route from the foothold to the CASEVAC helicopter landing zone.
- Designate locations for blocking positions to keep counterattacks from interfering with breaching operations.
- Resource blocking positions with MOPMS, conventional mines, and expedient barrier capability (such as abatis). Depict the planned locations of scatterable mines (include the safety zone) on maneuver and combat service support graphics to reduce fratricide.

Seize Key Facilities

- Designate buildings to enter and a reduction site that will support maneuver to the point of penetration.
- Designate where the support force will enter buildings.
- Resource battalions and their engineers with sufficient explosives and hand-emplaced and artillery smoke.
- Explain the cleared-building and cleared-lane marking systems.

Prepare/Execute

- Construct appropriate rehearsal sites to support maneuver and CSS operations.
- Provide enough detail in the troop-leading procedure timeline to encourage both engineer and combined arms rehearsals.
- Issue sketch maps and terrain products to engineers.
- Construct a lane marking system and by-pass marking system that all vehicle drivers must go through en route to the objective area.
- Provide enough detail in the maneuver and engineer execution checklists to effectively use the Decision Support Matrix.
- Specify times for engineer-specific pre-combat inspections conducted by platoon leaders, company commanders, and first sergeants.

R&S PLANNING CONSIDERATIONS

Integrate engineer reconnaissance (recon) teams (though not doctrinal, various units have created engineer recon teams) into the brigade R&S plan. Focus these teams on engineer targets such as landing zone denial, obstacles in the reduction area, enemy survivability on the objective, and obstacles on approach routes. The named areas of interest (NAI) assigned to engineers should have priority intelligence requirements (PIR) that determine the best reduction sites in the city and confirm or deny enemy fortification of key sites.

Pre-combat Inspections (PCIs)

After conducting pre-combat checks (PCCs), inspect materials used to mark obstacle by-pass lanes. Conduct FM radio communications exercises using the OPSKED and reports specific to the current operation. Inspect all maps for operations security considerations. Sterile maps are not required, but information provided on overlays should not compromise the attack plan. Overlays should portray only NAIs. Targets, pickup and landing zones, and link-up locations should not be on overlays taken into the objective area. All soldiers must clearly understand the NAI priority and associated PIR, casualty evacuation (CASEVAC) plan, abort criteria, compromise plan, exfiltration and link-up plan, and communications windows.

MOBILITY PLANNING CONSIDERATIONS

Providing mobility support to a maneuver force in a MOUT environment normally will require engineers to support multiple combined arms breaching operations. The reverse planning process discussed in **FM 90-13-1, *Combined Arms Breaching Operations,*** applies to all terrain situations. The following considerations complement this process:

Conduct Approach March

The S-3 and the battle staff plan a primary route and an alternate route to support the movement of each maneuver battalion's combat forces. The engineer makes recommendations based on trafficiability of the terrain and the ability to clear these routes using standard tactics, techniques, and procedures (TTP). Control of movement routes is critical, particularly when ground evacuation is the primary method of removing casualties. The S-4, S-3, and XO coordinate one-way, two-way, and alternating-direction traffic on task force routes and identify decision criteria for switching to alternate routes. Maximize aerial reconnaissance of routes to identify possible obstacles, combat outposts, and ambushes. The engineer planner ensures that the task force has enough engineer assets dedicated to accomplish the implied tasks and ensures that enough Class IV/V are available to support the movement.

Pre-combat Inspections

The engineer ensures that subordinate engineer squads conduct standard route-clearance PCCs and PCIs, which should be listed in the unit SOP. As a minimum, the task force engineer should check initiation systems, demolition charges, reduction equipment, marking materials, and mine detectors, and have a basic understanding of the concept of engineer operations.

Rehearsals

The engineer, with the S-3, ensures that all of the breach tenets and control measures are understood by key leaders at the task force rehearsal.

Secure the Foothold

Create lanes through obstacles using one sapper squad per lane, with a minimum of one lane per simultaneously assaulting platoon. (This does not mean nine lanes per infantry battalion--analyze carefully.) Use adequate marking materials, guides for assault and follow-on forces, and lane hand-over procedures. It takes at least 30 minutes to "cycle" this squad back into the fight.

A squad cannot support breaching operations continuously. A decision point or trigger must support any changes in task organization and missions for engineers. Establish decision points for changing approach routes, reduction sites, and initiation of SOSRA (suppress, obscure, secure, reduce, assault).

Pre-combat Inspections

Equip the unit with bolt cutters (two per engineer squad), grappels (three per engineer squad), a lane-marking kit, hand-emplaced explosives (10 per squad, per lane), mine detectors, and probes. Ensure that handheld smoke is available for each infantry soldier and that vehicles or utility helicopters carry smoke pots. Mass this smoke with the breach force at the objective rally point. Ballast load marking system upgrade materials on gun trucks. Use expedient reduction tools, such as SKEDCO litters, for wire reduction.

Rehearsals

No matter what rehearsal type or technique is used, perform basic SOSR rehearsals. (See **FM 101-5, *Staff Organization and Operations***, Appendix 6, for more information on rehearsals.)

- **Suppress**. Ensure that all personnel understand the location of support-by-fire positions and the pyrotechnic and radio signals to initiate obstacle reduction and indicate when the lanes are open (proofed and marked). The rehearsal site should have a full-scale lane-marking system visible to every soldier. All key leaders should understand the commitment criteria for the breach force.

- **Obscure.** Rehearse triggers for artillery-delivered, hand-emplaced, and vehicle-generated smoke. Consider the position of the moon relative to the support-by-fire position, the percent of illumination, and the night-vision goggle window.

- **Secure.** Hold a combined arms rehearsal of the breach force using the full-dress technique. This rehearsal includes engineers and attached maneuver elements dedicated to suppressing direct fires and destroying local counterattacks.

- **Reduce.** The combined arms rehearsal should include handing over lanes from engineers to maneuver soldiers. The rehearsal should be "NCO to NCO" and discuss details of linkup and handover. Consider the need to back-haul casualties when planning the number of lanes.

Seize Key Facilities

Plan procedures for dynamic entries into buildings and vertical envelopment, which require prepared special demolition charges (see FM 90-10-1, change 1), expedient assault ladders, and climbing grapnels. Rehearse the TTP for getting into windows on second and third floors. Have cutting tools available to prepare climbing poles at the objective rally point. Plan for sub-surface entry. Consider the use of reducing wire in stairwells and hallways.

Pre-combat Inspections

Inspect special breaching charges (see FM 90-10-1, with change 1). Ensure that charges are properly constructed and that they will "stick" when placed. Use double-sided foam tape when placing vertical breaching charges during warm, dry conditions. Use spikes, braces, or Ramset-type power-actuated fasteners during rain or when temperatures are below freezing. Ensure that sufficient handheld and hand-emplaced smoke is available.

Maneuver soldiers can carry smoke pots and additional explosives. Where practical, use battering rams (picket pounders or equipment found in MOUT areas) to enter doors. Conserve explosives by bringing one or two 24-inch crowbars to lift manhole covers and pry open entryways in buildings and sewers. Provide night-vision goggles to soldiers who reduce obstacles, because infantry leaders use infrared "tactical pointers" extensively, and reduction element soldiers must be able to see these signals. Use all available infrared lights. Mount and zero all AN/PAQ-4s and AN/PVS-4s during the preparation phase of the mission. Engineers must bring handheld infrared light sources (such as Phantom lights or infrared filters on Maglites) and visible light sources (D-cell Maglites or SureFire TAC Lights) to help move and reduce obstacles inside buildings and sub-surface structures. Ambient light inside hallways and underground is virtually zero, so plan for additional light sources. Mark cleared buildings so the marking is visible from rotary-wing aircraft and armored vehicles and by dismounted soldiers.

Rehearsals

Focus on the location and control of support forces and signals for committing the breach force. Ensure that soldiers understand the minimum safe distance and the best reduction site based on the building structure. Clearly identify routes between buildings and the marking method for "safe routes." Deconflict building clearance markings from collection points for casualties, displaced civilians, and enemy prisoners of war. Rehearse close quarters combat drills for interior building clearing. Basic SOSR rehearsals from "secure the foothold" apply to dynamic entry into buildings, but these rehearsals usually focus on the infantry platoon and an engineer squad.

Civilians on the Battlefield/Enemy Prisoners of War

Establish "protected areas" for civilians on the battlefield, and clearly mark routes for displaced civilians. Consider an expedient countermobility effort to restrict access to these civilians and enemy prisoners of war. Liaison officers from psychological operations, civil affairs, and the military police should address this topic in the brigade maneuver rehearsal. Although there are no specific engineer requirements, be prepared to provide technical assistance during planning and execution phases.

Sub-surface Fight

This is a variation on the theme of clearing buildings. Salient points are: entering the tunnel or sewer complex using hand tools or explosives, identifying and neutralizing mines and booby traps, and marking cleared areas. Navigation inside sewers and radio communications from inside the tunnel to soldiers above ground is challenging. There is no ambient light inside tunnels, so plan and rehearse using infrared and visible light signals.

Move Within the City

Plan one vehicle lane per mounted platoon entering each section of the city. The lane through tactical and perimeter protective obstacles will become an "axis" for movement within the MOUT area. These lanes initially will support one-way traffic. Plan and rehearse traffic control as lanes become alternating traffic lanes to allow for CASEVAC. Improve at least one lane to two-way traffic and designate this as the primary CASEVAC route. Designate, clear, and mark a route from the casualty collection point to the CASEVAC primary and alternate helicopter landing zones. Use combat route-clearance techniques to clear the ground CASEVAC route. Reduce or by-pass obstacles created by "junk vehicles," CONEXs, rubble, etc. If by-passing is part of the plan, make it a branch to the plan and include decision points and conditions.

Pre-combat Inspections

Inspect MICLIC and tank-mounted CME. Ensure that designated dismounted sappers have at least 20 blocks of TNT or C4 and 500 feet of detonating cord to reduce a 100-meter deep "lane" for vehicles. Inspect mine detectors carried by engineers designated to execute this mission. Sandbag one vehicle to use for proofing vehicle lanes, and dismount all passengers when proofing the lane. Ballast load additional lane marking material on vehicles. To assist the maneuver force in locating the correct lane to support their tactical plan, ensure that markings for multiple lanes are easily distinguished by day and at night. CASEVAC lanes must have a dedicated

traffic control post (TCP). One technique is for this post to be initially manned by representatives from the medical platoon of the lead task force. Integrate a tank-mounted plow or properly prepared heavy vehicle (dozer, loader, or 5-ton truck with winch) into the plan to reduce rubble or junk vehicle obstacles.

Rehearsals

A combined arms breaching rehearsal is required according to FM 90-13-1. This rehearsal will serve as the final check for mission-essential equipment and final adjustments to the plan based on PCIs. Synchronize the establishment of support-by-fire positions to isolate reduction sites and trigger conditions for initiating reduction operations (the conditions and who makes the decision). Determine who shifts obscuration and suppressive fires and when they are shifted. Leaders must rehearse handing over lanes to follow-on forces. Rehearse time-phasing the ground CASEVAC route clearance to helicopter landing zones and ambulance exchange points. Construct the unit's standard lane-marking system and route signs at the rehearsal site.

COUNTERMOBILITY PLANNING CONSIDERATIONS

Address these issues in the brigade-, battalion-, and company-level rehearsals. Plan to issue a scatterable mine warning (SCATMINWARN) to prevent fratricide.

Tactical Employment of Scatterable Mines

The S-3, engineer and FSO should plan, in detail, the employment of artillery-delivered antipersonnel mines/remote antiarmor mines (ADAM/RAAM) and multiple-delivery mine systems (VOLCANO). Specify the target to be attacked, a tentative location, its effect (disrupt, turn, fix, or block), the delivery system, the observer, and the trigger. To reduce fratricide risk, the scatterable mine execution plan must be clearly understood by leaders of mounted elements.

Protective Employment of Scatterable Mines

Ballast load the Modular Pack Mine System (MOPMS) on vehicles moving into objective area blocking positions. Consider sling loading the MOPMS, conventional mines, and limited barrier materials to support transitioning to the defense and blocking enemy counterattacks.

Engagement Area Development

The S-3 should specify the engagement area to interdict the enemy counterattack force. Ensure that battalion and brigade reserve forces have specified routes to move to the engagement area. The engineer must ensure that these movement routes are obstacle restricted zones. Engineers may not be available to emplace obstacles, so specify the engagement area development tasks, including obstacle emplacement and fire integration, to maneuver units.

SURVIVABILITY PLANNING CONSIDERATIONS

- Perform this work concurrently with initial reconnaissance and "condition setting" by the brigade to support the brigade and division deception plans.
- Field Artillery. Determine positioning areas and plan counterfire radars and ammunition.
- Forward Area Refuel Point. Establish locations for stocking fuel and ammunition. Plan for multiple refueling sites to support the attack and lift aviation simultaneously.
- Battalion aid station. Locate forward treatment facilities and ingress/egress routes. The implied task is to establish helicopter landing zones for these sites.

SUMMARY

While the process for planning engineer support to a MOUT attack follows existing decision-making steps, engineer planners must understand how this diverse terrain impacts engineer operations. Terrain enhances the enemy's countermobility and survivability efforts and increases the friendly force's mobility requirements. Critical points include:

- Structures become key terrain.
- Below ground and multi-layered above-ground dimensions are added.
- Decentralized execution--while staying collectively synchronized--is required.
- MOUT-specific pre-combat checks, pre-combat inspections, and rehearsals must be conducted.

By accounting for these impacts, engineer planners can make sound decisions to set the stage for effective engineer support to the maneuver force in this demanding environment.

This updated article was previously published in Engineer, July 1998, PB 5-98-3, US Army Engineer Center and Fort Leonard Wood, Missouri.

FORCE PROTECTION IN URBAN TERRAIN

by Stephen R. Reinhart, Intelligence Analyst, U.S. Army Intelligence Center

"Force protection is a security program designed to protect soldiers, civilian employees, family members, facilities, and equipment, in all locations and situations, accomplished through planned integrated application of combating terrorism, physical security operations security, personal protective services and supported by intelligence, counterintelligence and other security programs."

--Joint Publication 1-02, ***DOD Dictionary of Military and Associated Terms***

The joint service definition of force protection directs that intelligence, counterintelligence, and other security programs will support force protection. Force protection is a multi-faceted, continuous mission. It is performed by all branches of the U.S. Army to develop countermeasures against the complete range of threats within the full spectrum of military operations. It is designed to provide the commander with information outlining potential weaknesses in his force protection effort. Commanders and staff can use this information to:

- Plan for passive and active operations security (OPSEC), physical security, counterreconnaissance, deception, and other security measures.
- Plan base cluster defenses, logistic operations, combat health support, and troop safety measures.
- Reduce probability of fratricide by accurately locating enemy forces.
- Contribute to hazard avoidance once a risk is identified.

The S-2's role in force protection is to provide information to the staff on the threat force. He should analyze his own force to determine those targets the enemy regards as high priority, and the most timely way the enemy will attack the targets. After the S-2 provides this information to the staff, the appropriate staff officer must assume responsibility for arranging force protection of these targets from exploitation, neutralization, or destruction.

OBSERVATION 1: Unit planning for use of CI/HUMINT teams. Upon initial arrival in the AO, CI/HUMINT teams were not tasked to collect information in the local area. When deployed in an AO, the local area information can be obtained from the populace. These teams can also gather a considerable amount of information at enemy prisoner of war (EPW) holding areas.

DISCUSSION 1: The bulk of information comes from interviews or observations of the area and local personnel and, in the case of the interrogators, from EPWs. Their observations can assist the brigade's intelligence collection effort as a force multiplier. According to **FM 34-60,** ***Counterintelligence,*** information gathered from CI/HUMINT teams will help:

- Further develop, update and refine personality lists.
- Acquire the current location of enemy troops and supply points.
- Acquire information regarding the threat's ability to employ weapons of mass destruction.
- Learn current attitudes of groups and organizations toward U.S. forces present.
- Identify enemy supporters and collaborators in the rear areas.
- Identify local leaders and their feelings about U.S. forces and enemy forces, if not already known.
- Confirm or deny information provided by other collection assets.
- Assist in the development of force protection plans.
- Establish liaison contacts for further information gathering.

CI/HUMINT teams are normally employed to counter the enemy's HUMINT collection effort. The failure to correctly employ CI personnel adversely affected OPSEC. Examples of OPSEC failures included but were not limited to the following–

- Command vehicles were readily apparent by the number of antennas they carried. Trained gunners automatically concentrate on those vehicles with the most antennas since these are command and control.
- Vehicle numbers were not covered. This aids identification of unit movements, location of units, and unit boundaries.
- Vehicle driver names painted on windshields were not covered. This allows enemy HUMINT collection assets to identify the names and locations.
- Operators and passengers in vehicles left operations plans and orders, signal data, and other information in vehicles or were carried forward to reasonably unsecured areas.

Brigade battle staff also failed to employ adequate signal security (SIGSEC) measures, including:

- Operators did not zero radios when capture was imminent.
- Failure to leave written signal operating instructions (SOI) behind in a secure area when on a specific mission into an unsecure area.
- The brigade signal officer failed to issue new SOIs and frequencies when the current SOI was captured or believed compromised.

TTP:

- OPSEC and SIGSEC procedures should be included in the unit training plan and practiced prior to deployment. When good OPSEC and SIGSEC procedures are used, the force protection posture improves.
- A CI/HUMINT team includes both counterintelligence and interrogator personnel in its organization. The team, when properly employed, can provide a considerable amount of information and support leading to effective force protection.

OBSERVATION 2: Deployment of CI/HUMINT teams and the use of a screening point near the urban attack site.

DISCUSSION 2: During the attack on the MOUT site, there was no forward CI/HUMINT team screening point established. This screening point could have obtained information such as:

- The enemy's defenses of the urban site.
- The location of enemy supplies.
- The enemy's strength and order of battle (OB) in the area.
- Local attitudes toward the enemy.
- Local attitudes toward U.S. forces.
- The enemy's ability to collect information on U.S. forces.
- Other requests for information (RFI) as directed to support future missions in the AO.

TTP:

- Information gathered from a screening point can reinforce the force protection plan, and such information can prevent fratricide, prevent injury to soldiers, identify location of supplies, and identify enemy strength, enemy order of battle, and local needs.
- Regardless of the mission, force protection remains a major factor in the successful outcome of the mission. When a hazard or threat is identified, the five-step risk management process, identified in **FM 100-14, *Risk Management***, Apr 98, should be used.✪

CHAPTER 7
LOGISTICS

LOGISTICAL OPERATIONS ON URBAN TERRAIN
by MAJ William Carter, Military Analyst, CALL

1. GENERAL.

Combat Service Support (CSS) to military operations on urbanized terrain (MOUT) is a unique type of military operation and presents many challenges. Each urban area is different. The key to providing successful CSS to urban combat is with the ability for the logistician at all levels to properly plan for and anticipate requirements. The logistician must apply basic CSS characteristics, doctrine, and methodologies used in all military operations. The logistical planners should understand that urban combat is not a separate military task or operation, but a unique condition on the battlefield.

2. DOCTRINAL BASE.

To properly plan and execute logistical operations in an urban environment requires the logistician to have a thorough understanding of urban combat and CSS doctrine. The logistician should understand the concepts addressed in **FM 90-10-1, *An Infantryman's Guide to Combat in Built-up Areas.*** These concepts allow logisticians to understand techniques used in urban operations, thereby allowing them to accurately anticipate CSS requirements during urban operations. Additionally, the logistician requires knowledge of these combat skills for their own survival in MOUT. Chapter 7 of FM 90-10-1 outlines in more detail the unique CSS requirements for urban operations. The logistician should also review the CSS principles, characteristics, and functions outlined in **FM 100-10, *Combat Service Support.*** Of the five CSS characteristics (*anticipation, integration, continuity, responsiveness and improvisation)*[1] *found in **FM 100-10**, anticipation and improvisation are is the most important in supporting MOUT. Additionally, **FM 63-20, Forward Support Battalion***, Appendix C, "Deception," provides the logistician with methods on how to conceal and secure supplies, a required skill that is a must for urban operations. Finally, the logistical planner should review **FM 101-5, *Staff Organization and Operations***, on the planning process (specifically Step two, Mission Analysis, for the military decision-making process [MDMP]).

3. PLANNING.

OBSERVATION 1: Units should integrate the logistical planners from the beginning of the orders process. The logisticians cannot accurately develop the CSS requirements and plan after the brigade or battalion operations order is finalized. The logistical planners cannot brainstorm ideas on how to support or make estimates for urban operations. The logistical planners are an important part of the orders process for the brigade or battalion and they can bring a unique combat multiplier to the fight. To provide the best support to the orders process, the logistical

[1] **U.S. Army Field Manual 100-10, *Combat Service Support*** (Washington, DC: Government Printing Office, 3 October 1995), 1-2.

planners should be thoroughly familiar with the MDMP, specifically the mission analysis phase. To support the mission analysis phase of the MDMP, the CSS planner must provide the commander and staff with an accurate status of supplies, equipment, and personnel along with detailed and realistic estimates. Because of the time constraint associated with preparing for an operation, the logistical planners and their staffs must continually update this information.

DISCUSSION 1: The logistical planners must understand the needs of the commander and staff in the MDMP. In the mission analysis phase, the logistician should be able to answer these and other simple questions concerning logistics:

- What supplies, equipment and personnel does the unit have?
- What supplies does the unit need? (coordinate with S-3)
- What critical equipment in the unit needs repair?
- How does the unit get the supplies in and around the city?
- What does the unit have to treat and evacuate casualties?

These basic questions provide the logistical planners with some of the information they need before going to a brigade or battalion level course of action (COA) development or wargaming meeting. A shortage of supplies, equipment or personnel will have an adverse effect on the mission. The job of the planner is to make the commander aware of CSS issues and provide solutions.

It is a historical fact that urban combat requires a high expenditure of certain supplies, especially small-arms ammunition. The logistical planner must plan for this increase in the usage of supplies. Chapter 7 of FM 90-10-1 outlines the types of supplies that will have a high-usage rate during urban combat. The field manual recommends an increased ammunition usage of four times the normal consumption rate. Other considerations:

- What is the ammunition basic load for armor vehicles, for example, more HEAT rounds for tanks?
- How much fuel is needed? (Determining fuel consumption rates for armor vehicles using time rather than distance, 300 gallons every 8 hours)
- How close can the supplies be to a city?
- What special supplies are required (goggles, gloves, kneepads, etc.)? How many?
- How do supplies get to the soldier on the third floor of a building?
- How do soldiers get medical care?
- How will civilian refugees affect CSS for the mission?

The challenges are many in urban combat but by using common sense, basic CSS doctrine, and integration into the staff, the logistician will be a significant contributor and a combat multiplier to the combined arms team.

If my men put any more ammunition into the city, we would have sunk it.[2]
--MG William F Garrision, Task Force Ranger Commander, Mogadishu, Somalia

TTP: Cheat sheet
The company, battalion or brigade's logistician should determine their unit's special needs and requirements

[2] Mark Bowden, "Blackhawk Down," ***The Philadelphia Inquirer,*** 21 March 1999 [online at http://www3.phillynews.com/packages/somalia/nov16/rang16.asp].

for urban combat before deployment to an area of operation. This logistical operation plan (OPLAN), or "cheat sheet," can help develop baseline estimates and requirements well before an urban operation takes place. This OPLAN can include the UBL (unit basic load) for soldiers, sections, platoons and vehicles. The plan could include the number and type of special equipment required, for example, the packing list of platoon urban combat kit boxes containing eye protection, gloves, and chain saw (see Appendix A). The logistical planner cannot determine these requirements in a vacuum and should solicit the expertise of others within the unit, such as the mortar platoon leader. The logistical requirements for urban and all operations will be dependent on METT-T. Below is a simple example of a "cheat sheet."

MOUT REQUIREMENTS FOR BATTALION MORTAR SECTION

DODAC/NSN	AMMO	STANDARD QTY PER WPN	MOUT QTY PER WPN
1330g90000000	Green incendiary	2	10
1315c27600000	81mm WP w/fuse	11	11

How the "cheat sheet" looks and the information it contains depends on the planners and their unit. The goal is to make it user friendly and to contain estimates as realistic as possible. With the advent of computer technology on the battlefield, the need for a "cheat sheet" or logistical operations plan like this may seem outdated. But when the hard drive crashes, the electronic pulse hits, or the computer is run over by a tank, logistical planners are still expected to determine logistical estimates using the old paper and pencil method. Having these numbers easily accessible in hard copy will help.

TTP: Logistical Battle Book

The logistical planner must quickly and effectively articulate the status of personnel, supplies, and equipment. A tool the logistician can use is easy-to-read and understood briefing charts that quickly show maneuver planners the status of supplies and equipment. The needs of the commander and staff will determine the detail of information. (Note: Express the "delta" column in both number and percentage.)

ITEM	ON-HAND	REQUIRED	DELTA (No./%)
WATER	**10000**	**12000**	**-200/-17%**
JP8 (gals)	**10000**	**10000**	**0**
5.56 (rds)	**56000**	**28000**	**+28000/+150%**

This table is simple and using it will help logistical planners accurately express concerns and issues to the commander and staff. The noncommissioned officers (NCOs) on the logistical staff can prepare the briefing chart for the planners before the meeting and keep it updated. The NCOs may want to use the planning factors in **FM 101-10-1/2, *Staff Officers' Field Manual Organizational, Technical, and Logistical Data Planning Factors*** (Volume 2) in preparing the briefing chart. Logistical planners should place these charts in a battle book or planners book that they bring to the planning meetings or any staff meetings. During CTC rotations there have been numerous times when logistical planners were trying to determine a logistical forecast during COA development using scraps of paper found in the pockets of their battle dress uniforms (BDUs).

OBSERVATION 2: Urban combat is equipment intense. The soldiers going into urban conditions need a multitude of equipment and supplies. The expected ammunition consumption rate for urban combat is four times higher than other normal operations.[3] Based on standard planning in the now obsolete FM 101-10-1/2 (Volume 2), a soldier assigned to an air assault division would use 124 rounds (about four 30-round magazines) of 5.56 on the first day of an attack.[4] For urban combat, that same soldier would require 496 rounds or sixteen 30-round magazines. That additional amount of ammunition may not seem significant until you consider other equipment. By doing the same projections for mortar rounds and grenades, not to mention the batteries, eye protection, ropes and other items specific for urban operations, the soldier's basic combat load of 69.37 pounds[5] can quickly increase. The British Army's experiences in Northern Ireland determined a need for soldiers not to be loaded down with equipment, allowing them to quickly react to situations.[6] The need for a soldier to be highly equipped, yet highly mobile and flexible, presents a unique challenge that must be addressed by leaders and logisticians in the planning phase of the operation.

DISCUSSION 2: Leaders at all levels should determine what equipment is necessary using the commander's intent, METT-T, and an understanding of urban combat. By determining what equipment is needed, the leader can then determine what soldiers can carry without being overly burdened. According to **FM 7-10, *The Infantry Company***, a soldier's load should not exceed 72 pounds or 48 pounds when in contact. Depending on the mission, this may not be achievable. Once the leader determines what the soldiers will carry into the urbanized area, it is up to the logisticians (to include company 1SGs or executive officers) to bring the other required supplies into the area. The challenge for leaders and logistical planners is in how to get those supplies to soldiers located within a city on multiple floors of high-rise buildings. If there is no plan, it will not occur.

TTP: CSS overlay

Leaders and logistical planners must work hand-in-hand before urban operations occur in determining supply requirements, transportation requirements, the method of getting supplies into the city, and where supplies are going. Planning this out in detail can be as important as determining the high-priority target by the fire support officer. Dissemination of logistical plans must occur at all levels in the unit. A CSS overlay with locations and call signs (see Figure 1 on page 7-5) is a proven method at the Combat Training Centers (CTCs). A good logistical plan in urban combat requires the involvement of the unit providing the support, whether it is a support platoon, forward logistical element, or corps asset. Ideally, the leaders and planners incorporate the logistical or CSS plan with the combat health support (CHS) plan. There should be full integration of the CHS and CSS into the logistical plan. For example, a truck from a forward logistical element (FLE) will deliver supplies to a company's caches. That same truck will then back-haul routine or non-urgent stable casualties and other equipment that require repair to the rear. It is also a good idea for logistical supply points to move periodically within the city when possible to avoid targeting by snipers.

---

[3] **US Army Field Manual 90-10-1, *An Infantryman's Guide to Combat in Built-up Areas*** (Washington, DC: Government Printing Office, 12 May 1997), 7-1.

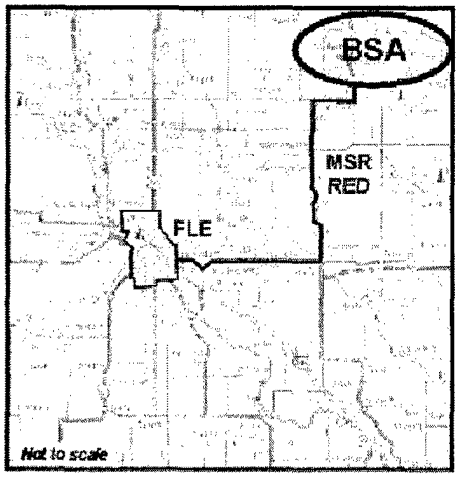
[4] **US Army Field Manual 101-10-1/2, *Staff Officers' Field Manual Organizational, Technical and Logistical Data Planning Factors*** (Volume 2) (Washington, DC: Government Printing Office, 17 July 1990), 2-133.

[5] **US Army Field Manual 7-10, *Infantry Company*** (Washington, DC: Government Printing Office, 14 December 1990), 8-10.

[6] USMC Intelligence Film.

CALL SIGNS
BN A/L 55.50
BN CMD 56.55
FSB CMD 67.50
FLE 67350

FLE – WX567123211
- Maintenance contact team
- Small arms repair
- 500 gallons of water
- 3000 gallons of JP8
- CLASS V
- Treatment team
- Two front lines ambulances
- Mortuary affairs (–)



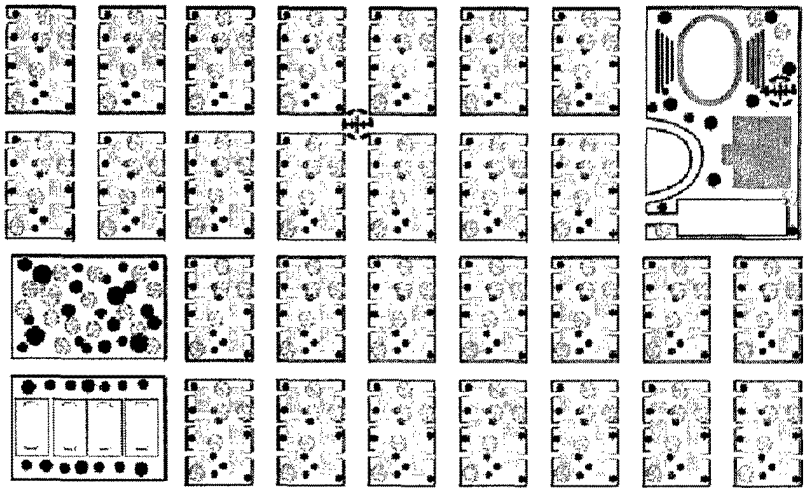


Figure 1
CSS OVERLAY

4. PREPARATION.

OBSERVATION 3: The benefits of proper preparation for urban combat or any other type of military operation speaks for itself, yet leaders fail to properly plan and execute this stage of the operation. This is the ideal time before the operation to complete logistical coordination, rehearsal of the CSS plan, and "top off" logistical elements, men and equipment.

DISCUSSION 3: Leaders and logistical planners must properly prepare soldiers in a tactical assembly area before urban operations. Properly preparing a soldier for urban combat is very important, not only to increase his efficiency on the battlefield, but to decrease the chance of combat stress associated with urban combat.

TTP: "Soldier Top-Off Point"

Leaders and logistical planners working together should develop a plan that prepares the soldiers physically and mentally for the upcoming operation. To achieve this, the leaders should establish a "soldier top-off point" that provides simple services that will meet this objective. How elaborate this type of operation becomes will depend on the availability of assets, time, and the tactical situation. This type of operation is time and manpower intense. It could involve corps support assets depending on the scope of the operation. These services are in addition to the unit level pre-combat inspections and rehearsals. These events can take place at a tactical assembly area (TAA), brigade support area, or combat trains. Security considerations and location of soldier population will determine where the "soldier top-off point" occurs. What occurs at this point and what is available is solely dependent on METT-T. In conjunction with this operation, units can issue Class I (food/water), Class V (ammunition), and other equipment items to the soldier.

TASKS FOR A "SOLDIER TOP-OFF POINT"

1. RECEIVE MAIL/NEWSPAPERS
2. HOT FOOD (with fresh fruit and cold/hot drinks)
3. CHAPLAIN SERVICES/SUPPORT
4. SHOWERS
5. COMBAT HEALTH SUPPORT (to include re-stock of aid bags and combat lifesaver bags)
6. SUPPLY ISSUE POINTS (water, MRE, ammunition, etc.)
7. A-BAG DISTRIBUTION (allows the soldier to change into dry/clean clothes)
8. SLEEP/REST AREA (tent)
9. BRIEFING AREA (tent)

Having soldiers well-fed, informed, supplied and mentally prepared can only make for a better soldier. Additionally, the "soldier top-off point" should help decrease the possibility of combat stress-related injuries, though not eliminate them. From the Russian experience in Gronzny, combat stress can easily degrade the unit's ability to perform its mission, making this "top-off point" critical in long-term urban operations. Additionally, leaders and logistical planners should have a "soldier top-off point" available outside an urban area during the battle to decrease the chance of combat stress and revitalize the soldiers. Even during the war in Afghanistan, the Mujahideen knew the benefit of rotating soldiers in and out of battle.[7]

---

[7] Ali Ahmand Jalali and Lester W. Grau, ***The other side of the mountain: Mujahedin Tactics in the Soviet War*** (Washington, DC: Government Printing Office, June 1995), 308.

> *"A poor plan thoroughly rehearsed has a greater chance for success than an excellent plan that is never rehearsed."*
> **--General George S. Patton, Jr.**

OBSERVATION 4: Units fail to conduct effective CSS rehearsals for urban operations because they were not fully prepared. For example, after the CSS rehearsal some of the logistical planners, mainly the medical planners, met to refine their plan a few hours before the operation.

DISCUSSION 4: Units should conduct a thorough rehearsal of the CSS plan, especially for urban combat, because of the high rate of casualties, high usage of ammunition, and numerous distribution challenges faced in this type of environment.

TTP: "Follow the manuals."

FM 101-5, *Staff Organization and Operations*, Appendix G, and **CALL Newsletter No. 98-5, *Rehearsals,*** outline the methods on how to conduct a rehearsal.

5. EXECUTION.

OBSERVATION 5: The challenge for leaders and logistical planners in MOUT is getting supplies to soldiers. The standard TTP is to place the supplies in an M113 armored personnel carrier (APC) and drive to a cache or unit distribution point within the urban area. Under most urban operation scenarios, this technique would work well. The challenge occurs when the streets are filled with rubble from buildings, abandoned cars, and broken glass (where small elements of "hunter/killer" teams like those faced by the Russian Army in Grozny armed with RPGs are awaiting for a target to kill). Through thorough planning and innovation, leaders and logisticians can easily meet the needs of the soldier.

DISCUSSION 5: Listed below are several techniques to assist in resupplying the soldier at the battalion level and below. The trick to resupply is detailed planning, coordination, and imagination. One's own imagination is the only limitation on the number of techniques for resupply. Most of these techniques listed below were used in a MOUT exercise and have been observed repeatedly at the CTCs. When a leader or logistical planner develops a technique for resupply, he must remember the environment of MOUT, the ability to perform this technique, and security. Usually the best source for new techniques comes from the soldiers who move supplies or the soldiers who are receiving them.

TTP: Plastic bags

Units should pre-package or pre-configure loads of supplies outside an urban area or in a safe location. Ideally, the units should configure these loads down to the soldier level. This load could include pre-filled magazines for soldiers, meals ready-to-eat (MREs), bottled water, and first-aid dressing. (If the unit cannot provide pre-loaded magazines, the unit should ensure there are plenty of speed loaders with the ammunition.) Placing a pre-configured soldier's load in durable plastic bags (probably double or triple-sacked), such as those found in the post exchange, presents a few benefits. It will eliminate the time a soldier has to spend at a supply point; he can run in, grab the bag and go. If a soldier is engaged on the upper floors of a building, someone can easily carry the bag to the soldier. Plastic protects the supplies; however, the amount of supplies a bag can carry may be limited and filling the bag will be manpower intensive. Found in most cities, these plastic bags can act as a form of camouflage for supplies. They are cheap, easy to find, expendable, and do not require back-haul.

TTP: Milk blivet

Plastic milk blivets used in milk dispenser machines in most military dining facilities are excellent water containers. These blivets hold approximately five gallons of liquid, have a spout for easily filling canteens, and will fit into a rucksack or any other container. These blivets will survive a 60-foot drop from a hovering helicopter when placed inside an empty MRE box. Additionally, all components are expendable. A box of 100 milk blivets costs approximately $10.

TTP: Water bottles

In most operations in today's Army, from the Balkans to Haiti, providing bottled water is a standard for supplying water to the soldier for individual consumption. In urban operations, this type of water distribution can be a benefit and a challenge. The benefit is obvious: plastic water bottles are easy to transport for individual soldiers and can be thrown away, eliminating back-haul requirements. The downside is that they are expensive, require a contract with a commercial provider, and, in bulk, come in less than durable cardboard boxes. Nevertheless, the plastic water bottle is an ideal method of getting water to the individual soldier. This method eliminates the need for the soldier to wait to fill his canteen from a 5-gallon water can; he can quickly grab it and go. Using bottled water eliminates the need to back-haul containers (5-gallon water cans or 500-gallon water blivet) to resupply the soldier.

TTP: Take from your buddy

Though an emotional subject and not discussed openly, a technique that should be used is taking supplies from seriously wounded, injured, or killed soldiers. Common sense must prevail when relieving a wounded or injured soldier of his supplies. Soldiers must be aware of this resupply technique. Otherwise, these supplies will be back-hauled with the casualty to the rear. In the battle of Stalingrad, wounded Russian soldiers "would try to take off the white coverall (used for camouflage in the snow) before it became bloodstained."[8]

TTP: Foraging and scavenging.

FM 7-10 addresses foraging and scavenging, but this technique, though partial, can present leaders and logistical planners with numerous concerns:

- Are the items safe to use?
- Have they been booby trapped?
- What are the legal ramifications?

The unit's leadership should address these concerns as part of the rules of engagement (ROE) for operations. The techniques should only apply in long-term urban operations and if the military logistical system has failed.

TTP: Speed balls.

The use of helicopters within the city is another means for transporting supplies to soldiers. Unfortunately, the limited availability of landing zones/pick-up zones and the enemy's increased advantage to engage aircraft from the upper floors buildings will limit the use of helicopters in the resupply role. One technique is to use rooftops or a wide area, such as a junkyard, as a drop-off point for supplies. These sites must be in secured locations within an urban area. CSS personnel pre-package supplies in aviation kit bags or duffel bags. The helicopter will fly as close as possible to the site, reduce speed, and drop the supplies and rapidly egress the area to decrease exposure time (see Figure 2 on page 7-9). This technique is similar to the "speed ball" technique used by Rangers. Supplies should be packaged in commercial packaging material (for example, bubble wrap) or with material available from a rigger detachment to limit damage to the supplies. For example, placing a piece a thick cardboard on the bottom of an aviator kit bag could help decrease damage at impact.

---

[8] Beevor, Anthony, ***Stalingrad–The Fateful Siege: 1942-1943,*** Penguin Group, NY, 174.

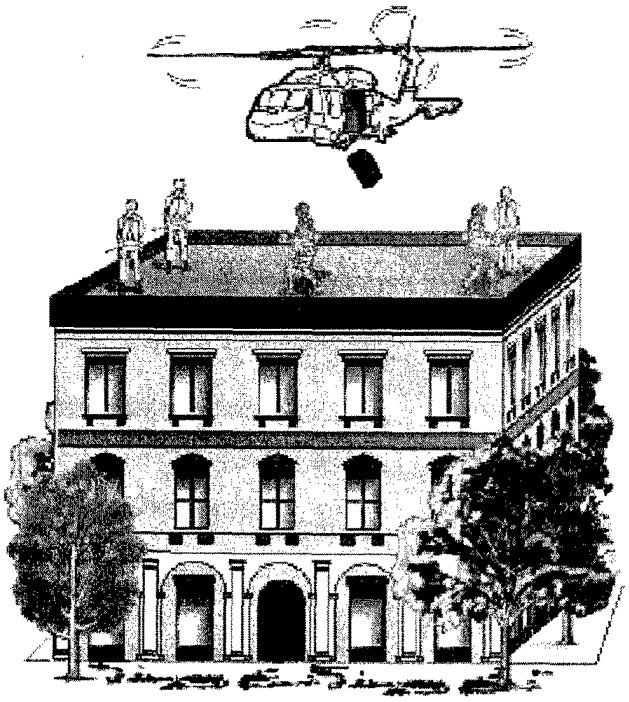


Figure 2
Speed Ball

TTP: Fast rope

Another similar method of resupply using a helicopter is to take a 5-gallon water can and tie it to the end of a rope, then slowly lower the rope to a secure location. Connect the water cans, "speed balls," or the supplies to the rope with a carabiner (snap link) and slide them down the rope. The benefit of this method is that the helicopter does not have to get close to the roof or to a secure site. Additionally, the extract point where the unit receives the supplies is more precise than kicking the supplies out the door. Once the soldiers receive the supplies, this same rope can back-haul empty water cans and other items. The trick is to ensure that the water can, or weight at the bottom of the rope, remains to prevent the rope from flapping in the wind and catching the propellers of the helicopter. The downfall to this method is that damage will occur to some of the supplies when they make contact with the ground. A 5-gallon water can weighs 40 pounds.

TTP: SKEDCO

At the squad and platoon level, using a SKEDCO litter to move supplies within an urban area is a technique worth considering. The primary purpose of the SKEDCO is to evacuate casualties from the battlefield. This same litter can move supplies and equipment, especially mortar rounds, effectively through the rubble of an urban area or through a sewer system. Additionally, by using basic mountaineering techniques, the SKEDCO can haul supplies along the side of a building, through elevator shafts or destroyed stairwells, to the upper floors of a building using simple ropes and pulleys.

TTP: Body bags

A unique technique to move a squad's worth of basic supplies is by using a "Human Remains Bag" (body bag), NSN 9930-01-331-6244 Type 2. Clearly stencil the word "supplies" in bright colors on the bag so as not to confuse it with other body bags. These bags are useful because they are rugged, have built-in carrying handles, have a capacity to hold a squad's worth of supplies, and can be folded and carried in a rucksack. The advantage over using a duffel bag or aviator kit bag is:

- The bag remains sealed and is waterproof.
- Two soldiers can easily carry a loaded bag.
- There is a greater availability, which reduces back-haul requirements.

The TTPs listed above are just a few techniques to deliver supplies to soldiers in the fight. The recurring theme for the above techniques is that resupply operations must be fast, soldier friendly, and minimize the requirement for back-haul of resupply material. Additionally, pre-configuring loads is an important technique to use in resupply during urban operations.

> ***"What we have here is a failure to communicate."***
> **from the movie *Cool Hand Luke***

OBSERVATION 6: Communications in urban areas is a known problem. The inability to communicate will surely sever the ability of the logistician to support the soldier. Without communications, the logisticians cannot track the battle. Therefore, they cannot anticipate the CSS/CHS requirements of the soldiers within an urban area and "push" needed supplies forward. Without proper communication, the logisticians are blind.

DISCUSSION 6: Depending on the location and available infrastructure, logisticians should consider using cellular telephones and beepers to coordinate supply requests. Most cities throughout the world have a cellular telephone infrastructure available. Cellular phones can be easily obtained from numerous sources worldwide. There are even companies, through the use of satellite technology, that claim they can provide cellular phone coverage anywhere in the world. The Chechens used cellular phones with great success against the Russians.[9]

TTP: Beepers and cellar telephone codes

Since these communication sources are not secure, the logistician needs to use brevity codes for requesting supplies. All parties involved in CSS/CHS operations must know theses codes. Additionally, a communication exercise using beepers, cellular telephones, and these codes should occur before the operation. Logisticians can use code words, like "power bars," for water on cellular telephones. For the beepers, the logistician can use number codes. The first five numbers used could be meaningless. The next three numbers could represent the amount of supplies needed and the last three numbers can represent a specific item or class of supply. These telephones and beepers are lightweight and easy to carry, but can be easily detected with off-the-shelf technology, therefore possibly compromising the location of the user. Unfortunately OPSEC will suffer using these apparatus and every opportunity should be made to disable or jam all repeaters supporting cellular communications. But recent examples, documented with the Russian experience in Grozny, have shown these systems will work in extremes when used.

---

[9] Foreign Military Studies Office, Chechen Brief to MOUT Focused Rotation Team, 24 February 1999, Tim Thomas.

OBSERVATION 7: Having a soldier or a supply point overburdened with excess supplies can hinder the logistical system just as much as the lack of supplies.

DISCUSSION 7: Once operations have begun in an urbanized terrain, the logistician needs to "push" supply based on the situation. Situational awareness for the logistician in support of urban operations is invaluable in providing the right amount of supplies at the right time. Reliance on resupply based on forecast consumption should be minimized to prevent accumulation of excess stockage in both units and support caches with consequent limitation of decreased mobility and increased vulnerability to the supplies.[10]

TTP: Caches

A system of small "caches" operated by a minimum number of logisticians and located in a secure location may be the preferred method in supporting engaged in MOUT.[11] The caches, besides being located in secure locations, should be easily accessible by resupply vehicles or personnel, and defendable. They should be established within the building or caches using techniques found in FM 90-10-1, paragraph E-2, subparagraph c, "*Other Construction Tasks.*"

"CSS leaders and staff must anticipate future missions. They do this by understanding the commander's plan and translating current developments into future requirements."[12]

TTP: Battle Tracking

The logisticians at every level, to include first sergeants and company executive officers, must track the battle to provide or "push" supplies in a timely fashion to the soldier in a foxhole. Below are some recommended tracking techniques from the CTCs:

- Track units along with supporting and adjacent logistical element locations with grids and symbols (a CSS/CHS overlay should provide the initial location of these elements).
- Track unit status with a combination of number and color codes.
- Ensure tracking charts are self-explanatory and updated.
- Monitor the appropriate radio nets (command or operation intelligence nets).

Proper battle tracking alone will not provide the soldier on the ground with the right amount of supplies at the right time. The information should be analyzed and translated into future support requirements. Having staff huddles to review past actions and projected upcoming events is one method of determining these requirements.

6. CONSIDERATIONS.

OBSERVATION 8: Today's major urban areas are home to millions of people. During a conflict within an urban area of any size, the military will have to plan for dealing with the mass exodus of displaced civilians living in and around an urban area.

---

[10] Urban Warfare Logistics Study and Analysis (Draft Final Report), 5 February 1999, 32.

[11] Ibid.

[12] **US Army Field Manual 71-3,** ***The Armor and Mechanized Infantry Brigade*** (Washington, DC: Government Printing Office, 8 January 1996), 8-1.

DISCUSSION 8: Although this is a major operational concern, displaced civilians from an urban area will stress the logistical system. Depending on the size of the operation and the number of displaced civilians, the logistical requirements for displaced civilians can include transportation, food, water, shelter, medical treatment, and preventive medicine support. This will drain the unit's logistical system, and, without proper planning, possibly deplete the units of their supplies and assets, therefore possibly halting combat operations.

FM 90-10-1, Change 1, states:

"Commanders at all levels automatically assume the burden of ensuring the bare necessities of life to all civilian noncombatants that fall under their control during MOUT. Depending on the situation, protection, food, water, shelter and medical care may be provided in special refuges established for that purpose, or they may be provided in place by some other organization. Whatever the final arrangement, U.S. commanders should expect to exercise control and provide support until long-term arrangements can be made."[13]

TTP: Plan and Coordinate.

At all levels within a unit, there must be a plan to handle displaced civilians. If a group of civilians walks up to a battalion's combat trains or supply caches, the soldiers at that location need to know what support they can provide, (food, water, medical care), and then where to send them. The logisticians must have a thorough picture of the displaced civilians they can expect to support (how many, the expected age, gender, and cultural considerations). The logisticians, along with the unit's S-2/G2 (Intelligence), S-3/G3 (Operations) and S-5/G5 (Civil-Military Operations), should coordinate directly to develop a detailed and supportable plan on how to deal with displaced civilians. The S-5/G5 will coordinate with host nation and non-governmental organizations for support of the displaced civilians. Logisticians must be proactive when it comes to dealing with displaced civilians. Ignoring the situation can result in displaced civilians overwhelming the unit's logistical system, in turn degrading the combat effectiveness of the unit.

7. CONCLUSION.

This chapter only addressed some of the logistical issues and TTPs needed to be successful in urban operations. Providing logistical support in urban combat requires detailed planning, coordination, and imagination. The two biggest challenges faced by the logistical planner will be communications and the distribution of supplies at the lowest level. A tall building will create a man-made valley of steel that will hamper the logistician's ability to communicate, therefore hinder his ability to battle track, forecast, and anticipate the supply requirements of the soldier on the ground. The possibility of having lines of communication within a city blocked by abandoned cars, fallen structures, rubble, and broken glass will impede the logistician's ability to "push" supplies to soldiers within the city. These are the many challenges that a logistician may face in urban combat. The logistical planners must consider all facets of METT-T since all will dramatically affect the logistical plan in urban operations. There have been many battles fought throughout history where the momentum of the battle has stopped and changed hands because of the lack of supplies on the front lines.✪

[13] **US Army Field Manual 90-10-1, Change 1,** ***An Infantryman's Guide to Combat in Built-up Areas*** (Washington, DC: Government Printing Office, 12 May 1997), G-5.

CHAPTER 8
COMBAT HEALTH SUPPORT

COMBAT HEALTH SUPPORT

by MAJ David Sheaffer, CSS Observer Controller, JRTC

1. GENERAL.

The combat health support (CHS) mission in support of military operations on urbanized terrain (MOUT) will very likely be significantly different from CHS on the non-urban battlefield. The deliberate attack on an urban area may result in a high number of casualties, with many of those casualties isolated and not treated for long periods of time. CHS planners and those personnel with whom they coordinate must fully appreciate the difficulties they are about to encounter. Primary issues and difficulties are the medical threat, the types of casualties expected, planning and synchronization, medical evacuation, and the employment of medical treatment assets.

2. DOCTRINAL BASE.

Doctrinal references in assisting the CHS planners in the urban environment are found **in FM 8-42, *Combat Health Support in Stability Operations and Support Operations***; **FM 8-10-6, *Medical Evacuation in a Theater of Operations***; and **FM 90-10-1, *An Infantryman's Guide to Combat in Built-Up Areas***. These references provide general information, yet much of the details and tactics, techniques, and procedures (TTP) do not exist in written form to provide for a solid urban combat CHS plan. An important aspect missing from current doctrine is the role and responsibility of the combat health support officer (CHSO) and how he plans to support the urban fight from a CHS perspective.

Additionally, valuable sources that exist within the CALL database are: **CALL Newsletter No. 97-2, *Combat Health Support Synchronization and Rehearsals***, Jan 97; **Combat Training Center (CTC) Quarterly Bulletin No. 96-7, *The Tenants of Combat Health Support***, Jun 96; **CTC Quarterly Bulletin No. 97-15, *Level One CHS for the Light Infantry Deliberate Attack***, Jul 97; and **CTC Quarterly Bulletin No. 97-18, *The Role of the CHS Officer in the FSB***, Sep 97.

3. PLANNING.

The purpose of the CHS plan is to provide a simple, yet effective, process for consolidating, treating, and evacuating battlefield casualties. The CHS plan is critical to any combat operation and therefore must not be oversimplified or omit critical coordination and synchronization details.

Initially, someone must delineate the roles and responsibilities involved with creating, coordinating, and synchronizing the CHS plan. Research of current doctrine contains contradictions of whom the primary CHS planner to develop the CHS estimate and plan should be. According to **FM 101-5, *Staff Organization and Operations***, the responsibility for planning and coordinating CHS operations is placed on the surgeon. According to the FM 7-series, the S-1 battalion personnel officer is the primary staff officer charged with this task at battalion level/brigade level. This individual is usually a junior combat arms company grade or a combat arms field grade

officer at the brigade level who has a general understanding of the capabilities and limitations of the medical assets supporting the unit. Therefore, the S-1 should not formulate the CHS plan alone. At the brigade level, the brigade surgeon and the CHSO should work with the brigade S-1. The medical platoon leader at the battalion level should consult with the battalion S-1 on how best to provide medical support to an operation. At brigade level, the CHSO and brigade surgeon are the medical subject matter experts and must be able to integrate the CHS plan with the maneuver plan but must still consult and plan support with the S-1.

As with any military operation, the CHS planners should consider the threat to properly counter it. The medical threat in an urban battlefield involves some wounds, injuries, and diseases not common to the conventional battlefield. FM 8-42 describes the medical threat in detail. Some key issues for consideration:

- Disease rates will most likely increase due to environmental conditions imposed by urban areas. Disruption of utilities (water, sewage, waste disposal) will increase the potential for disease transmission. Large numbers of refugees and displaced persons will quickly exhaust available resources for personal hygiene and medical treatment.

- Damaged or destroyed buildings will provide breeding grounds for rodent and arthropod vector populations.

- In addition to wounds from conventional direct fire and fragmentation, missiles of glass, steel, and stone will cause secondary wounding. Collapsing buildings will result in numerous crushing injuries. Increased burns and inhalation injuries will result from burning fuels, vehicles, and structures.

- Prolonged combat in urban areas generates significant physical and mental stress. The presence of hostile civilians, the amount of destruction, and extended periods of isolation increase the risk of misconduct stress behaviors and subsequent post-traumatic stress disorders. Trained medical personnel should be on hand to support units when the situation dictates. The CHS plan should include a method to evacuate adversely affected personnel to a safe area for treatment. The best method for stress management is prevention. (Refer to the combat service support [CSS] chapter of this newsletter.)

The CHS planner must take the following battlefield operating systems (BOS) into consideration:

- Intelligence:
  - Known or suspected enemy situation.
  - Terrain and weather. What kind of road network is in the area of operations? How will the predicted weather impact the trafficability on and off the roads? Are there landing zones along the axis of advance and in or around the urban area? How will the weather impact on the availability of aircraft?

- Maneuver: What is the combat scheme of maneuver and are there medical assets readily available to care for potential casualties? Particular attention should be paid to the employment of the armored ambulances.

- Fire Support: Are there any buildings specifically targeted? If so, CHS planners should ensure casualty collection points, evacuation routes, and treatment elements remain at a safe distance away from these buildings to prevent potential fratricide.

- Mobility/Survivability: Where are the suspected or known enemy or friendly minefields? How does this impact proposed evacuation routes?

- Air Defense: What is the enemy's capability for interdicting main supply routes (MSR) and logistical elements?

- Combat Service Support: Typically, the FSB moves a forward logistics element (FLE) toward the battle area to provide support. If this is the case, then how are medical assets integrated into the plan, and, more importantly, where are they positioned in the convoy and how are they secured?

- Command and Control: Who is the person to call for casualty evacuation, and what are the primary and secondary frequencies? This element is the central point for prioritizing assets and medical evacuation requests. It is imperative that this element is capable of continuous situational awareness through accurate battle tracking.

OBSERVATION 1: CHS planners do not conduct a good intelligence preparation of the battlefield (IPB).

DISCUSSION 1: At the Joint Readiness Training Center (JRTC), the opposing force (OPFOR) normally establishes an "outer ring" of defense 3-5 kilometers from the main defensive perimeter. This "outer ring" is normally composed of counter-recon patrols, combat outposts, and small units effecting delaying actions and spoiling attacks. The CHS planners normally focus on only the urban area and do not consider the potential for casualties at this "outer ring."

TTP:

From information provided by the S-2, the CHS planners must understand the tactics of the enemy and be prepared for casualties at all possible areas of contact. The CHS planners should be able to gain insight into this matter during the wargaming process. The CHS planners should provide input into the counter-reaction portion of the action, reaction, counter-reaction drill.

Additional information the CHS planners should bring to the course of action (COA) development phase of the Military Decision-Making Process (MDMP) are:

- Availability of aeromedical evacuation assets--flight windows, number of aircraft, patient configuration.
- Non-standard aircraft availability and how to trigger their involvement.
- Non-standard ground asset availability--especially cargo vehicles for a MASCAL situation and how to trigger their involvement.
- Additional medical assets from higher echelons such as treatment teams, ambulances, push packages of CL VIII.
- Locations of all available medical treatment units and proposed new locations
- Class VIII resupply plan.
- The need for litter bearer teams and special equipment for extracting casualties from buildings and rubble.
- The impact of civilian casualties on military medical resources. Often the requirement to treat civilian casualties will far outstrip the available military and civilian medical assets.

OBSERVATION 2: Care of civilian casualties.

DISCUSSION 2: According to **FM 90-10-1**, the commander is responsible for providing aid and protection to wounded civilians. How can CHS planners execute this doctrine and still provide world-class healthcare to soldiers? This is critical because "in this setting, United States public perception of inadequate or delayed medical care to U.S. service personnel could lead to loss of public support and an inability to continue the campaign." (**The Army Surgeon General, Army Medical Department Update**, Winter 1999.)

TTP: The commander should ensure civilian medical facilities, hospitals, and medical supplies are not destroyed, and ensure the concept of the operation will maintain the integrity of the civilian medical system. The CHS planner must know how to access the civilian health care system and must brief this plan to all personnel responsible for the health and welfare of the civilian population. This point is critical and illustrates the need to coordinate with the civil affairs unit to help in the coordination with the host nation and any international organizations or private volunteer organizations. This will facilitate the rapid transfer of civilian casualties from military medical units to the local healthcare system, enabling focus on wounded soldiers.

4. PREPARATION.

The preparation phase of any operation is critical to the success of the operation. Steps taken prior to mission execution can greatly impact the ultimate success or failure of the mission during the execution phase. MOUT operations are no exception.

OBSERVATION 3: Force Protection.

DISCUSSION 3: The most important action during the preparation phase is force protection. Force protection includes physical and force health protection methods. Physical protection includes items such as body armor, NOMEX suits, and eye protection. Force health protection includes field sanitation, vaccinations, and prophylaxis to prevent and ward off diseases. The need for ballistic protection is obvious; however, the need for force health protection is often overlooked. A soldier with dysentery and severe dehydration is just as combat ineffective as a soldier with a gunshot wound.

TTP:

Leaders must ensure all methods of force protection are executed. CHS planners should identify potential threats and, through command channels, employ appropriate countermeasures.

OBSERVATION 4: CHS Rehearsals.

DISCUSSION 4: Normally the CHS rehearsal is included in the combat service support (CSS) rehearsal, but pushed to the end and often rushed and inadequately executed. Additionally, the CHS rehearsals are not conducted at all levels, compounding the ultimate confusion when attempting evacuation of casualties. The rehearsal is not the time for medical units to coordinate and synchronize the CHS plan. The rehearsal validates the coordinated and synchronized plan, ensures continuity of supporting plans, and verifies the sustainability of the tactical plan within the maneuver commander's intent.

TTP:

Prior to the CHS rehearsal, a CHS synchronization drill should be held which includes the key leaders of the brigade's medical community. These key leaders include, but are not limited to, the brigade S-1, brigade surgeon, CHSO, forward support medical company commander, medical platoon leaders, forward support medical evacuation team leader, and medical representatives from the field artillery, the heavy team, division medical operations center, and the S-3 from the supporting level III hospital. These personnel identify and resolve problems to ensure a synchronized CHS effort. All ten medical functions must be addressed. Some key issues include:

- Ambulance exchange point (AXP) locations and contingency plans in case of compromise
- Ambulance linkup
- Evacuation routes
- Augmentation/reconstitution

- Priority of support
- Class VIII resupply

The end product of the synchronization drill is a CHS matrix, which will serve as a "road map" for everyone to follow during the CHS rehearsal and during execution of the plan.

➜ A separate CHS rehearsal should be planned and executed. All key leaders should attend to ensure complete understanding of the plan. In addition to the personnel involved in the CHS synchronization drill, key leaders include, but are not limited to, the following: brigade executive officer, brigade S-2, brigade signal officer, support operations officer, Air Force aeromedical evacuation liaison team (AELT) representative (if available), and maneuver company executive officers and first sergeants. The brigade executive officer ensures the CHS plan is integrated with the maneuver plan and also ensures proper resourcing of personnel and assets. The brigade S-1 is the rehearsal facilitator since he is the staff proponent for the CHS plan. The plan should be rehearsed by each phase (or event) of the operation by having each leader or representative discuss their actions during that particular phase (event), with focus on treatment assets available (with the understanding of the capabilities and limitations of those treatment assets), acquisition of casualties, means of casualty evacuation, and communications. The end product of the rehearsal is a fragmentary order (FRAGO) describing the finalized CHS plan and CHS synchronization matrix.

➜ The brigade signal officer should schedule and execute a communications exercise (COMMEX) to validate the communications plan. The CHS leaders must participate in the COMMEX. The COMMEX should include the expected distances (if tactically feasible) to determine if the communications platforms are adequate. If a receiving-transmitting (RETRANS) station is required, the COMMEX must rehearse this operation. The CHSO and brigade surgeon should ensure all CHS assets are able to communicate with each other, and the maneuver elements are able to call for evacuation. Additionally, as part of the communications plan, there should be alternate means of communication since radio communications become degraded in the urban environment. For CHS planners, this includes methods of marking casualty locations.

OBSERVATION 5: Medical supply tailoring.

DISCUSSION 5: Due to the high potential for specific wounds in the MOUT environment, CHS planners may consider altering medical supply assemblages, especially at the combat medic and treatment team level.

TTP:

The combat medic and the treatment team should pack Class VIII to attend to the high incident of MOUT-related wounds and injuries, turning over sick call items to the follow-on medical forces, and concentrating on initial trauma management. Items such as intravenous (IV) fluids, bandages, poleless litters, SKEDCO litters, and lightweight blankets can be distributed to combat lifesavers (CLS) and to the individual infantryman to facilitate timely self- and buddy-aid and evacuation to the CCP.

6. EXECUTION.

The ultimate success or failure of the mission is determined by how well it is executed by the units. Obviously the planning and preparation for any given mission are key to any subsequent success or failure. However, regardless of the plan or the level of pre-mission preparation, a soldier's or an officer's ability to execute the individual and collective tasks inherent in the mission clearly determine the likelihood of mission success. This task ability is a direct result of disciplined training and repetition. If medical personnel can execute their tasks to standard, then it is up to the CHS leaders to position their assets for success in supporting the force.

The critical aspect of CHS execution is the maintenance of communications with supported and supporting units. This facilitates CHS leaders in battle tracking, enabling the sequential execution of the CHS plan, and the ability to execute contingency plans, if necessary.

Following is an example of a successful CHS MOUT operation at JRTC:

OBSERVATION 6: Casualty evacuation.

DISCUSSION 6: At the JRTC, the maneuver battalion executed casualty evacuation very well due to the dynamic leadership of the junior officers and senior non-commissioned officers. As the battle in the city raged, the medical platoon leader of an infantry battalion, along with the first sergeant of one of the supported companies, effected a casualty collection point 100 meters north of the town. The medical platoon leader remained at the casualty collection point (CCP) with a radio to coordinate movement of evacuation assets. The first sergeant organized aid and litter teams to acquire casualties and conduct manual evacuation from point of injury to the CCP. A treatment team established their operations at the CCP to conduct initial trauma management, thus creating a battalion aid station (BAS) (-) (#1). Initially, the medical platoon leader used the attached M113 ambulances to evacuate casualties from the CCP to a BAS (-) (#2) established by the second portion of the medical platoon. As the battle matured, the forward medical element from the forward support battalion occupied the area, established as BAS (-) (#2), which allowed the medical platoon to consolidate forward at BAS (-) (#1). The M113 ambulances were then used to evacuate the casualties from within the city to the BAS. The casualties were treated and evacuated on wheeled assets to the forward medical element for additional treatment and subsequent evacuation to level III, primarily by air.

TTP:

This is an example of how casualty evacuation may be conducted. The first thirty minutes after wounding is the most critical to the casualty. Proper treatment, or lack thereof, within that time will determine if that casualty survives. The responsiveness of the leadership enabled casualties to be treated and evacuated in a timely fashion, resulting in a very low died-of-wounds (DOW) rate. The success can be directly attributed to the ability of the medical platoon leader to communicate with supported and supporting units.

OBSERVATION 7: Aid and litter teams.

DISCUSSION 7: The CHS planners developed a plan for and organized aid and litter teams with the mission of conducting manual carries of casualties from point of injury to the CCP to enable medical personnel to treat casualties. However, the aid and litter teams were inserted at the rear of the support convoy and were not able to execute their mission, forcing the impromptu formation of aid and litter teams, thus degrading the combat force.

TTP:

- CHS planners should ensure that medical assets, to include aid and litter teams, are properly integrated into the maneuver plan to provide maximum benefit to the combat force. Casualty evacuation by vehicle in a MOUT environment will be very limited; therefore, aid and litter teams should accompany the treatment team to effect timely evacuation to the CCP.
- Aid and litter teams should have a marking system to alleviate redundant searches and provide for more efficient and timely casualty evacuation, just as the infantry mark buildings that have been secured. Consider adopting the North Atlantic Treaty Organization (NATO) color-coded marking system which includes a yellow marker positioned at the point of entry to indicate a casualty in a particular building. This marking system indicates to the medics and aid and litter teams that casualties inside require treatment and evacuation.
- To facilitate the extrication of casualties in the MOUT environment, aid and litter teams should have

special equipment such as sledgehammers, axes, crowbars, ropes, special harnesses, pulleys, and ladders. These are additional items that must be procured, and a pre-combat check must be conducted prior to execution.

7. CONSIDERATIONS.

CHS planners must always consider the ten functions of CHS for all operations. For the execution of the MOUT fight, the following functions are particularly critical:

- Treatment
- Evacuation
- Command, control, and communications (C3)

As depicted in Figure 1, the function of C3 is paramount to a successful CHS plan. CHS planners will then only be concerned with the "balance" of treatment and evacuation. If evacuation is readily available and accessible, there is less of a requirement for treatment assets far forward. Consequently, if evacuation is limited, as would usually be the case for urban combat, then there is a greater requirement for treatment assets far forward. CHS planners must understand that this balance is constantly changing and must be prepared to take appropriate actions to meet the CHS challenges presented on the urban battlefield.✪

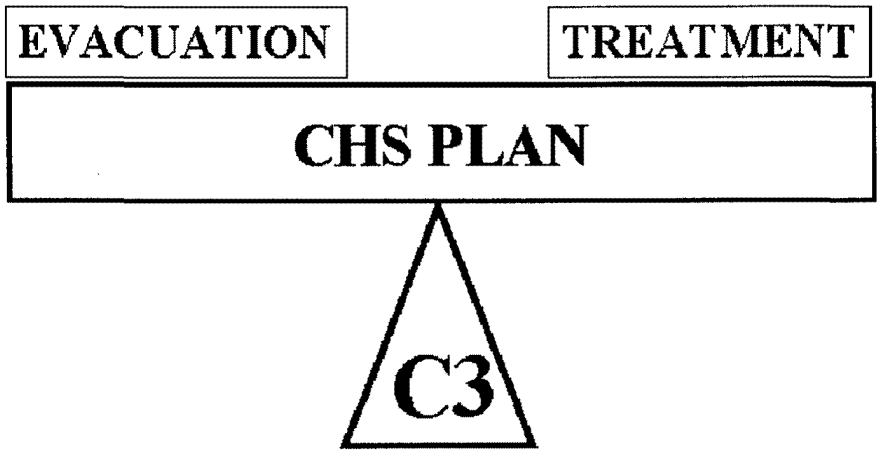


Figure 1

CHAPTER 9
FLIGHT OPERATIONS IN URBAN AREAS

AVIATION OPERATIONS ON URBAN TERRAIN

by CPT John White, Military Analyst, CALL
and CW3 Michael Scheel, Doctrine Writer, U.S. Army Aviation School

1. GENERAL.

The infantry, in **FM 90-10-1,** ***An Infantrymans Guide to Combat in Built-up Areas,*** has divided a deliberate attack on a city into five distinct phases: Reconnoiter the Objective, Move to the Objective, Isolate the Objective, Secure a Foothold, and Clear the Objective. Aviation units, attack battalions, cavalry squadrons, and assault battalions can expect missions during each phase of the attack.

Military operations on urbanized terrain (MOUT) also contain many challenges for Army aviation. Commanders, both ground and air, must keep these challenges in mind when planning for the use of aviation forces on urban terrain.

Aviation units conducting direct fire in urban terrain will find it differs greatly from open terrain. In open terrain, attack and cavalry aircraft can engage at maximum ranges, while engagements in urban terrain are usually at close range and in close proximity to friendly units.

2. DOCTRINAL BASE.

Currently there is no aviation doctrine that specifically addresses aviation operations on urban terrain. **FM 1-100,** ***Army Aviation Operations,*** gives aviation units less than a page on aviation urban operations (section 3-2e, page 3-4). The only other aviation manual that addresses urbanized terrain is **FM 1-112,** ***Attack Helicopter Operations*** (section 3-5c (1) page 3-19), which devotes one page to the topic; The infantry, on the other hand, has dedicated a single field manual-- FM 90-10-1. A draft manual, ***Aviation Urban Operations,*** from the joint Air, Land, Sea Application Center, was used as a source of information in this article.

3. PREPARATION.

OBSERVATION 1: Phase One: Reconnoiter the Objective

DISCUSSION 1: The first phase of a deliberate attack on an urban area is to thoroughly reconnoiter the objective. The ground unit commanders will conduct a thorough reconnaissance with their subordinate leaders to complete the attack plan. Aviation units with their speed, flexibility, training, and systems are an essential element of this phase.

Cavalry Squadron. This phase is where the cavalry squadron is most effective. Cavalry units provide the ground commander flexibility and speed in his reconnaissance. Cavalry units can expect route (air and ground), area, and zone reconnaissance missions during this phase. **FM 1-114,** ***Air Cavalry Squadron/Troop Operations,*** and **FM 17-95,** ***Cavalry Operations,*** do not specifically cover missions on urbanized terrain, but cavalry units can apply all the fundamentals found in both manuals to the urban environment. The draft manual, ***Aviation Urban***

Operations, provides the cavalry squadron with many urban-related reconnaissance tasks. Cavalry units conducting reconnaissance during this phase can conduct the following missions:

- ***Route Reconnaissance.*** Cavalry units can expect to conduct both air and ground route reconnaissance of routes that support the ground maneuver commander's plan. Air cavalry and ground cavalry troops must conduct a detailed reconnaissance that provides for aviation and ground integration and should include the following:

  - Determining the trafficability of the route, including routes through buildings, subterranean approaches, rooftops, elevated throughways, and walkways.
  - Reconnaissance of the terrain dominating the route, including buildings and subterranean approaches.
  - Reconnoitering any lateral routes. Inspect and evaluate all bridges, buildings, subterranean approaches, elevated throughways, and walkways.
  - Locating fords and other crossing sites on the route. Inspect and evaluate all overpasses, underpasses, culverts, and subterranean avenues of approach that can influence the route.
  - Locating and clearing mines and obstacles within the unit's capability.
  - Locating a bypass around all obstacles and contaminated areas.
  - Finding and reporting enemy forces that can influence movement on the route. Pay particular attention to buildings and towers that may provide cover and concealment to enemy forces.
  - Locating and reporting all elevated obstacles that may affect aviation movement--all wires, towers and tall buildings.
  - Assessing and reporting the impact of terrain and urban effects on sensor acquisition. Report on the effects of thermal crossover and ambient light conditions along the route

- ***Area Reconnaissance.*** Cavalry units may conduct an area reconnaissance of the objective or of areas leading to the objective. Units should pay particular attention to the following:

  - Composition and internal structure of buildings.
  - Avenues of approach including subsurface ingress and egress points.
  - Enemy positions on rooftops and other locations. Location of armored forces within and on the periphery of the urban area.
  - Locations of potential landing zones (LZ), forward arming and refueling points (FARP), and assembly areas (AA).
  - The location and composition of enemy counterattack forces.
  - The location and composition of obstacles in the approach to the city, within the city, and by-pass points.
  - Possible sites for the ground maneuver unit to establish a foothold during the attack.

- ***Zone Reconnaissance.*** Cavalry units may conduct zone reconnaissance during this phase of the operation. Cavalry units can also expect to conduct a terrain-oriented reconnaissance during this phase. Here the cavalry unit will identify all of the key features that could affect the movement to and attack on the city. Considerations for a zone reconnaissance should contain those of the route and area reconnaissance and the following:

  - Reconnoitering terrain not easily accessible to ground troops.
  - Rapidly checking key points in zone.
  - Locating the flanks of enemy forces encountered by air or ground scouts.

- Locating bypasses around obstacles and enemy positions.
- Providing security on the far side of obstacles while ground troops clear them.
- Coordinating joint air attack team or attack helicopter operations.

Attack Helicopter Battalion. While the attack battalion is not as well suited to perform reconnaissance as the cavalry squadron, it is an asset the ground maneuver commander can assign reconnaissance and security missions. Attack units can conduct route reconnaissance of the routes leading to and from the urban area (both ground and air), zone reconnaissance of the areas around the city, and area reconnaissance of key terrain or areas leading to the city. Attack units can also conduct hasty attacks on enemy units found during this phase of the operation. Attack units can provide security during insertion for scout and long-range surveillance teams.

Assault Helicopter Battalion. While reconnaissance of the objective is the primary mission of the cavalry squadron, the assault helicopter battalion has some key missions that support the reconnaissance effort. The assault battalion can insert ground scouts to overwatch the urban area; insert low-level voice intercept (LLVI) teams, ground sensors and ground surveillance radar teams; air move FARP to support the air cavalry mission; conduct air movement of troops and equipment to staging areas; and conduct command and control missions. Assault units can also assist in casualty evacuation (CASEVAC) and conduct combat search and rescue (CSAR).

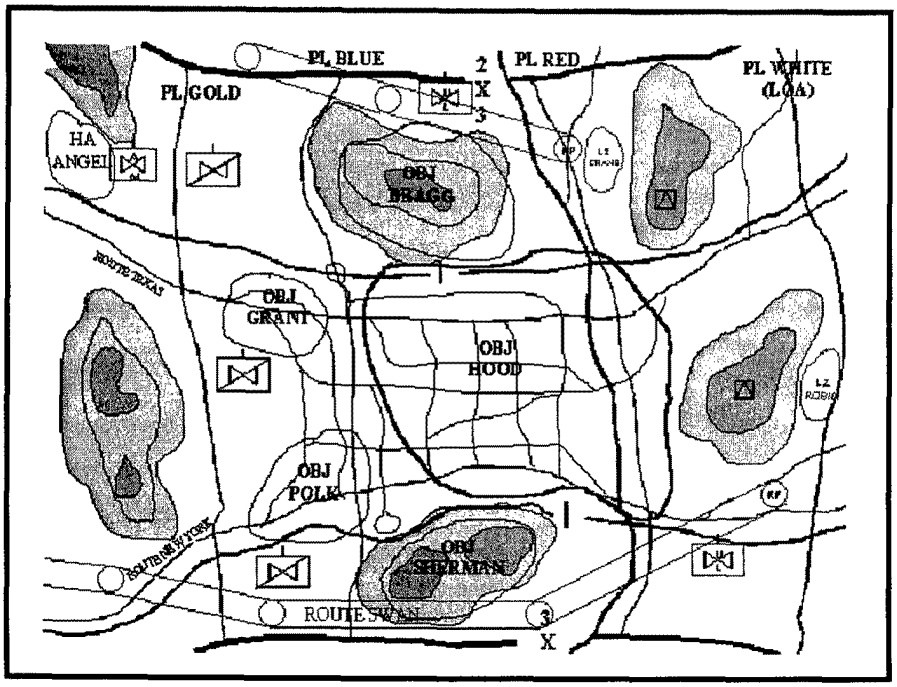


Figure 1
Phase One: Reconnoiter the Objective

OBSERVATION 2: Phase Two: Move to the Objective

DISCUSSION 2: The second phase of a deliberate attack on an urban area is to move or position forces for the assault. The ground unit commander will move his forces on covered and concealed routes to approach gaps or lightly held areas. Reconnaissance elements will continue to detect enemy forces, positions, and obstacles and prevent them from interfering with the attack plan. Enemy forces encountered are either bypassed or destroyed. Obstacles are bypassed if possible or breached.

Cavalry Squadron. Cavalry units can expect both reconnaissance and security missions during this phase of the operation. If the movement involves an air assault, the cavalry units may conduct an area reconnaissance of both air route and landing zone/pick-up zones (LZ/PZ). Cavalry units may conduct a screen of a moving force as the ground units move along their attack routes into the urban area. Cavalry units can conduct a force-oriented zone reconnaissance to locate and defeat enemy forces along the route or in areas that can influence the ground scheme of maneuver. Enemy positions are by-passed, destroyed by the cavalry, or fixed and handed over to the attack battalion for destruction. Cavalry units can continue to identify routes or confirm that previously cleared routes are still free of obstacles. Other missions that the cavalry unit may perform include air assault security and route security.

Attack Helicopter Battalion. If the mission involves an air assault, the attack units can expect to assist and facilitate the assault battalion's movement of units to the attack position. Attack units can provide LZ/PZ security and en route security, and can act as a reserve force to counter any threat to the air assault task force (AATF). Attack units can conduct hasty attacks on enemy units and positions identified by the cavalry. Attack units can perform an area reconnaissance to locate LZs/PZs, air route reconnaissance, or coordination of passage of lines.

Assault Helicopter Battalion. Assault battalions can best assist the ground commander during this phase. The assault battalion's speed and flexibility gives the ground commander the ability to rapidly reposition his forces to assault positions. Assault battalions can expect both air assault and air movement of supplies. Assault battalions can continue to insert and reposition ground scouts, deploy Volcano minefields to fix forces located by the cavalry squadron, conduct CASEVAC and CSAR, and conduct command and control (C2) missions.

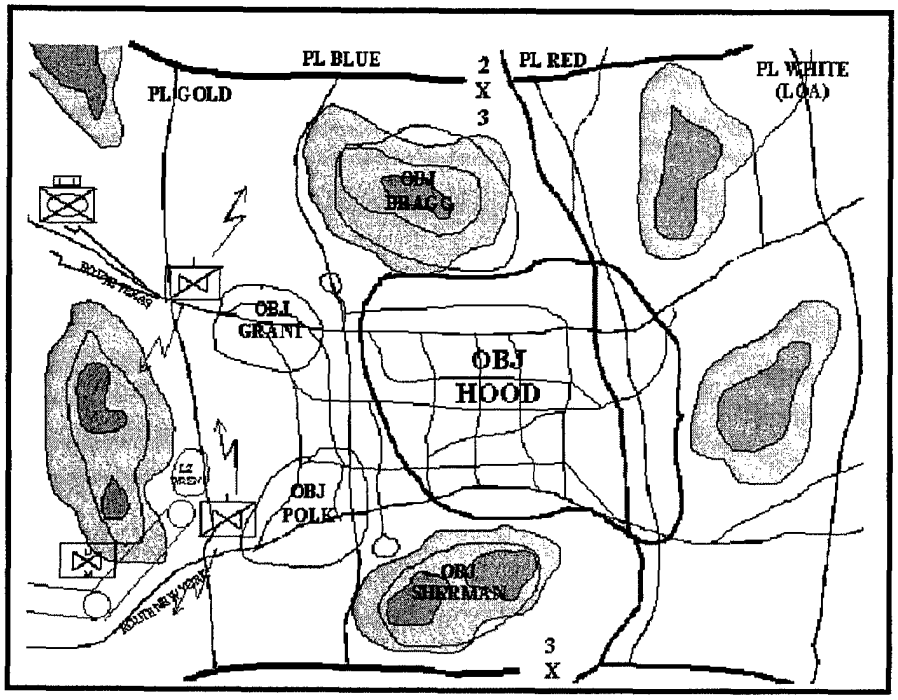


Figure 2
Phase Two: Move to the Objective

OBSERVATION 3: Phase Three: Isolate the Objective

DISCUSSION 3: The third phase of a deliberate attack on an urban area is to isolate the objective. FM 90-10-1 states "isolation of the objective involves seizing terrain that dominates the area so that the enemy cannot supply or reinforce its defenders."

Cavalry Squadron. During this phase of the attack, the cavalry squadron can assist the ground unit by isolating the objective and preventing the enemy from escaping or reinforcing the urban area. Cavalry units can expect to conduct a screen to provide early warning of incoming enemy forces that are attempting to reinforce the city. Cavalry units can develop the situation and destroy the forces or conduct battle handovers with attack aviation. Cavalry units may have the mission of area security. FM 17-95 states that area security missions are conducted to "deny the enemy the ability to influence friendly actions in a specific area or to deny the enemy use of an area for his own purpose." Area security missions may be offensive or defensive in nature and may entail establishing and occupying a 360-degree perimeter. Area security operations may focus on friendly units, the enemy, or a combination of the two.

Attack Helicopter Battalion. The attack battalion is best suited to this phase of an attack on a city. Attack units can assist the ground maneuver commander in isolating the objective and in preventing enemy forces from reinforcing or resupplying the urban area. FM 1-112 states, "The attack helicopter battalion (ATKHB) is well-

suited for employment on the outskirts of an urban area, attacking forces that are attempting to bypass, envelop or reinforce the built-up area." Attack units can expect to conduct both deliberate and hasty attacks on enemy forces around the city or any enemy counterattack forces attempting to counterattack into the city. The attack units can expect battle handovers from the cavalry squadron. They can also contribute to the isolation of the city by performing security missions, screening areas around the city, or conducting an area security mission in conjunction with the cavalry squadron. Attack units can augment the squadron or conduct a screen that supports the isolation of the city.

Assault Helicopter Battalion. Using conventional air assault techniques, the assault battalion can assist in the isolation of the objective. Air assaults to the flanks, rear, and forward of the urban area can assist in the isolation and prevent enemy forces from reinforcing or retreating from the city. Volcano minefields, placed by assault units, can further isolate the objective and prevent enemy movement. Assault units can move artillery, anti-tank guided missile crews, and mortar crews to further isolate the objective and provide support to the attacking force. Assault units can expect to conduct CASEVAC and CSAR during this phase.

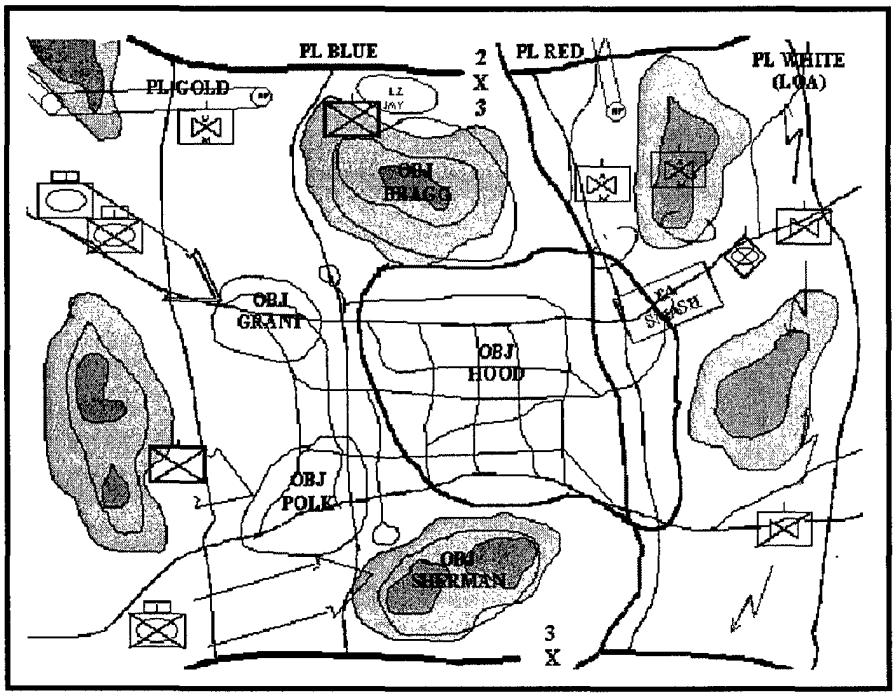


Figure 3
Phase Three: Isolate the Objective

OBSERVATION 4: Phase Four: Secure a foothold.

DISCUSSION 4: The fourth phase of a deliberate attack on an urban area is where the ground maneuver commander begins his assault on the city. FM 90-101-1 states, "securing a foothold involves seizing an intermediate objective that provides cover from enemy fire and a place for attacking troops to enter the built-up area." Aviation units can greatly assist the ground unit commander during this phase.

Cavalry Squadron. Once the foothold area is designated, cavalry units can conduct an area reconnaissance of that area to determine possible enemy forces, weak points, flanks, and enemy composition. Cavalry units can conduct battle handovers with attack units so they can mass their fires and assist the ground units with establishing a foothold. Cavalry units will continue to conduct area security, reconnaissance, or other security missions to maintain the isolation of the urban area.

Attack Helicopter Battalion. The attack unit's fires can greatly assist the ground unit commander in securing a foothold in the urban area. Attack units can occupy attack by fire (ABF), support by fire (SBF) or battle positions (BP) to provide suppressive fires that support the friendly breech point. Enemy armor on high-speed avenues of approach into the city are likely, and the attack unit's precision fires can destroy this asset. A joint air attack team (JAAT) may be used to destroy armored forces securing the breech point. Attack units can coordinate with the JAAT and provide laser identification of targets. Attack units can also continue to provide security for assault units that transport ground forces to the area and continue to conduct reconnaissance, security, and hasty attacks to maintain the isolation of the city.

Assault Helicopter Battalion. The assault helicopter unit continues to conduct air assaults to further isolate the objectives adjacent to the urban area. Light infantry may be inserted to assist in securing the foothold. Aircrews must maintain close coordination with the ground units during this phase. Air assaults in close proximity of the urban area require extensive coordination with ground units to suppress enemy air defense fires. Aircrews can expect air defense fires from both the ground and buildings that overwatch the air avenues of approach. Ground units must suppress these fires to enable the assault units to land. Assault units can insert sniper or counter-sniper teams, assist civil affairs movement, assist psychological operations forces, conduct command and control missions, as well as conduct CASEVAC and CSAR.

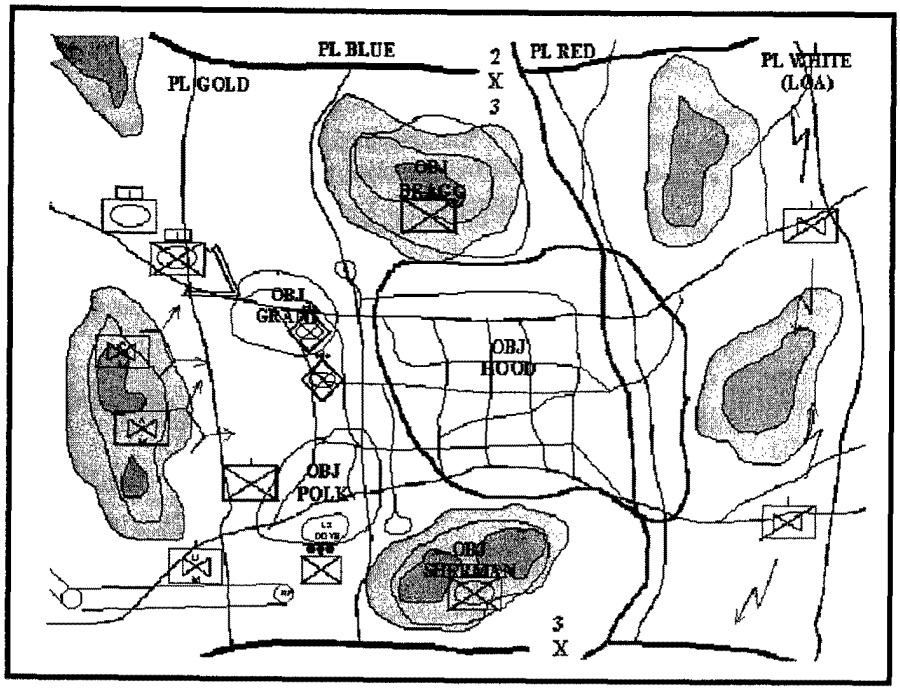


Figure 4
Phase Four: Secure a Foothold

OBSERVATION 5: Phase Five: Clear a Built-up Area

DISCUSSION 5: This phase of the operation is the most dangerous for both ground and air units. The phase is characterized by systematic house-to-house fighting as ground forces attempt to force the enemy from the city. Aviation units are best suited to continue the isolation of the city, but units can also expect to support the ground commander's scheme of maneuver within the city.

Cavalry Squadron. Cavalry units can expect to continue the isolation of the urban area and may also conduct reconnaissance and security operations in the city in support of the ground units in contact. Air operations in the city are best performed by small units/lead wingman teams. Cavalry units that assist units in contact must have an understanding of the weapons system's effectiveness against urban targets. Units in contact must accurately mark their location and the target's location during both day and night conditions. Cavalry units can continue to screen outside the city to prevent reinforcements from arriving or the enemy resupplying the city. Cavalry units can also conduct reconnaissance within the city that supports assault units repositioning forces or conducting aerial resupply.

Attack Helicopter Battalion. This is the most dangerous phase of the operation. Attack forces can expect to assist units in contact by performing deliberate and hasty attack missions with units in contact. These missions are

best carried out by teams of attack aircraft under control of the unit in contact. The risk of fratricide is great, and units in contact must have effective means of identifying targets as well as themselves. It is critical that the attack units have communications with the unit in contact. Aircrews must thoroughly understand the rules of engagement and the effects of their weapons systems. Aircrews can expect short engagement ranges and must limit collateral damage. Attack units may also support assault units by providing security as they move and reposition throughout the city or conduct aerial resupply missions. Attack units will also continue to provide attack support to keep the city isolated and prevent enemy forces from escaping or reinforcing the city.

Assault Helicopter Battalion. Casualties to ground forces are extremely high and the consumption of ammunition is also high during this phase. Infantry units can expect to expend great amounts of small-arms ammunition, mortar ammunition, and grenades. Assault units can expect to conduct resupply operations and air movement of troops as replacements for the wounded. Landing zones and pickup zones may be located outside the urban area or, as the fighting progresses, inside the city. Assault units can expect LZs in large parking lots, city parks, athletic fields and even on buildings. Landing zones on buildings may already exist, or the crew may be required to land next to a building or conduct fast rope operations to the roof tops. As the fighting moves into the city, assault units may conduct air assault operations to clear pockets of resistance throughout the city. Fighting in urban terrain is intense and is characterized by high casualties. Assault units can expect CASEVAC missions and must be available for CSAR.

TTP:

- Incorporate these missions into training scenarios at Home Station and include fighting in the urban environment into all unit SOPs.
- Train as teams in conducting attacks within close proximity to friendly units. Develop strong unit SOPs that cover target identification and marking, friendly units' identification, and weapons effects on urban targets.
- Train on reconnaissance in the urban environment.
- Assault units must coordinate closely with ground units to provide suppression of enemy air defense (SEAD) fires to support air assault operations.
- Assault units can expect extensive aerial resupply and air movement of replacements due to the high volume of casualties and high demand for ammunition that characterizes urban fighting.

4. PLANNING.

OBSERVATION 6: Mission Planning Factors

DISCUSSION 6: Current and future/draft aviation doctrine identifies planning factors and challenges aviation units face when conducting operations on urban terrain. Both ground and air commanders must realize these factors exist and consider them when planning aviation mission in the city. FM 1-112 contains the following list of planning factors:

- Urban areas directly affect weather, especially wind patterns.
- The numerous buildings and streets and few map references complicate navigation over built-up areas. Flight routes over urban terrain may increase employment time and fuel consumption.
- Buildings limit maneuverability and engagement ranges.
- Urbanized terrain may limit FARP size, location, and response times.
- Extensive urban sprawl and high buildings degrade communications and may require extensive relay and retransmission sites.
- Urbanized terrain masks intelligence and electronic warfare acquisition capabilities.
- Landing and pickup zones may be severely limited; operations from rooftops may be required.

FM 1-100 also lists challenges that aviation units face when operating on urbanized terrain.

- Aviation units will face increased hazards to flight operations--towers, wires, antenna hazards.
- Foreign object damage to aircraft from flying debris.
- Operations in areas with a high concentration of civilians.
- Collateral damage of property.
- Night-vision system degradation due to city lights and thermal imagery challenges in the city.
- Degraded communications.
- High risk to aircraft from close-range, small-arms fires complicated by the close proximity of both friendly forces and non-combatants.
- Degraded visibility and possible toxic fumes when flying near or through smoke and dust.

Another list of rules for aviation operations in urbanized terrain is found in the unpublished draft of **FM 1-130, *Army Aviation Operations in MOUT***. This manual contains the following "rules to live by" for aviation MOUT.

- **Avoid urban areas.** Operate in urban areas only when the mission dictates it. When the mission requires urban operations, avoid unnecessary flight over built-up terrain.

- **Get in and out quickly.** Minimize time spent over urbanized terrain. Ingress and egress the area by routes which minimize the duration of flight over urbanized terrain. Fly at medium to higher airspeeds, depending on altitude and hazards, to decrease the opportunity for engagement by ground weapons.

- **Do not be predictable.** Alternate flight routes and checkpoints. Plan egress and contingency routes, rally procedures, and back-up navigation techniques.

- **Minimize your signature.** Take maximum advantage of flight profile options and existing conditions to lessen the risk of acquisition and engagement. Plan and execute the mission with maximum emphasis on aircraft signature reduction.

- **Know the current situation.** Insist on the most current information available regarding friendly forces, the enemy, and hazards. Update information prior to takeoff, en route to the objective, and continuously during the mission.

- **Establish communications with all players.** Determine net information for all participating and supporting elements. Establish communications with ground maneuver elements as soon as possible en route to the objective. Understand the ground commander's intent and current situation, and coordinate all actions at the objective. Establish and maintain continuous contact with airspace authority for the battlespace you are in or transitioning through.

- **Think before you shoot.** Fratricide prevention is paramount. Develop a clear understanding of the friendly situation before you engage targets. Ensure identify friend and foe (IFF) and aircraft survivability equipment (ASE) is working, and know the purpose and demarcation lines for IFF and ASE. Communicate clearly with all elements, and consider your weapons limitations and effects prior to trigger pull.

TTP:

- Incorporate these planning factors in unit SOPs and consider them when planning for aviation operations in urban terrain.
- Ensure aviation liaison officers know these factors and can assist the ground unit commander in planning for aviation in the city.

OBSERVATION 7: Area Sketch

DISCUSSION 7: The area sketch offers both the ground commander and the aircrew a means of identifying both friendly and enemy locations. The sketch is an excellent planning tool and an excellent tool to use for unit coordination. The area sketch is best used for smaller towns and villages, but can be applied to a certain engagement area or specific area of operations in a larger city. The area sketch simply captures the natural terrain features, man-made features, and key terrain in that area, and designates a letter or numeral code to each. Buildings are coded and each corner of the building is coded. This gives the aircrews an accurate way to either target specific buildings as requested by the ground unit commander or to identify friendly locations. Units must ensure they are both using the same area sketch to affect coordination.

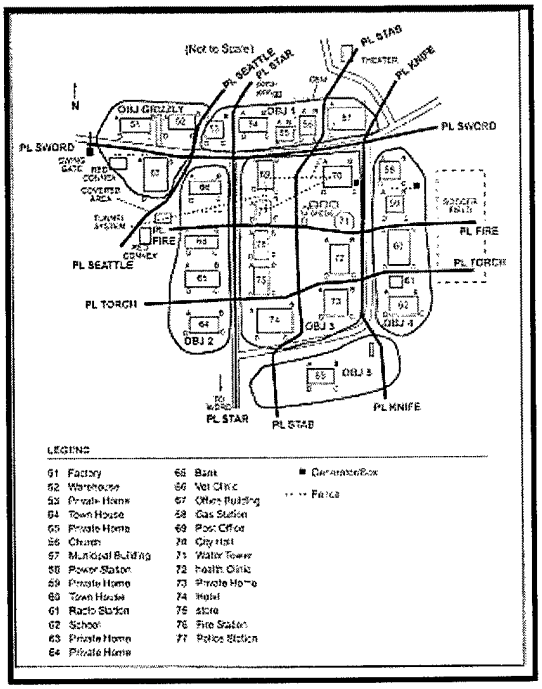


Figure 5

OBSERVATION 8: Aviation route planning and navigation.

DISCUSSION 8: Navigation and route planning on the urban environment poses many challenges to the aircrew. Routes and navigation up to the city are usually planned and executed in relatively open-wooded terrain. Once in the city or over the urban sprawl surrounding the city, the navigation challenges become apparent. Aviation units must develop strong TTPs to navigate in the city.

Navigation in the city can be overwhelming because of the over abundance of visual cues. Aircrews must train to distinguish cues that are pertinent to their route. Aircrews can use vertical and linear references to distinguish en route checkpoints. Radio towers, tall buildings or unique city features (parks, malls) can assist the aircrew with their navigation. Towers and buildings are easily visible from many miles away and give the aircrew a reference on their position. Linear cues such as roads, highways, and rivers through a city can also assist the crews with navigation.

If possible, obtain the proper maps with the proper information on them. This is critical for both navigation and synchronization with the ground maneuver elements. Units can use an area sketch for target areas or objectives. The area sketch simply identifies the natural and man-made features in the area and codes them with letters, numbers, or code words. Identification of both targets and friendly unit location is much easier with both air and ground units using the same area sketch.

Units can convert civilian maps to the military grid reference system (MGRS) by a set formula that converts the scale of the map to a system of grid lines that coincide with the 1:50,000 scale. The civilian maps also include names of streets and key buildings, locations, and terrain within the city. Once aircrews are familiar with an area, they can use local landmarks for navigation.

Navigation in the city is also affected by the abundance of lights which degrade night-vision devices. Aircrews must have a system of routes that follow easily identifiable features. Units must plan for threat en route planning and attempt to fly in the lowest threat areas or areas that are under the control of friendly units.

If there has been much fighting in the city, the familiar landmarks may disappear, become covered with rubble, or obscured by smoke and dust. Wide spread conflagration can affect instruments and degrade night-vision devices. Should a city's drainage system and water supply be damaged, large areas of the city may be under water, making navigation even more difficult.

The "spider web" concept found in the Air, Land, Sea Application Center's draft manual of ***Aviation Urban Operations*** provides the unit and aircrews with a simple-to-construct route structure throughout an urban area. The air control points (ACP) are placed on easily identifiable features and then linked together to form the route. The spider web concept provides for many different routes and variations of routes using established checkpoints. This ability to vary routes adds unpredictability to flight missions.

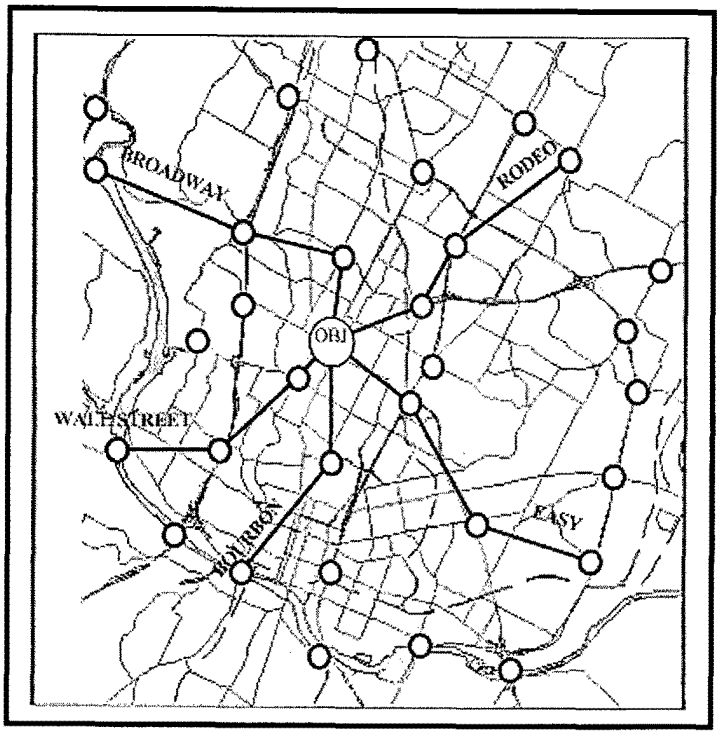


Figure 6
Spider Web Route Structure

TTP:

- Area sketches and civilian maps are a way to assist navigation and target/friendly unit navigation.
- The spider web concept is a way to portray a route structure in the city that is easily used or changed and is unpredictable to enemy forces.

OBSERVATION 9: Landing Zone (LZ)/Pickup Zone (PZ) and Forward Arming and Refueling Point (FARP) Selection

DISCUSSION 9: Terrain in the urban environment is severely limited, and suitable LZ, PZ, and FARP locations are rare. Aviation units, especially assault and lift units, can expect to land in the city to conduct air movement/air assault operations, resupply, and casualty evacuation. A high percentage of casualties and a high consumption rate of ammunition characterize fighting in the city by ground units. Lift aircraft provide the fastest way to resupply units, replace lost soldiers, and evacuate casualties.

Aviation units must take a detailed look at the city and locate potential sites for these critical elements of attack, assault, and cavalry aviation. Aviation planners must look at all available products to find suitable sites for LZs, PZs and FARPs. City maps, overhead imagery and even reconnaissance flights will help the unit select proper sites. Units should consider the use of city parks, parking lots, stadium fields, and athletic fields. Major highways and large multi-lane roads offer potential LZ, PZ, and FARP sites if civilian traffic is not using them. Units may even be forced to use rooftops as LZs if the mission dictates. Lighting at the LZ is also a factor. If the city is not blacked out, the city lights will affect the night-vision goggles used by the pilots. If the LZ is large or has multiple turns, aviation planners may consider using pathfinders or air traffic services to control the PZ or LZ.

When using such man-made sites for landing, units should make a detailed study of the area. This study should look for hazards to aviation operations that are found at the site. Antennas, light poles, debris, wires, and enemy locations all are hazards at the landing site. Winds may change direction because of buildings and built-up areas. Tall buildings also may funnel winds through the streets causing a much higher wind condition than briefed.

Single LZs large enough to support multi-ship operations may not be found in the city. This lack of large LZs may force units to use multiple LZs in close proximity to each other. Units must ensure strict flight discipline and coordination when using multiple LZs. Control measures, both positive (air traffic control, pathfinder) or procedural (routes, limits of movement), must be established to control the aircraft as they work in close proximity.

Rooftop LZs may offer the only place to insert troops in a critical area. Some buildings have an established LZ, but many do not. Aviation and ground unit commanders can plan for the use of existing rooftop LZs. Aircrews can remain light on the skids/wheels or hover over rooftops for insertion, or use rappelling or conduct FASTROPE insertions. Rooftops contain many hazards to flight including antennas, wires, smokestacks, and exhaust vents.

LZs and PZs close to enemy forces must have suppressive fires to allow aircraft to land. Attack aviation can expect an air assault or air movement security mission to protect the lift aircraft. AH-64 aircraft can use the 30mm gun to suppress enemy air defense assets on rooftops and also flechette rockets to clear enemy air defense from rooftops. Friendly units on the ground must also suppress nearby buildings that may contain threats to landing aircraft.

TTP:

- Urban terrain does not offer many suitable LZ, PZ, and FARP sites. Units must plan and do a careful selection process. Units must consider any open area in the city as a potential site and identify the hazards associated with it
- Close coordination with attack aircraft, units on the LZ, and assault aircraft are necessary to suppress air defense fires in the LZ.

OBSERVATION 10: Direct fire planning

DISCUSSION 10: Urban terrain is severely canalized which causes severely limited fields of fire. The streets tend to limit target views to a narrow corridor along the street or from high angles over the buildings. Enemy forces may utilize the near sides of buildings, putting them out of view of the attack helicopters. Engagements of rooftop targets can come from all angles. Expect targets to move rapidly from cover to cover and require quick engagement.

Attack aircraft can operate from battle positions (BP), attack-by-fire positions (ABF) or support-by-fire positions (SBF). Areas within the city that are secured by friendly forces may support stationary fire from BPs, ABFs, and SBFs. The threat to aircraft is lessened when firing from the friendly side of the battlefield. When forced to fight and fly over areas where the enemy has not been cleared, the risk to aviation forces becomes

extremely high. Aircrews can expect to be engaged from both the ground and from the upper floors of buildings. When these conditions exist, it is better to keep the aircraft moving and make it a harder target to hit. Aircrews may consider conducting running fire engagements from an initial point (IP), engaging the target, and returning to a safe area to regroup for another attack. The lead wingman concept is excellent for this type of attack where the wingman can suppress the target after the lead man's engagement and "cover his break." Coordination should be made with the ground units to suppress the enemy's fire to protect the aircraft during their attack. The 30-mm on the AH-64, .50-cal on the OH-58D, and the 2.75-inch rockets fired by both aircraft are ideal for this attack.

Precision-guided weapons, such as the Hellfire missile, can be used in congested urban terrain; however, their capabilities are limited. Maximum stand-off ranges may not be available, and the altitude the aircraft must obtain to see over buildings and structures masking the target may put it at great risk. Aircrews can expect short-range Hellfire engagements and may have to reposition many times and seek out the best angle for attack.

Aircrews can plan for both running fire and hover fire engagements. Running fire generally offers better aircraft survivability and keeps the aircraft from becoming a stationary target. If hovering fire is used, aircrews can unmask both laterally and vertically from behind the cover.

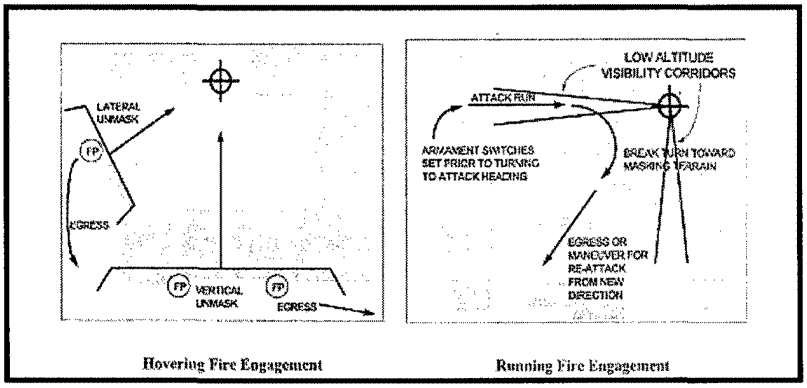


Figure 7

When using running fire, aircrews must prevent overflight of friendly units and ensure their attack runs do not produce casualties to friendly units from their fires or effects from their fires.

Aviation planners must consider different methods of targeting the enemy. Most engagements will come from attack units supporting ground units in close contact with the enemy. Aviation and ground units must have strong and workable SOPs that deal with urban area targeting. The Air, Land, Sea Application Center's draft manual of ***Aviation Urban Operations*** gives both ground and aviation units three common techniques to urban targeting.

TTP:

- The urban targeting grid system divides up the urban area into specific grid sectors. Each building should be identified by a number or letter. Planners may also code the corners of the buildings to facilitate rapid fires. The target handover to the aircrew is simply the location from the grid system and a brief target description. Both the aircrew and the ground unit must have the same urban targeting grid for effective coordination to occur.

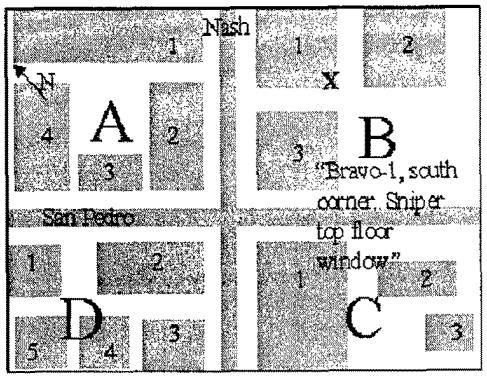


Figure 8
Urban Targeting Grid

- Bulls-eye targeting gives the aircrew a specific point and reference target locations from that point. The "bulls-eye" must be a point that is easily recognizable for both the unit in contact and the aircrew flying the attack mission. The bulls-eye may be pre-planned or given to the aircrew on-site. As long as the aircrew and the ground unit are working from the same map or both are familiar with the area, bulls-eye targeting is very effective. The target handover to the aircrew is simply a distance and direction from the bulls-eye and a target description.

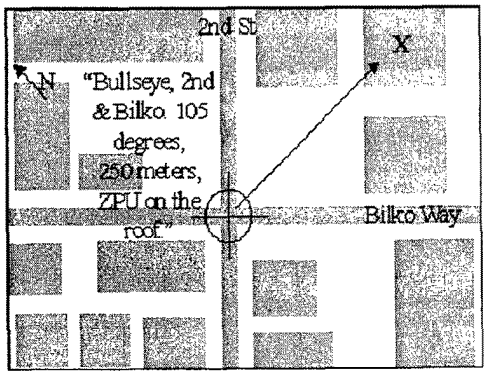


Figure 9
Bulls-eye Targeting

• Target reference points (TRPs) are tools that both air and ground units can use to coordinate fires. TRPs are easily recognized points on the ground (either natural or man-made) used to initiate, distribute, and control fires. TRPs are designated by maneuver leaders to define sectors of fire or observation. TRPs can also designate the center of an area where the commander plans to converge or distribute the fires of his weapons rapidly. The target handover is similar to the bulls-eye targeting: a distance and direction from the TRP and a brief target description.

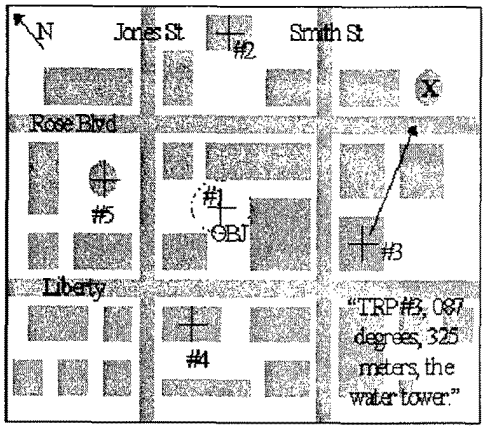


Figure 10
Target Reference Points

OBSERVATION 11: Aviation Weapons Effects

DISCUSSION 11: Attack and cavalry aircrews are all familiar with what their weapons systems will do to their primary targets. Aircrews are trained to select the appropriate weapon system for the appropriate target. Aircrews know that if the target is a tank, it must be destroyed with either a tube-launched, wire-tracked, optically tracked weapon (TOW) or a Hellfire missile. Lightly skinned armored vehicles or trucks are engaged with 2.75-inch rockets or 30-mm or .50-cal guns. Operations in urbanized terrain present the aircrews with a much different target array. Aviation units must know the effects of their weapons systems on these targets.

The Air, Land, Sea Application Center's draft manual, ***Aviation Urban Operations,*** gives aviation planners a list of considerations when choosing a weapons system for urban targets.

• Urban targets are usually hard, smooth and contain flat surfaces. Rounds fired from the air strike the surfaces at an angle and tend to ricochet. This can cause impact-fused weapons to not detonate. Aircrews must consider this ricochet risk when engaging in close proximity to friendly units.

• Targets rarely present themselves for extended periods of time. Aircrews can expect short target exposure and rapid engagements. Aircrews must be constantly on the lookout for targets and be ready to engage rapidly. Expect enemy-held structures to be covered by fire. Ground units can suppress the enemy fires while the attack helicopters unmask to engage.

• Expect dead space within urban areas. Large, tall buildings and narrow streets create dead space that aircrews cannot engage.

- Smoke from burning buildings, dust from the city, shadows, and rubble may mask targets.

- Engagements may be in close proximity to friendly units. Ground and air units must have specific and workable SOPs for marking both targets and friendly positions. The risk of fratricide is extremely high from direct engagements on the wrong target, from ricochet, or from effects from rockets or missiles.

- If enemy units are in buildings, the buildings must be attacked first to get to the soldiers inside. Weapons that can break through walls must be used.

The weapons found on attack aircraft are designed to destroy vehicular targets and troops in the open. These weapons systems are also effective in the urban environment. TOW, Hellfire, and 2.75-inch rockets will produce effects on structures found in the city. Precision-guided munitions, TOW, and Hellfire give the aircrew the ability to target specific windows, floors, or sections of a building. Rockets also produce effects on structures and are also effective on troops in open streets. HE rockets produce the best effects on buildings, but aviation planners should consider the use of other types of rockets. Smoke rockets can be used to mask friendly movement, and flechette rockets are ideal for clearing rooftops or attacking troops in the open. The gun systems on attack aircraft are also effective when used to clear rooftops and troops in the open, or fired on the front of buildings and into windows.

Aviation planners should consult the ***Joint Munitions Effectiveness Manual (JMEM)*** for information regarding the effect of weapons on targets. This manual contains information on the type of weapon to use and in what quantity to achieve the desired results. Aircrews should also be familiar with this information to determine what weapon to use on the appropriate target.

5. EXECUTION.

There are unique aviation considerations during urban combat. Detailed planning is vital to the effective employment and continued survival of aviation in the urban environment. Armed helicopters can carry a mix of weapons. The commanders must choose the weapons to use on a specific mission based on their effects on the target, employment techniques, and the target's proximity to ground forces. Planners must consider proportionality, collateral damage, and non-combatant casualties.

OBSERVATION 12: Hover-fire engagement is not recommended in urbanized terrain.

DISCUSSION 12: During a recent rotation to the JRTC, the OPFOR shot down four aircraft that were using hover-fire techniques to engage OPFOR soldiers shooting from a building. Because of the target masking common in urban terrain, the aircrews had to maneuver within 2,000 meters to get "eyes on" the target.

Continuous movement minimizes exposure time to surrounding terrain and ensures survivability. If the enemy has established a stronghold in the urban area, the risk to aviation assets dramatically increases. The close infantry battle will become increasingly difficult to support with helicopters.

As enemy elements seize key features (particularly vertical structures), the air defense threat escalates within the urban area. Helicopter movement must be swift and unpredictable. The devastating fires of the OH-58D and AH-64 provide tremendous advantages in any engagement.

TTP: A unit that recently trained at the JRTC uses a technique it calls "close combat attack (CCA)." This is a unit-specific SOP technique that could be used by other aviation units. CCA is a procedure that is very similar to running or diving fire. CCA procedures ensure aviation fires destroy the enemy with minimal risk to friendly forces. By conducting CCA maneuvers, aviation attack teams of two or three OH-58Ds or AH-64s are able to engage targets with a greater degree of accuracy and protection than they could with hover fire.

When a maneuver unit requests armed helicopter support, the helicopter attack team air mission commander coordinates with the leader on the ground who can best identify the target. The two leaders positively identify the target and coordinate the attack timing and direction. The aircrews fly at nap-of-the-earth (NOE) altitudes at airspeeds of 80-100 knots. Approximately 300-1000 meters out from the target, the aircrews execute a cyclic climb to an altitude of 100-300 feet. At the specified altitude (threat/terrain dependent), the aircraft is "nosed over" and the aircrews immediately engage the target with 2.75-inch rockets or machine-guns.

After employing their weapon systems, the aircrews have three options available to them: break left, break right, or fly straight-ahead. If the aircrew breaks left or right, they are exposing the larger side profile of the airframe to enemy fire. If the aircrew flies straight-ahead, they may fly through the effects of the ordnance they just fired or they may overfly previously undetected enemy forces. Depending on the tactical situation, it is probably best for the aircraft to break hard to one side and return to NOE flight immediately.

Each of these CCA engagements is executed as part of a team. The fires from the second helicopter as it begins its firing run aids the first helicopter's egress from the target area by forcing the enemy to keep their heads down. To work properly, this technique requires aviators and soldiers to understand it and drill it frequently. CCA should not be conducted without positive identification of friendly or enemy forces.

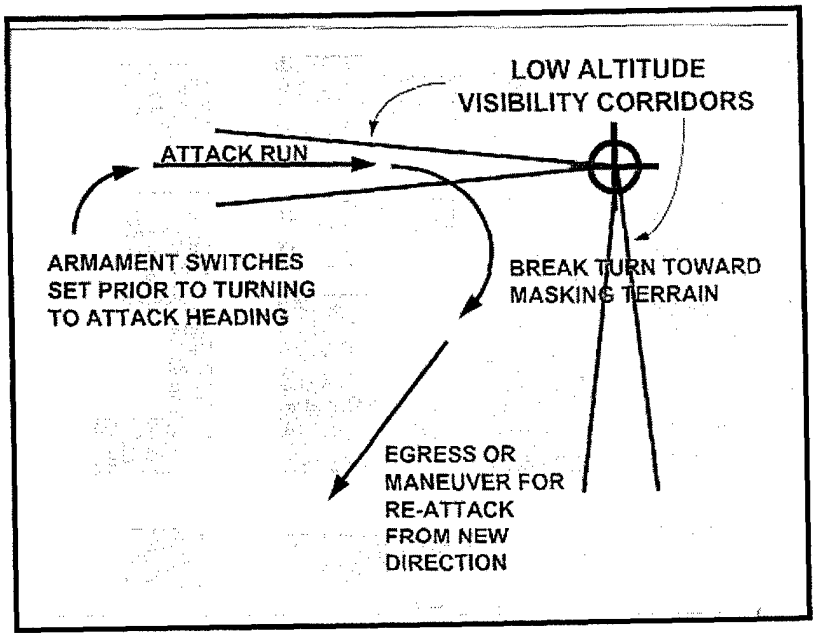


Figure 11
Close Combat Attack

OBSERVATION 13: Attack aviation support to ground maneuver requires some simple, clearly understood procedures.

DISCUSSION 13: A scout/weapon team was ordered to launch immediately and conduct a hasty attack to support an infantry company that was attempting to destroy an enemy stronghold in the city's railroad station.

The infantry company was conducting a movement-to-contact under the cover of darkness when it came under heavy machine-gun fire. When the OH-58D/AH-64 attack team arrived on station, its task was to suppress enemy fire from the railroad station. This would allow the infantry unit leader to break contact with the enemy and reposition his platoons.

Throughout the mission, there was excellent air-to-ground communications. The aircrews engaged the enemy on the second floor of the railroad station with 125 rounds of 30-mm high explosive (HE) and numerous 2.75-inch rockets. Timing of the attack was perfect; the infantrymen were ready to move just as the helicopters began to fire. The results were dramatic: 11 enemy killed in action and 2 wounded, with only 3 friendly wounded. The infantrymen were able to reposition to a much better position and continue their attack.

Effective coordination between light infantry and attack aviation can maximize the capabilities of attack helicopters while minimizing the risk of fratricide.

TTP: This unit developed some techniques and procedures for enhancing the effectiveness of coordination between light infantry engaged in close combat and attack helicopters conducting hasty attacks in the same area. The key to success for enhancing air-ground coordination and the subsequent execution of the tasks involved begins with standardizing techniques and procedures. The endstate is a detailed SOP between air and ground maneuver units that addresses hasty attacks in a close combat situation.

Effective integration of air and ground assets begins with the ground maneuver brigade. When the aviation task force receives a mission to provide assistance to a ground unit engaged in close combat and planning time is minimal, the initial information provided by the brigade should be sufficient to get the aviation attack team out of its own assembly area. The assembly may be in a holding area in the sector of the infantry battalion involved in close combat. The holding area must be a concealed position that allows for final coordination between the attack team leader and the infantry unit leader before the attack begins. It must be located within frequency modulated (FM) radio range of all units involved. Alternate holding areas, along with ingress and egress routes, must be designated if occupation is expected to last longer than 15 minutes.

En route to the holding area, the attack team leader contacts the infantry battalion on its FM command net to verify the location of the holding area and to conduct additional coordination. The attack team leader receives information from the infantry battalion on the enemy and friendly situations. The battalion also verifies communications information regarding the unit in contact. By this time, the infantry battalion has contacted the infantry unit leader to inform him that attack aviation is en route to conduct a hasty attack.

NOTE: Following is an example of a TTP being reviewed for possible inclusion into future doctrine.

AIRCRAFT	INFANTRY
"Bulldog 06 this is Wolfpack 48, over"	
	"Wolfpack 48 this is Bulldog 06, L/C (loud and clear) over"
"Bulldog 06, Wolfpack 48 en route to HA (holding area) at grid VQ 98454287, request SITREP (situation report) over"	
	"Wolfpack 48 this is Bulldog 06, enemy situation follows, break, platoon size element has Hardrock 36 pinned down at grid VQ 96204362, break, contact Hardrock 36 on FH (frequency hopset) 478, over"

Upon receiving the required information from the infantry battalion, the attack team leader drops to the infantry company's FM command net to conduct final coordination before launching his attack. Coordination begins with the infantry company commander and ends with the leader of the lowest level unit in contact.

AIRCRAFT	INFANTRY
"Hardrock 36 this is Wolfpack 48 on FH 478, over"	
	"Wolfpack 48 this is Hardrock 36, L/C over"

The attack team leader provides the infantry unit leader with the attack team's present location, which is normally the attack team holding area; the composition of the attack team; the armament load and weapons configuration; total station time; and the night-vision capability of the attack team.

The composition of the attack team includes all aircraft types and numbers, to include scout observation aircraft. The armament load includes the types of weapons on board and the number of rounds available. The infantry key leaders consider the effects of these various weapons carried by the attack aircraft.

Normally, the attack team will engage enemy forces during a hasty attack with area fire systems. These include the gun systems and the 2.75-inch rockets. These area fire weapon systems pose a danger to friendly soldiers who may be in the lethality zone of the rounds or rockets. The attack team may be called on to deliver more precise fire with TOW or Hellfire missiles. In this case, the leader on the ground must be very precise in describing the target he wants the aircraft to hit.

AIRCRAFT	INFANTRY
"Hardrock 36, Wolfpack 48 is currently holding at grid VQ 98454287, break, 2 Kiowa Warriors with 7 rockets, 900 rounds of .50 cal, 2 Hellfires, break, 1 and a half hour station time, all aircraft are NVG capable, over"	
	"Wolfpack 48, Hardrock 36, stand by, over"
"Wolfpack 48, roger"	

The infantry unit leader, in turn, succinctly provides the attack team leader with his maneuver plan. This includes updates on enemy composition, disposition, and most recent activities, particularly the location of air defense weapons. He also provides an update on the friendly situation--to include the composition, disposition, and

location of his forces and supporting artillery or mortar positions. He then updates the attack team, outlining the concept of his ground tactical plan. The infantry unit leader also describes his method for marking friendly positions.

The ability of the aircrews to easily observe and identify ground signals is a critical factor in reducing fratricide and maximizing responsive aerial fires. The signal or combination of signals is based on items commonly carried by the infantryman, must be acquirable by the night-vision or thermal imaging systems on the aircraft, and must be recognizable by the aircrew.

The infantry unit leader then provides a concise description of the target and its location. If necessary, the ground unit uses geographical terrain features and smoke rounds from artillery or mortars, ordnance already impacting on the target area, illumination or tracer rounds, or other ground fires to provide a reference mark on the target.

AIRCRAFT	INFANTRY
	"Wolfpack 48, Hardrock 36, stand by for update, break, enemy platoon size element is 800 meters due north, break, there has been sporadic heavy machine-gun fire to our position, break, fire appears to be coming from second floor of train station, break, negative knowledge on disposition of enemy ADA, over"
"Hardrock 36, Wolfpack 48, request update on position of friendly forces, over"	
	"Roger Wolfpack 48, negative friendly forces due north of our position, break, my entire platoon is pinned down on the south side of the concrete wall at grid VQ 96204362, break, I will mark our position with IR strobes, over"

The attack team leader then informs the infantry unit leader of the battle position, attack-by-fire position, or the series of positions his team will occupy that provides the best observation and fields of fire into the engagement or target area. The battle position or attack-by-fire position is a position from which the attack aircraft will engage the enemy with direct fire. It includes a number of individual aircraft firing positions. It may be pre-planned or established as the situation dictates. Size will vary depending on the number of aircraft using the position, the size of the engagement area, and the type of terrain. The battle position or attack-by-fire position is normally offset from the flank of the friendly ground position. This ensures that rotor wash, ammunition casing expenditure, and the general signature of the aircraft does not interfere with operations on the ground. The offset position also allows the aircraft to engage the enemy on its flanks rather than its front, and lessens the risk of fratricide along the helicopter gun target line.

The attack team leader then provides the infantry unit leader with his concept for the team's attack on the objective. Only on completion of coordination with the lowest unit in contact does the flight depart the holding area for the battle position. As the attack team moves out of the holding area, it uses NOE flight to mask itself from ground enemy observation and enemy direct fire systems. The attack team leader maintains FM communications with the infantry unit leader while he maintains internal communications on either his very high frequency (VHF) or ultra-high frequency (UHF) net.

AIRCRAFT	INFANTRY
"Hardrock 36, Wolfpack elements will attack from the southeast, break, turn on IR strobes at this time, break, keep your heads down as we will be firing over your position during our attack run, over"	
	"Wolfpack 48, Hardrock 36, strobes on at this time, over"
"Roger Hardrock, Wolfpack has your position, break, commencing attack, over"	
	"Hardrock 36, roger"
"Hardrock 36, Wolfpack 48, engagement complete, break, building destroyed, over"	
	"Wolfpack 48, Hardrock 36, return to base, thanks for the support, over"

NOTE: This scenario was written as though in perfect conditions. Grid locations will be difficult for the infantry due to rubble and building damage, and actual FM communications between the ground and air may not work this well. In summary, when an attack team is committed to execute a hasty attack, mission success requires detailed coordination between the attack team and the infantry unit already engaged in close combat.

- The maneuver brigade provides the aviation task force with the information available on locations, routes, and communications before the attack team's departure from its assembly area.
- The holding area is a concealed position where final coordination is made with the infantry unit in contact before the attack team launches its hasty attack.
- The attack team coordinates directly with the lowest level unit in contact on the infantry company FM command net.
- The infantry leaders must understand the ground effects of the attack team's area fire weapons systems.
- Final coordination with the infantry unit includes agreeing on a method of identifying the friendly and enemy positions.
- The means of identifying friendly positions should take advantage of the forward looking infrared (FLIR), thermal imaging system (TIS), and NVG capabilities of the attack team.
- The battle position or attack-by-fire position should be offset from the infantry unit to maximize the effects of its weapons and to minimize the risk of fratricide.

Successful integration of Army attack aviation and infantry requires considerable coordination and communication. The key to success begins at Home Station with intense, realistic training focused on developing and testing a variety of techniques and procedures. These techniques and procedures will differ from unit to unit, given the differences in personnel and equipment as well as the mission of the units involved. Once established, these techniques and procedures must be standardized as unit-level battle drills and trained to standard on a regular basis. Only in this way will the integration of attack aviation assets with light infantry units maximize the capabilities of both elements to defeat the enemy on today's battlefields.[1]

[1] Portions of this section were taken from a previously published article in the ***U.S. Army Aviation Digest,*** Mar-Apr 95, "Air-Ground Coordination in the Hasty Attack" by LTC Davis D. Tindoll Jr. and CPT Michael J. Negard. This article can also be found at the CALL website at http://call.army.mil (CALL products/Combat Training Center Bulletins & Trends/CTC Related Articles).

6. CONSIDERATIONS.

TARGET MARKING AND FRIENDLY POSITIONS IN THE CITY

OBSERVATION 14: During urban combat, clear marking of targets and friendly positions is critical. Aircrews require positive identification of the target and friendly positions prior to releasing ordnance. Methods employed must be adapted to the conditions prevalent at the time.

DISCUSSION 14: Accurate and timely information of friendly and non-combatant locations is critical to expedient target engagement. This is especially true for sizable conventional forces operating in an urban environment. Numerous factors can limit visual, electro-optical, and electronic identification and tracking of targets and friendly positions. Several of these factors are particularly prevalent in an urban environment and include electric lighting, fires, smoke, haze, smog, and man-made structures.

TTP: All aircrew and battle planners should understand strengths and weaknesses of available sensors and equipment in urban conditions. They need to choose the appropriate equipment or equipment combinations for the conditions at hand. This section addresses several factors operators should consider when using target-marking equipment and sensors. The equipment covered includes target-marking devices, night-vision goggles (NVGs), forward-looking infrared (FLIR), thermal imaging system (TIS), TV/electro-optical (EO), electronic beacons, and laser designators. The discussion is generic and is applicable to fixed wing fighter type aircraft, fixed-wing gunships, and rotary wing aircraft.

- Determine all required identification and marking procedures before starting a mission. Accurate and detailed maps, charts,or imagery facilitates aircrew orientation to the friendly scheme of maneuver. Aircrews must continue to work closely with the ground forces to positively identify friendly positions.
- Visual signaling or marking positions helps determine the disposition of friendly forces. During building clearing, the progress of friendly maneuver elements (both horizontally and vertically) may be marked with spray paint or bed sheets hung out of windows. Often, the simplest methods are the best. Traditional signaling devices, such as flares, strobes, and signaling mirrors, may be quite effective. Target marking, or orientation on enemy positions, may also be accomplished by signaling. Common techniques include the use of smoke, laser pointers, or tracers. Other devices are available which aid in the recognition of friendly forces and equipment where the fluid tactical situation, intermingling of forces and urban terrain make identification difficult. The use of glint tape, combat identification panels (CIPs), and infrared beacons assist in the clear identification of friendly ground forces, on urban terrain, though ground lighting, thermal contrast, and intermediate structures influence the effectiveness of these devices.
- The proximity of friendly forces to targets requires positive identification and makes marking of friendly units and targets critical. Procedures must be clearly understood and all participants must be issued the appropriate devices. The fire support assets must be familiar with the friendly marking system. Friendly positions and targets require positive identification/marking in urban terrain. The methods to do this are limited only by the creativity of the ground forces and aircrews. Commanders should use this as a reference but not limit themselves to only these methods. Aircrews require positive identification of the target and friendly positions prior to firing. Methods employed must be adapted to the conditions prevalent at the time. Positive air-to-ground communications are essential to coordinate and authenticate marks. (Figure 12 on pages 9-25 and 9-26 lists the relative common marking devices and describes merits and shortcomings of each.)
- When working with a terminal guidance controller or other friendly ground troops in an aviation support scenario, aircrews and ground parties should attempt to follow normal JCAS and J-Fire procedures. Fixed wing gunships and rotary wing aircraft should expect detailed continuing directions, including reference points to the target in addition to standard range and bearing.
- Aircrews and terminal guidance controllers must become familiar with the roof outline of buildings before a mission, as this will often be the first characteristic used for identification by aircrew. Flat roofs, pitched roofs,

domed roofs, roofs with towers or air conditioning units on top will aid in acquisition, visually and thermally. Additional structural features revealed in imagery will aid in confirmation. This method of terrain association will prove invaluable for engagement or reconnaissance, since structures are often too close for relying on mere grid coordinates.

- Expect to see significant visual urban shadowing from buildings both during ambient high-light and low-light level conditions when electric lights are on. Shadows will hide personnel or vehicle targets from both the terminal guidance controller and the aircrew. Shadows will hide non-thermally significant targets, but thermal targets should still be seen. A combination of sensors will have to be used to acquire and identify the target; therefore, a sensor handoff plan must be thoroughly briefed. The use of any aircraft with an integrated global positioning system (GPS) will expedite the time to locate the target area. Time permitting, inputting a target grid into the GPS/inertial navigation system (INS) will provide fire control cues (range, heading, time) to the target which will aid in quicker target acquisition and help distinguish friendly from enemy. Because CAS missions may be "danger close" with short firing ranges, expect minimum tracking time and thus minimum time to optimize the sensor.

TARGET AND FRIENDLY MARKING METHODS

METHOD	DAY/ NT	ASSETS	FRIENDLY MARKS	TARGET MARKS	REMARKS
SMOKE	D/N	ALL	GOOD	GOOD	Easily identifiable, may compromise friendly position, obscure target, or warn of fire support employment. Placement may be difficult due to structures.
SMOKE (IR)	D/N	ALL/ NVD AT NIGHT	GOOD	GOOD	Easily identifiable, may compromise friendly position, obscure target, or warn of fire support employment. Placement may be difficult due to structures. Night marking is greatly enhanced by the use of IR reflective smoke.
ILLUM GRND BST	D/N	ALL	N/A	GOOD	Easily identified, may wash out NVDs.
SIGNAL MIRROR	D	ALL	GOOD	N/A	Avoids compromise of friendly location. Dependent on weather and available light and may be lost in reflections from other reflective surfaces (windshields, windows, water, etc.).
SPOT LIGHT	N	ALL	GOOD	MARGINAL	Highly visible to all. Compromises friendly position and warns of fire support employment. Effectiveness is dependent upon degree of urban lighting.
IR SPOT LIGHT	N	ALL NVD	GOOD	MARGINAL	Visible to all with NVGs. Less likely to compromise than overt light. Effectiveness is dependent upon degree of urban lighting.
IR LASER POINTER (below .4 watts)	N	ALL NVG	GOOD	MARGINAL	Effectiveness dependent upon degree of urban lighting.
IR LASER POINTER (above .4 watts)	N	ALL NVD	GOOD	GOOD	Less affected by ambient light and weather conditions. Highly effective under all but the most highly lit or worst weather conditions. IZLID-2 is the current example.
VISUAL LASER	N	ALL	GOOD	MARGINAL	Highly visible to all. Risk of compromise is high. Effectiveness dependent upon degree of urban lighting.

METHOD	DAY/ NT	ASSETS	FRIENDLY MARKS	TARGET MARKS	REMARKS
LASER DESIGNATOR	D/N	PGM OR LST EQUIP	N/A	GOOD	Highly effective with PGM. Very restrictive laser acquisition cone and requires line of sight to target. May require pre-coordination of laser codes.
TRACERS	D/N	ALL	N/A	MARGINAL	May compromise position. May be difficult to distinguish mark from other gunfire. During daytime use, may be more effective to kick up dust surrounding target.
ELECTRONIC BEACON	D/N	SEE REMARKS	EXCELLENT	GOOD	Ideal friendly marking device for AC-130 and some USAF fixed wing (not compatible with Navy or Marine aircraft). Least impeded by urban terrain. Can be used as a TRP for target identification. Coordination with aircrews essential to ensure equipment and training compatibility.
STROBE (OVERT)	N	ALL	MARGINAL	N/A	Visible by all. Effectiveness dependent upon degree of urban lighting.
STROBE (IR)	N	ALL NVD	GOOD	N/A	Visible to all NVDs. Effectiveness dependent upon degree of urgan lighting. Coded strobes aid in acquisition.
FLARE (OVERT)	D/N	ALL	GOOD	N/A	Visible by all. Easily identified by aircrew.
FLARE (IR)	N	ALL NVD	GOOD	N/A	Visible to all NVDs. Easily identified by aircrew.
GLINT/IR PANEL	N	ALL NVD	GOOD	N/A	Not readily detectable by enemy. Very effective except in highly lit areas.
COMBAT IDENTIFICATION PANEL	D/N	ALL FLIR	GOOD	N/A	Provides temperature contrast on vehicles or building. May be obscured by urban terrain.
VS-17 PANEL	D	ALL	MARGINAL	N/A	Only visible during daylight. Easily obscured by structures.
CHEMICAL HEAT SOURCES	D/N	ALL FLIR	POOR	N/A	Easily masked by urban structures and lost in thermal clutter. Difficult to acquire, can be effective when used to contrast cold background or when a/c knows general location.
SPINNING CHEM-LIGHT (OVERT)	N	ALL	MARGINAL	N/A	Provides unique signature. May be obscured by structures. Provides a distinct signature easily recognized. Effectiveness dependent upon degree of urban lighting.
SPINNING CHEM-LIGHT (IR)	N	ALL NVD	MARGINAL	N/A	Provides unique signature. May be obscured by structures. Effectiveness dependent upon degree of urban lighting.

Figure 12

Television/Electro-optical (EO)

TV/EO sensors are subject to many of the same limitations as the naked eye, particularly TVs with no low-light capability. Aircrews may not be successful in acquiring a target and achieving lock-on if smoke, buildings, or other urban factors repeatedly interrupt line of sight (LOS). Low-light or all-light TV/EO sensors may require

frequent gain and filter changes to accommodate varying light levels in urban target areas. Normal means of target and friendly identification many prove ineffective. IR strobes or even overt strobes normally visible to TV/EO sensors may be lost in the light clutter. Laser pointers will suffer the same type of degradation. TV/EO resolution is typically not sufficient at medium and extended ranges to discriminate between a friendly position or a target and its surrounding urban features. Ground personnel may need to utilize more aggressive and overt means of identifying their position and that of the target if TV/EO sensors are to be used to identify, track, and engage targets on urban terrain.

Laser Designation

One of the greatest challenges on urban terrain is achieving and keeping LOS with a target or friendly position from a moving aircraft. Laser designation requires uninterrupted LOS to identify and engage a target. Rotary wing aircraft may use hover capabilities, but only in the most permissive environments. This may mean the lazing platform has to be very near the target, often within danger close distances or weapon arming distances, to keep the spot on the target until ordnance impact. Smoke from burning buildings or other fires may drift across the laser to the target line causing laser dispersion. While this is also true on a rural battlefield, urban areas typically contain more potential smoke sources, and sources for heavier smoke, than found in natural terrain.

Most laser designating platforms cannot actually see their laser spot on a target. Lasers are often boresighted to other supporting sensors like FLIR/TIS or TV/EO. If the supporting sensor cannot see a target, then the laser cannot effectively mark the target. Further, even though a FLIR/TIS may "see" a target, the laser may not be capable of guiding ordnance against it, since smoke invisible to the FLIR/TIS may attenuate the laser energy. For the wavelength of the laser, the most important contributor to this nonselective scattering is, once again, water vapor or absolute humidity. The impact of humidity on FLIR/TIS performance is greater than its impact on the laser. In other words, if you can detect the target in clear air, then the laser should provide sufficient laser energy for seeker acquisition. A rule of thumb is if you detect a target with a supporting sensor and consistently determine a range to it with a laser range finder, then you can likely designate it satisfactorily for a laser-guided weapon. As an additional consideration, many CAS targets are relatively small and may be acquired at relatively short range. For low and medium threats where a great amount of time is available to use the FLIR/TIS to point the laser, the methods are simple. As the threat escalates and the time available for target acquisition shrinks, targeting with the FLIR/TIS becomes more difficult, and laser munitions deliveries may prove impossible if the aircrew does not practice this highly demanding mission.

THREAT AND ENVIRONMENTAL

OBSERVATION 15: Threat considerations.

DISCUSSION 15: Threat intelligence will be difficult to obtain and more difficult to accurately update. Lines of battle and areas of control can change rapidly and may be confused most of the time. Planners must anticipate rapid changes in the threat and incomplete information. Every building and structure in an urban area is a potential enemy position. The presence of snipers increases the vulnerability to ambush, and the difficulty in distinguishing combatants from non-combatants places participants under additional psychological stress.

Establish reconnaissance operations early, using unmanned aerial vehicles (UAVs) with data linked video as the first tier of reconnaissance. Manned aircraft with multiple systems such as low-light television (LLTV), FLIR, radar, and night-vision systems provide commanders a directed telescope of specific areas. These visual systems, coupled with voice intercept, direction-finding platforms networked with ground-based systems, civil affairs, special operations forces (SOF), and ground patrols, provide a real-time picture of the urban environment. Snipers can also provide a valuable data source for aviation planning. Gathering detailed information during the planning phase of an aviation operation provides planners and aircrew with detailed information concerning known threat positions, movement routes, and known weapons in the area.

The defending force normally has the advantage of familiarity with the terrain. The civilian population of the area may play a role in the defense. The larger the civilian population remaining within the area, the more influence it has on military operations. Indigenous forces may have the support of the people. This provides enormous advantages in intelligence, logistics, security, and perhaps a paramilitary capability.

Aircraft are more vulnerable to low-tech weapons in urban combat. Planners must expand their view of what constitutes a threat for aviation operations. Missions requiring landing operations must consider ground threats such as artillery, mortars, or snipers into account. Orbits, weapon's employment, and landing approaches increase aircraft vulnerability and limit defensive options. Urban terrain may also contain anomalies that may cause difficulties for certain aircraft defensive systems. The nature of the terrain may also limit suppression options. The cluttered environment (i.e., lights, fires, smoke, dust) makes identification of missile launches/gunfire much more difficult. Established ROE during some operations can even limit the ability to employ specific defensive measures (i.e., deployment of flares over cities and populated areas).

Urban terrain provides excellent cover and concealment for a variety of weapon systems. Coupled with the restrictions on airspace available for maneuver, this makes these weapons a more significant threat to aircraft than they normally are in open terrain. Some of these weapons include:

- **Tank Main Gun.** Modern fire control systems permit effective aircraft engagement by tanks with their main gun. Tanks are equipped with precision fire control systems and laser-range finders, providing a high probability of first round hits on moving targets, day or night. The development of effective anti-helicopter ammunition, such as the U.S.-fielded MPAT (multi-purpose anti-tank round), include an air/ground fuse. In the ground mode, this round performs like a high-explosive anti-tank (HEAT) round. In the air mode, it uses a millimeter wave (MMW) proximity fuse and an expanding rod warhead. This allows the round to be effective even with a near miss, extending its maximum effective range beyond that of standard ammunition. Russia also developed an MPAT round with several different fuses. Some Russia tanks can fire laser-guided anti-tank guided munitions (ATGM) from their main guns.

- **ATGMs.** Most ATGMs have effective range between 3,000 and 5,000 meters and can engage helicopters in the same way they engage ground targets. ATGMs are a threat to rotary wing aircraft in an urban environment due to the restriction and compression of airspace and operating closer to potential threat positions.

- **Anti-armor rockets.** Anti-armor rockets such as the light anti-tank weapon (LAW), AT-4, rocket-propelled grenade (RPG), etc., are readily available, inexpensive, and normally standard equipment at the small unit level even in irregular forces. They are unguided and have effective ranges less than 500 meters, but can become a real threat to rotary-wing aircraft, as demonstrated in Somalia and Afghanistan with the effective use of RPGs in an anti-aircraft mode.

- **Medium Cannons.** Many armored personnel carriers (APC) and infantry fighting vehicles (IFV) carry rapid-fire cannons ranging from 20-mm through 40-mm, and are effective against rotary-wing aircraft. Although older vehicles have less sophisticated fire control systems, all can use rapid fire, burst-on-target techniques that are effective from 2,000 to 3,000 meters. Recent developments in medium cannon ammunition permit linking the burst of the round, at a predetermined range, to a laser-range finder, further increasing the effectiveness of these systems.

- **Small arms and machine-guns.** Small arms and machine-guns can also become a more significant threat in an urban environment. Generally, 5.56-mm and 7.62x39-mm rifles are effective out to 500 meters, 7.62-mm machine-guns and sniper rifles of similar caliber are effective to 1,000 meters, and .50-cal/12.7-mm machine-guns and sniper rifles are effective to 2,000 meters. Another consideration is that these weapons can be placed on the upper floors of buildings above the helicopters to fire down on the helicopters. Since these are small, light weapons, they can be easily moved to unexpected positions easily.

OBSERVATION 16: Environmental considerations.

DISCUSSION 16: The commander must establish minimum weather requirements before conducting operations. Weather conditions affect the employment of all aircraft and weapons systems. Poor weather conditions adversely affect weapons accuracy and aircraft survivability by obscuring targets and reducing standoff ranges. Adverse weather may reduce the performance of radar systems, UAVs, GPS, FLIR/TIS, laser, and infrared (IR) weapons.

- **Ceilings.** Low ceilings affect all aircraft, especially fixed-wing fast movers. Low ceilings can obscure high-rise rooftops. The presence of high-rise buildings and low ceilings decreases the effective above-ground level (AGL) operating area. As an example, an 800-foot building under a 3,000-foot ceiling only leaves 2,200 feet of airspace to operate in.

- **Visibility.** Aircrew performance decreases as visibility decreases. Reduced visibility increases target acquisition time and threat exposure. Smog buildup from industrial areas and vehicle exhausts also reduce visibility. The reduction in visibility degrades weapons sensors; even laser-guided weapons are severely affected.

- **Winds.** In urban areas, the city structure affects wind patterns. Wind patterns are "broken up" and funneled down streets and alleys. While the wind may be calm along one end of a block, it can be turbulent at another. City structure also influences the location of turbulence, making predicting turbulent areas difficult. Turbulence affects aircraft performance and weapon's delivery.

- **Temperatures.** Thermal heating is affected by the proximity of other buildings and structures. Urban temperatures are generally higher than rural areas, and can be 10 to 20 degrees higher than the surrounding rural area. Thermal heating can adversely affect thermal sights on aircraft.

Command, Control, and Communications (C3)

Understanding the commander's intent is imperative for all operations. In urban environment, with its increased challenges, it is critical. Maintaining communications despite the interference caused by man-made structures inhibiting electrical line of sight and absorbing or reflecting transmitted signals is difficult. This increases the reliance on decentralized command and control for operations. Detailed mission orders and briefings aid in conducting operations.

A detailed, flexible, and redundant C3 plan is essential. Aerial or rooftop retransmission systems and the use of remote antennas may overcome some of these problems. Pre-mission exercises are required to test the communications plan and minimize the adverse effects of the terrain. Airborne C3 support systems may alleviate some of these difficulties. Platforms such as the Airborne Battlefield Command and Control Center (ABCCC), Airborne Warning and Control System (AWACS), and JACKPOT-equipped C-130/C141s should be considered during planning for urban operations.

Procedural control measures may also be required for air operations. This is especially true in situations where airborne C2 assets are unavailable or unable to communicate due to interference. Visual signals are also affected. Vertical development blocks visual markings or signals. The normal urban clutter makes it harder to differentiate these signals from their background.

A common language for all units facilitates rapid transfer and understanding of information. Specific information concerning multi-service procedures for air-to-air, air-to-surface, and surface-to-air brevity codes is found in service manuals FM 90-38, MCRP 3-25B, NWP 6-02.1, and AFJPAM 10-228.

Airspace Control

Compressed airspace and a unique three-dimensional environment characterize urban flight operations. These factors increase planning and execution problems, especially when in close proximity to friendly forces and non-combatants. The compressed urban airspace brings separate and diverse missions into close proximity. For example, an airdrop of supplies to a unit could be performed at the same time as CAS missions protecting these units are conducted. Knowledge of other missions tasked for the same general area is vital to avoid hazardous interference.

Developing positive and procedural control measures for specific airspace assists in de-conflicting missions, but may not consider ongoing host nation or foreign military airspace requirements. Establishing a restricted operating zone (ROZ) or high-density airspace control zone (HIDACZ) over the area of operations that stacks aerial platforms with coordinating altitudes maximizes the simultaneous employment of aerial platforms. Specific information concerning multi-service procedures for integrating airspace command and control (ICAC2) are found in service manuals FM 100-103-1, MCRP 5-61, NWP 3-52.1, and AFTTP (I) 3-2.16.

Night-Vision Devices (NVD)

Aircrews must pay careful attention to the color, location, and intensity of lights to include the moon angle along the flight route and objective area. Night imagery of the area is an important tool for effective analysis and mission planning. Detailed analysis of the objective area is necessary to determine when and where to use NVGs, image intensifier or infrared sensors. Is the target in a lit ballpark or an unlit vacant lot? Aircrews should prepare to make frequent and rapid transition from aided to unaided flight. One technique is for the aircrews to fly with their NVGs positioned higher than normal on their helmets, looking under them most of the time, but allowing them to dip their heads and look through the tubes for detail in areas of interest.

The FLIR/TIS can be a significant aid in target engagements, particularly at night. It can detect targets through battlefield smoke and camouflage and many targets; for example vehicles, armor, and artillery present good infrared signatures. However, successful use of the FLIR/TIS is still contingent upon basic air-to-ground assumption. It is reasonably safe to operate with an unobstructed line of sight to the target for the entire engagement window. Friendly personnel may wear strips of "No Power Thermal Target Material" known as "cold sky" as thermal signatures to friendly FLIR/TIS-equipped aircraft to identify them as friendly forces. The cold sky is visible from 1-2 miles depending on altitude and LOS interference. However, if some type of identification device is not worn, then FLIR/TIS can be difficult to identify friendly from enemy or non-combatants.

NVGs and FLIR/TIS are affected by the composition and surface conditions of urban terrain. A rural battlefield has a somewhat homogeneous composition where man-made objects contrast sharply. However, in an environment that consists primarily of manmade objects, there is very little consistency in the thermal/visual scene. High-light levels in urban areas create special problems. The volume and irregular patterns of ground lights in urban areas affect NVG operations. FLIR/TIS is an excellent identification aid for terrain features and hazards in brightly-lit areas. Brightly-lit cities can be navigated unaided, but discerning detail in darkened areas or shadows require using image intensifiers or infrared sensors. Relatively dark areas, such as large city parks, are readily identified and make good navigation references at night. Cultural lighting will often wash out NVGs, making them ineffective. Very bright city lights can "shut down" NVGs and render them useless. In a less bright but still well-lit environment, aircrews may not be able to see details of the target area or the friendly position because the details are "washed out" due to the lighting. For example, consider the effects of lighting and aircrew coordination requirements to compensate for such things as a rotary-wing hover next to an irritating strobe on top of a tower or landing in a brightly illuminated area.

Operations involving twilight, dawn, or dusk may also present problems. The rapid changes in the illumination during these periods make it difficult for aircrews to observe the ground and see other aircraft. FLIR

devices are not affected by artificial light and are generally effective navigation and targeting systems during this period. Depending on the equipment used by the ground commander, aircrews may or may not be able to detect laser pointer devices. Infrared sensors work well in urban areas because they are not vulnerable to the overwhelming light levels that affect NVGs. Like NVGs, however, they are subject to being overpowered by intense sources within the field of view. Very hot areas such as factory stacks or fires burning on the ground make details of lesser thermal contrast very difficult to discern. Hostile elements may attempt to degrade the effectiveness of thermal systems by lighting bonfires, buildings, cars, tires, etc., in the area of activity.

FLIR/TIS thermal clutter occurs when there are a number of objects in the scene with approximately the same thermal signature. These objects can be "cool," leading to an overall dark image, or can be "hot" enough to cover an image, leading to an image saturated with bright spots. Overlapping hot spots result in overall reduced image quality. Using the gain function can enhance FLIR/TIS imagery enough to highlight man-made features. Hand-held smoke or diesel smoke will not affect the FLIR/TIS performance. A rule of thumb is that if you can detect a target with a FLIR/TIS and consistently laser range-find or designate it, then you can likely designate it satisfactorily for a laser-guided weapon. Generally all buildings will be seen and recognizable on the FLIR/TIS. Building roofs will present a different signature from walls due to the material emissivity, and this may act as another cue aiding target acquisition. Typically the rooftops will be much darker than the walls. If aircraft are forced to operate less than 200 feet, then the low slant angle will make building acquisition difficult and personnel and vehicle target acquisition more difficult. Slight variations in construction material for either roads or structures can alter the image enough to inhibit target acquisition and tracking.

Thermal reflections can produce odd signatures making target identification difficult. Smooth or glassy surfaces such as windshields, unpainted metal surfaces, or water are examples of thermal reflectors. They can reflect IR radiation images, impinging on them from other sources. They may appear very dark because they reflect the low radiant temperatures from the night sky. Most buildings constructed from concrete or brick will have high thermal mass, meaning their rate of temperature gain will be slow during the day (until noontime) and rate of temperature loss will be slow during the night. Urban structures viewed midday should be distinctly different after having been heated throughout the day. As late afternoon approaches, heat dissipates quickly; structures of plywood or aluminum lose heat quickly and contrast with their background. Heat loss occurs more rapidly in winter than summer. In the morning, objects facing the sunrise will heat up more quickly, appearing hotter than the other three walls. Air conditioning or heating units on buildings can produce localized hot spots. Windows will appear very dark when reflecting the night sky temperature. However, in a combat zone, as was seen in Bosnia, many building windows will be broken out.

Urban areas can have significant concentrations of carbon dioxide, with a degraded affect on FLIR/TIS performance. In practice, this factor is usually not important. FLIR/TIS visibility through diesel fog or oil smoke is very good, but phosphorous smoke or flares significantly hinder thermal transmission. However, being able to see phosphorous smoke in certain situations may be desirable. The atmosphere can attenuate transmission of IR energy through refraction, absorption, or scattering. Water vapor or absolute humidity is responsible for the majority of IR absorption.

Rotary-Wing Operations

A typical rotary-wing urban flight profile consists of modified low-level and contour techniques. Aircrews must evaluate obstacles, ambient light levels, and available navigation cues, as well as types and locations of threat sources, to determine the optimum altitude and airspeed. Maintaining higher airspeeds may minimize exposure time. To limit exposure to heavy antiaircraft weapons, the preferred method of ingress and egress may be a low, swift flight profile. However, slower flight speeds may be necessary to allow enough time to precisely identify and navigate to the objective area. Aircrews should avoid true NOE, as it exposes the aircraft to potential engagements. Slow speeds coupled with low altitudes may put the aircraft and aircrews at greater ground threat risk (small arms,

RPGs, etc.). A low density of structures or extensive enemy use of high rooftops may diminish the masking advantages of low flight profiles. Task Force Ranger in Mogadishu tragically emphasized the danger of a low, slow flight profile. To buffer obstacle and hazard clearance, flight at 300 to 500 feet AGL over a city, day, or night, may be necessary. Flight at higher en route altitudes exposes the aircraft to observation as it approaches the objective and makes it far more vulnerable to engagement during the descent for landing. This may expose aircraft to a shoulder-launched SAM threat, but the trade-off may provide a better margin of safety from more formidable hazards of unlit towers, cranes, and power lines that blend into the urban landscape and are more difficult to detect. If a degraded threat level and higher illumination allow it, significantly higher altitudes above 500 feet AGL are recommended.

Multi-ship rotary-wing operations are more difficult and may require "stack-down" rather than conventional "stack-up" formations to prevent the loss of visual contact with other aircraft among ground lights. Planning must include formation break-up and rendezvous procedures if visual contact is lost within the flight or ground fire requires evasive maneuvering. When multiple aircraft are operating together, consider greater formation spacing to facilitate flexible maneuvering ability while still providing mutual support for other aircraft in the flight. Wingman vertical position from the preceding helicopter may not allow a traditional vertical "stack up." Maintain a position that compensates for the illumination pollution but avoids jeopardizing the aircraft by greater exposure to obstacle hazards or increases formation collision potential.

CAUTION: If stacking low, pay strict attention to disk spacing and have a pre-briefed formation break-up plan. Formation break-up from a stack-low position is more dangerous than from a stack-high position.

Attack helicopters may be employed for en route or LZ security missions. Both the assault and security elements must clearly understand the complete mission. Specific issues to be resolved between the assault and security elements include:

- Flight coordination and communication between elements
- En route actions on contact
- Objective area target reference procedures
- Fire distribution and control measures
- Fratricide prevention
- Downed aircraft procedures
- Ground tactical plan/scheme of maneuver

Experiment with aircraft external lighting to best accommodate the mission, otherwise follow the SOP. If overt external lighting is required, use the flash position to better distinguish aircraft from static light sources. In brightly lit areas, covert lights may not be visible. Weigh mission lighting needs and conveniences with susceptibility. Aircrews must weight optimal visual contact with their wingman against the possibility of visual detection by the enemy. During Operation JUST CAUSE, reflective tape was placed on all friendly aircraft to assist in identification during ingress and egress. Bright ambient illumination can be favorable at times. During Operation EASTERN EXIT, evacuees commented that in the darkened landing zone, they could hear the helicopters but did not see them until they were already on the ground. During Operation JUST CAUSE, Panama Defense Force soldiers stated they could only see the cockpit lights of two UH-1s after they landed in a blacked-out prison courtyard.

Airfields

Many airfields are located in or near urban areas, and planning for aviation operations in urban terrain should include an assessment of available airfield facilities. Airfield operations in urban terrain are a challenge for forces tasked with operating and securing them. The airfield location is a known and easily identified location.

On the ground, aircraft come under the threat of surface-to-surface threats such as artillery, mines or booby traps, and mortars. The proximity of urban structures to either the approach or departure routes or the airfield itself complicate security issues when using these facilities. Planners should also anticipate the presence of major roads and industrial facilities in and around the airfield and include them in the assessment.

Consider the following when planning airfield operations:

- Arrival/departure routing and maneuver limitations.
- Size of useable runways (length/width/obstructions).
- Turn-around areas and the capability for emergency departure.
- Taxiways and obstructions to taxi routes.
- Parking areas, on/offload sites, access to each.
- Ground access routes and securing them.
- Security of airfield buildings and the perimeter.
- Hazardous terrain, towers, buildings, wires, etc., near flight areas.✪

APPENDIX A

THE PLATOON URBAN OPERATIONS KIT

by MAJ Jeffrey A. Bovais, Assistant TRADOC System Manager-Soldier
U.S. Army Infantry Center

1. GENERAL. The challenges of operating in an urban combat environment are many and combine to create a very hazardous condition under which soldiers must fight. It is not enough to rewrite doctrine, adjust tactics, techniques, and procedures (TTP), or build elaborate training facilities. Although critical for success, these elements do not provide the soldier with the tools he needs to fight and win in a built-up area. Brigade and battalion commanders need to place emphasis on identifying what equipment is needed at the platoon level, and should provide those items in order to set their subordinate units up for success. Obviously, identifying the proper equipment should be done with input from platoon and squad leadership. These leaders know best what tools are needed in closing with and destroying the enemy. After receiving this input, brigade or battalion commanders should ensure the contents of the platoon kits are standardized. This standardization allows for cross-leveling kits for more efficient restocking and more efficient training on the use of its contents, and for ensuring that every soldier in the unit knows what to have for an urban operation. The result of such an effort is a combat force correctly equipped to meet the unique challenges of the urban environment.

2. DOCTRINAL BASE. As the brigade or battalion goes through the process of determining the contents of the platoon urban combat kit, it should structure its analysis to coincide with the tasks that must be accomplished in an attack of a built-up area. There are three primary tasks that must be accomplished during an urban attack, and each has its own unique equipment considerations. Each area is discussed below.

BREACH A MINED, WIRED OBSTACLE. This is by far the most equipment-intensive task. It requires the platoon to deal with wire and an assortment of mines, booby traps, and other debris designed to impede movement, and to fix the platoon in an area that permits the enemy to engage it with direct and indirect fires. The equipment available to the platoon should permit it to rapidly perform the elements of suppress, obscure, secure, and reduce (SOSR), with particular emphasis on reducing the obstacle. The platoon must be able to physically create a lane in the obstacle (manual as worst case if demolition is not available), to mark the lane for follow-on forces (day and night), and to rehearse those actions in a combat environment.

ENTER A BUILDING/CLEAR ROOMS. As the unit passes through the breach, it must enter the first building and clear it room by room. This obviously entails clearing booby traps and debris; entering the building from unexpected places (i.e., second-story windows); forcing doors open; creating entry points; and marking cleared rooms, buildings, and entry points. These are not tasks that the soldier is typically equipped to handle. He needs unique equipment items to accomplish the mission.

MOVE TO SUBSEQUENT BUILDINGS. It is a common observation at the Joint Readiness Training Center and in past battles that the majority of casualties occur while soldiers are moving between buildings. This means that the soldier must be able to look around corners without exposing himself to enemy observation and fire, be able to mark safe crossing areas, and be able to signal when it is safe to move to the next building. Again, this requires a thorough analysis of what equipment the soldier needs to ensure his unit moves to subsequent buildings safely.

3. CONTENTS OF THE PLATOON URBAN COMBAT KIT. Listed below are suggested items that should be included in the platoon urban combat kit. This is not a complete solution, as all units have different TTP and SOPs that demand a variety of equipment solutions. This list is designed to stimulate thought and discussion while a brigade or battalion goes through the process of providing those MOUT-specific tools that the soldier needs to survive and be successful in the urban combat. A suggested basis of issue for each item is in brackets. "The devil is in the details" and so is the solution.

PLATOON URBAN COMBAT KIT CONTENTS:

- Wire handling gloves {two per squad}.
- Wire cutters {two per squad}.
- Grappling hooks with 30-60 meter rope for clearing mines and booby traps and for moving debris inside buildings {two per squad}.
- Marking devices for breach lanes, cleared rooms, cleared buildings, safe crossing areas between buildings; simple and clearly identifiable {two complete kits per squad}.
- Signal devices for lifting and shifting fires and for safely moving between buildings {two per squad}.
- Lightweight, foldable assault ladders for by-passing obstacles and for entering buildings in unexpected places {one per squad}.
- Rehearsal area set-up items for all phases of the attack to include a sand table kit geared specifically for MOUT. This is particularly important for the breach and room clearing tasks; the sand table should replicate the actual objective {one per platoon}.
- A mirror device for observing around corners and up stairs.
- Shotguns with slug ammunition for opening doors (a 12-gauge breaching round is currently being developed) {one per clearing team}.
- Crowbars, axes, and sledgehammers for forced entry into locked and barricaded rooms {one door defeated item per clearing team}.
- Protective eyewear to shield against flying debris (wood, glass, metal, etc.) {one per soldier}.

4. SOLDIER ENHANCEMENT PROGRAM (SEP). SEP is a vehicle that unit commanders, soldiers, or civilians can use to submit proposals for new equipment to make the soldier more effective or efficient on the battlefield. This means anything that reduces the soldier's load (in either weight or bulk) or enhances lethality, survivability, command and control, sustainment, mobility, safety, training, or quality of life. Items that soldiers or units are already purchasing are strong SEP candidates. This congressionally mandated and funded program demands that the proposal must have the capability to be fielded within three years from the date the Operational Requirement Document (ORD) is approved.

After a valid proposal is submitted (example worksheet is at page A-4), it is included in an annual review (where a council of colonels votes on new proposals and determines whether they should be funded). A SEP candidate must meet the following criteria:

- Be an item of equipment that is worn, carried, or consumed by the soldier for his or her individual use in a tactical environment.
- Be commercially available (off-the-shelf with little or no modification for field military use).
- Satisfy an operational need or battlefield deficiency.

Some examples of successful SEP items that are ongoing and will soon be fielded include:

- Modular weapon system
- Soldier intercom
- Equipment belt extender
- Land mine probe
- Weapon flashlight mount
- 12-gauge breaching round
- Lightweight fragmentation grenade
- Short-barrel M249 squad automatic rifle

The SEP is managed by TRADOC System Manager-Soldier at Fort Benning, GA. The proposal worksheet should be sent to:

TRADOC System Manager - Soldier
ATTN: ATZB-TS
Fort Benning, GA 31905-5000

The point of contact is Mr. Ken Sutton; telephone (706) 545-1189, DSN 835-1189; FAX (706) 545-1377, DSN 835-1377; e-mail: suttonk@benning.army.mil.

SEP PROPOSAL SUBMISSION FORM

TO: TSM-SOLDIER
ATTN: ATZB-TS
Fort Benning, GA 31905

1. ITEM DESCRIPTION:

2. OBJECTIVE/APPLICATION:

3. LIST POSSIBLE COMMERCIAL SOURCES (IF KNOWN):
a. _____
b. _____
c. _____

4. LIST ANY EXISTING REQUIREMENT DOCUMENTATION (IF KNOWN):
a. _____
b. _____

5. WILL THIS PROPOSAL REPLACE AN EXISTING ITEM(s)? IF SO, WHAT?
a. _____
b. _____

6. IS ANY OTHER SERVICE ORGANIZATION CURRENTLY USING THIS?
a. YES _____ NO _____
b. IF YES, LIST THE SERVICE _____

7. IF ADOPTED, THIS PROPOSAL WILL RESULT IN (CHECK APPROPRIATE LETTER(s) BELOW: ADDITIONAL REMARKS USE THE BACK OF THIS FORM.

____ a. WEIGHT REDUCTION TO THE SOLDIER'S LOAD.
____ b. IMPROVEMENTS TO QUALITY OF LIFE IN A TACTICAL ENVIRONMENT.
____ c. IMPROVEMENTS IN SOLDIER: ____ SURVIVABILITY ____ MOBILITY ____ LETHALITY ____ SUSTAINMENT ____ COMMAND & CONTROL ____ SAFETY ____ TRAINING PROCEDURES
OTHERS (EXPLAIN):
_____
_____

8. NAME: _____ RANK/GRADE: _____ DATE _____
ORGANIZATION/MAILING ADDRESS:
_____
PHONE NUMBER: COMMERCIAL _____ DSN: _____

NOTE: COMMANDERS AND THEIR SOLDIERS SHOULD USE THIS FORMAT. ATTACH ANY ADDITIONAL INFORMATION, BROCHURES, PHOTOS, ETC.

CF: PM-SOLDIER
10401 TOTTEN ROAD, SUITE 121
FT BELVOIR, VA 22060-5852

APPENDIX B

U.S. MARINE ORGANIZATION

by David P. Dilegge, Intelligence Analyst, Marine Intelligence Activity
and CAPT Shenandoah Sanchez, Tactics Instructor Basic School, USMC

The Marine Corps provides operating forces to support the U.S. fleet through deployment and employment of Marine Air Ground Task Forces (MAGTFs). MAGTFs are the Marine Corps' mandated forces of combined arms. MAGTFs include infantry, artillery, armor, engineer, reconnaissance, aviation, and logistics components.

MAGTF elements are drawn principally from Marine divisions (MARDIVs); Marine aircraft wings (MAWs); force service support groups (FSSGs); and Marine Expeditionary Force (MEF) command elements which include intelligence units that provide the MAGTF with its surveillance, reconnaissance, and intelligence capabilities. MAGTFs can also be formed from assets of the Marine Corps Reserve. MAGTFs can operate across the full spectrum of conflict in all levels of war as a landing force of an amphibious task force; part of a joint, multi-service, or combined task force; or as a single-service command.

A MAGTF is structured to accomplish a specific mission and is commanded by a single commander. All MAGTFs, whatever their size, have the same structure: a command element (CE), a ground combat element (GCE), an aviation combat element (ACE), and a combat service support element (CSSE).

The CE provides a command and control system for effective planning and execution of operations and is designed to facilitate the sequencing of additional MAGTFs as necessary. It is composed of the commander, his staff, and intelligence assets. Intelligence capabilities resident in the CE include ground reconnaissance, signals intelligence, human intelligence, counterintelligence, and intelligence collection management and analysis.

The GCE conducts ground combat operations. It is composed of an infantry unit that varies in size from a platoon or company of Marines and sailors to one or more divisions. Sailors assigned to the GCE (and the MAGTF as a whole) include medical, naval gunfire liaison, and chaplain personnel. Elements that comprise the GCE include infantry, artillery (M198), armor (M1A1), assault amphibian vehicles (AAV), light armored reconnaissance vehicles (LAV-25), and combat engineers. The GCE has its own combat support units and organic combat service support capability.

The ACE conducts air operations and provides aviation support to the GCE and CSSE. It can vary in size from a reinforced helicopter squadron to one or more MAWs. Type aircraft include attack (AH-1W), heavy-lift/medium-lift (CH-53D/CH-46E) and utility (UH-1N) rotary-wing aircraft; ground attack (AV-8B), ground attack/air-to-air (FA-18D), and electronic warfare (EA-6B) jet aircraft; and aerial refuelers (KC-130). The MV-22 vertical takeoff and landing (VTOL) tilt rotor aircraft is scheduled to replace the CH-46E beginning in FY02. The ACE is also responsible for ground air-defense and aerial reconnaissance to include unmanned aerial vehicles (UAVs). The ACE has its own combat support and combat service support units.

The Marine Expeditionary Force (MEF) is the principal Marine Corps warfighting organization. The size and composition of the MEF can vary greatly depending on the requirements of the mission. A special-purpose MAGTF (SPMAGTF) is a non-standing MAGTF temporarily formed to conduct a specific mission. It is normally formed when a standing MAGTF is either inappropriate or unavailable.

Marine Expeditionary Unit, Special Operations Capable (MEU [SOC]]

The MEU is the basic MAGTF that is continuously afloat and forward deployed. The MEU can be thought of as both a self-contained operating force capable of missions of limited scope and duration and as a forward-deployed extension of the MEF. MEUs routinely receive special training before deploying that result in their being designated "special operations capable." To receive this certification, the MEU undergoes an intensive 26-week, standardized pre-deployment training program that includes an exercise and a final evaluation.

Although each MEU (SOC) is task organized, a typical MEU (SOC) includes:

- A standing CE.
- An infantry battalion reinforced with artillery, reconnaissance, engineer, armor, assault amphibian units, and other detachments as required.
- A reinforced helicopter squadron with transport, utility, and attack helicopters; a detachment of vertical/short takeoff and landing (V/STOL - AV-8 Harrier) fixed wing aircraft, and other detachments as required.
- A task-organized CSSE.
- Sustainment for 15 days.

The MEU (SOC) GCE is formed around an infantry battalion and typically includes:

- Three rifle companies
- Weapons company
- Artillery battery
- Light armored reconnaissance platoon
- Assault amphibian platoon
- Tank platoon (when required)
- Combat engineer platoon
- TOW section
- Reconnaissance platoon
- Scout sniper platoon
- Shore fire control party

The rifle companies (182 Marines) contain three rifle platoons (42 Marines each) and a weapons platoon (47 Marines). The weapons platoon is comprised of a machine-gun section, a mortar section, and an assault section. The rifle platoon is comprised of three squads (13 Marines each) with three fire teams (4 Marines each). The weapons company has a mortar platoon (69 Marines), an anti-armor platoon (50 Marines), and a heavy machine-gun platoon (28 Marines).

Basic Marine infantry organization does not change when the battlefield is moved into an urban area. However, infantry units may be task organized or reinforced down to squad level in order for small units to fight and win in the violent, three-dimensional MOUT battlespace.

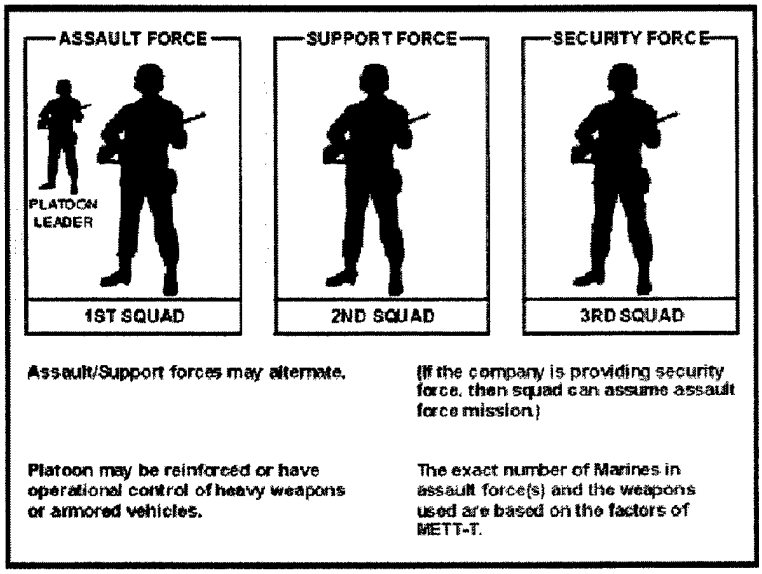


Figure 1
Task-Organized Marine Platoon

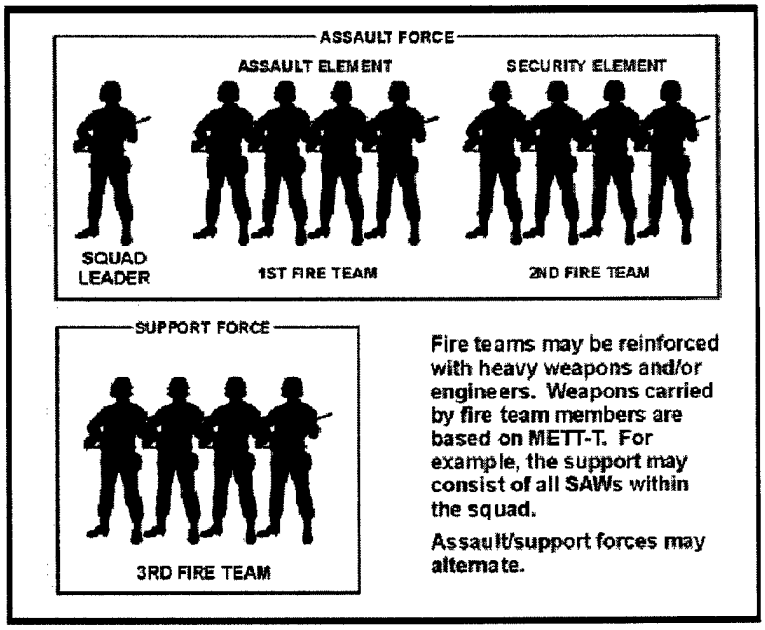


Figure 2
Task-Organized Marine Squad

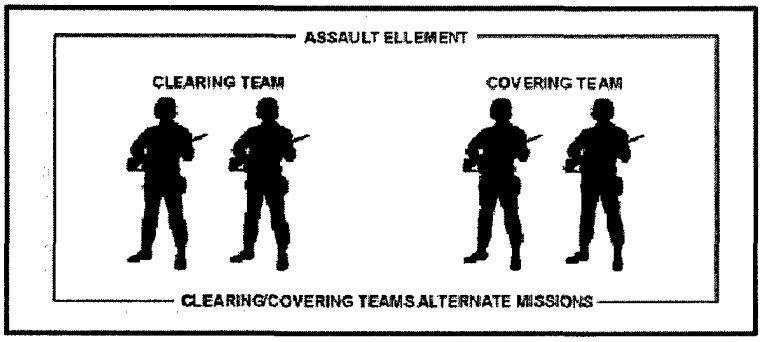


Figure 3
Task-Organized Marine Fire Team

The infantry battalion's organic weapons are as follows:

• M9 9-mm pistol	245
• M16A2 rifle	645
• M203 grenade launcher	107
• MK153 SMAW	18
• M249 SAW	81
• M240G machine-gun	29
• M2 .50-cal machine-gun	6
• MK19 40-mm grenade machine-gun	11
• M47 Dragon (anti-tank)	2
• M224 60-mm mortar	9
• M252 81-mm mortar	8
• M40A1 sniper rifle (7.62-mm)	8
• SASR .50-cal sniper rifle	2
• 12 gauge shotgun	(as needed from higher HQ)
• TOW (anti-tank)	8

APPENDIX C

WEAPON EFFECTS AND EMPLOYMENT IN AN URBAN ENVIRONMENT

by Tactics Group, The Basic School (USMC), MCCDC, Quantico, Va.

As with any other type of operation, a unit leader plans to use all available weapon systems: organic, supporting, and attached. The three-dimensional and naturally restrictive nature of urban terrain requires that every weapons system be employed to maximize its effects. Weapons should be employed to create and/or exploit tactical advantages. Street patterns and building location influence the plan of attack or defense by creating "city canyons" which are compartmentalized portions of the area. City street width, *line of sight* distances, and intervisibility problems caused by building angles can all influence the selection of firing positions and the effectiveness of weapons. Buildings that may *mask* fires, key terrain, critical areas, and building construction should also be considered when deciding how to employ weapons. Below are some of the effects of and employment considerations for weapons in an urban environment.

1. WEAPONS EFFECTS.

Obviously, unit leaders will have to take into consideration the effects of the specific weapons under their direct control and those they may bring to bear in the urban setting. This will vary and will be influenced by availability, logistics, effectiveness, and suitability as they apply to the current situation faced by that leader. Below are some general considerations concerning the effectiveness of weapons in the urban environment.

(1) Hard, smooth, and flat surfaces are characteristic of urban targets. Rounds usually strike these surfaces at some degree of obliquity. This reduces the effectiveness of the round and increases the chance of ricochets. In addition, the above also means that up to 25 percent of impact-fused explosive rounds (i.e., 40-mm grenades) will not detonate when striking such targets at an angle.

(2) Engagement ranges in urban combat are close. Historically, about 90 percent of all engagements occur at 50 meters or less. Minimum arming ranges and unit safety from backblast or fragmentation must be considered.

(3) Because of the close nature of most engagements and the broken nature of the urban terrain, the time available to engage targets will be short. Riflemen have difficulty engaging with deliberate, well-aimed shots without prolonged exposure to enemy observation and fire.

(4) Depression and elevation limits for some weapons create dead space. Tall buildings form deep canyons and make engaging targets in the upper portions of these buildings difficult or impossible with such weapons. Positions that have depression limits may not be able to engage enemy positions in basement or cellar positions.

(5) Smoke from burning buildings, dust created by explosions, shadows from buildings, and lack of ambient light penetrating inner rooms all contribute to reduce visibility. Targets, even at close range, may be difficult to see. The effectiveness of night-vision goggles and even thermal sights may be greatly reduced.

(6) Specific rounds and munitions must be evaluated for their effects against and penetration of certain types of building construction when planning. This will reduce the possibility of friendly fire injuries. In addition,

leaders must evaluate the risk of starting fires. The benefits of using tracer ammunition, which can be shot from a number of different weapons systems, must be evaluated against the likelihood and consequences of starting fires.

(7) The presence of power lines must be considered when employing wire-guided missiles. Guidance wires that cross "hot" power lines can short out and cause the missile to become erratic.

(8) Modern engineering and design improvements mean that most large buildings constructed since World War II are resilient to the blast effects of demolition and artillery attacks. Even though portions may be rubbled or burned, buildings may hold their structural integrity.

(9) Understanding the effects of different types of weapons can also have an effect on defenses and the type of protection constructed or used. Many materials normally found in an urban environment can be used to effectively protect against modern weapons and their effects. Furniture and building materials taken from interior walls can be fashioned into overhead cover to protect from the effects of artillery, mortar, or demolition attacks. Chain-link fences can be placed in front of fighting positions to protect against rocket-propelled grenades (RPGs) and other shaped-charge warhead weapons. Sandbags are very effective against small arms fire, but may be limited in supply. Some effective alternatives to sandbags may be furniture, vehicle bodies, 55-gallon drums filled with water, or brick/cement rubble between boards. However, a disadvantage to the latter is the possibility of secondary fragmentation.

(10) The depleted uranium (DU) used in the APDS (SABOT) tank round poses a significant health hazard to noncombatants and will for a long time after it is used in an urban combat situation. This long-term health hazard is due to radiation effects of the penetrator.

2. WEAPONS EMPLOYMENT.

The following are some employment considerations as they pertain to specific weapons normally found at the rifle company or platoon level.

(1) **M16A2 Service Rifle.** Rifles are the primary weapon to engage and kill the enemy in MOUT. In addition, rifles are particularly effective in suppressing enemy positions placed in individual windows and doors of buildings because of their ability to deliver accurate fire. To effectively engage small, fleeting targets requires a high degree of accuracy and weapons fired in the semiautomatic mode. Tracer ammunition may be used (after considering building construction and the risk of fires) by unit leaders to direct the fire of their units. Penetration of the 5.56 round is optimal at 200 meters. Because of the close nature of most engagements in urban areas, this penetration will be reduced. The 5.56 round, however, will easily penetrate materials commonly found on the interior of buildings (wooden doors, paneling, Sheetrock, or plaster). The 5.56 round will not penetrate brick and other masonry works initially, but successive rounds may.

(2) **M249 Squad Automatic Weapon.** SAWs should be employed using the same considerations as M16A2s. The penetration capabilities and limitations of the 5.56 rounds are the same. The SAW, however, provides a much greater volume of fire and is, therefore, well suited for suppression of enemy positions and can be utilized to isolate or suppress objectives. The increased rate of fire will also have a corresponding greater destructive effect on buildings and building materials. SAWs are cumbersome in the assault because of their length and weight. This does not mean that they will not participate in the clearing of buildings; rather, they should be placed in a covering team or security team while clearing rooms.

TYPE	PENETRATION	ROUNDS (REQUIRED)
8 inch reinforced concrete	Initial Loophole	35 250
14 inch triple brick	Initial Loophole	90 160
12 inch cinder block with single brick veneer	Loophole Breach hole	60 250
9 inch double brick	Initial Loophole	70 120
16 inch tree trunk or log wall	Initial	1 to 3
12 inch cinder block (filled with sand)	Loophole	35
24 inch double sandbag wall	Initial	220
3/8 inch mild steel door	Initial	1
Initial = penetration only, no loophole Loophole = penetration about 7 inches in diameter Breach hole = large enough for a man to enter		

Table 1. Structure penetration capabilities of the 5.56mm round against typical urban targets (range 25 to 100 meters).

(3) **M203 Grenade Launcher.** The M203 can be effective at destroying point targets in the offense or defense. The destructive force of the 40-mm HE or HEDP rounds can be a significant combat multiplier in urban combat. Blast effects and fragmentation within enclosed rooms may be amplified. In addition, the fragmentation effects may be multiplied by the added fragmentation created by building materials (masonry chips, wood splinters, etc.). Because of the close nature of combat in urban areas, care must be taken to avoid friendly forces being affected by fragmentation, and attention must be paid to minimum arming distances of the rounds. Another consideration is interior wall construction. M203 rounds may pass right through light building materials like Sheetrock or paneling without detonating. The array of M203 rounds make it a good weapon for delivering covering smoke, signals, illumination, and CS. Because of the trajectory of the round, the M203 round can be delivered into defilade such as behind walls, piles of rubble, or buildings. M203 gunners should be proficient enough to deliver fire through windows, doors, and small openings.

TARGET	PENETRATION (inches)
Sandbags	20 (double layer)
Sand-filled cinder block	16
Pine logs	12
Armor plate	2

Table 2. Penetration capabilities of 40mm HEDP round.

(4) **M240G Machine-Gun.** The M240G is the rifle company's primary organic direct fire weapon used to suppress designated targets/areas, isolate objectives, or establish kill zones down streets and alleys. Employment in the offense and defense are the same as any other environment with some special considerations. Streets, alleys, and open areas normally found in an urban environment provide an opportunity to achieve grazing fire seldom equaled in other types of terrain. To achieve maximum grazing fires, machine-guns should be positioned on the lower levels, in basements, or cellar firing positions. However, rolling urban terrain, buildings, rubble, vehicles, and other objects may all present obstacles to machine-gun fire and require them to be positioned higher within buildings. The M240G is a cumbersome weapon, making it difficult to use while clearing a building. The weapon can be fired from the assault fire position using the bipods, or employed on the M122 tripod for increased accuracy and stability. The penetration capability of the 7.62 round, however, penetrates most light construction materials easily and will penetrate most typical urban walls with continued and concentrated fire. It will not penetrate steel-reinforced concrete and dense natural stone structures.

RANGE (meters)	PINE BOARD (inches)	DRY LOOSE SAND (inches)	CINDER BLOCK (inches)	CONCRETE (inches)
25	13	5	8	2
100	18	4.5	10	2
200	41	7	8	2

Table 3a. Penetration capabilities of a single 7.62mm (ball) round.

TYPE	THICKNESS (inches)	HOLE DIAMETER (inches)	ROUNDS REQUIRED
Reinforced concrete	8	7 (loophole)	100
Triple brick wall	14	7 (loophole)	170
Concrete block with single brick veneer	12	6 and 24	30 and 200
Cinder block (filled)	12	Initial	18
Double brick wall	9	Initial	45
Double sandbag wall	24	Initial	110
Log wall	16	Initial	1
Mild steel door	3/8	Initial	1
Initial = penetration only, no loophole Loophole = penetration about 7 inches in diameter			

Table 3b. Structure penetrating capabilities of 7.62mm round (NATO ball) against typical urban targets (range 25 meters).

(5) **Heavy Machine-guns – M2 .50-cal/MK-19.** Heavy machine-guns are often employed on their vehicular mount both in the offense and defense. If necessary, they can be mounted on the M3 tripod for use in the ground role or in upper levels of buildings. As with the M240G, the obstacle that will affect the employment of heavy machine-guns will be the limited availability of long-range fields of fire. Additionally, grazing fire of the M2 .50-cal machine-gun may be obstructed by rubble. The .50-cal machine-gun's ammunition penetration will be affected by the shorter ranges, but not as much as that of the M240G. The .50-cal machine-gun is capable of producing significant amounts of damage to structures with continued, concentrated fires. The MK-19 40-mm automatic grenade launcher is capable of delivering large volumes of 40-mm grenade fire into defilade, behind rubble, and into buildings. It is also capable of producing significant damage to buildings. The MK-19 may be affected by the short engagement distances, and the minimum arming distance of the rounds should be considered. Also, as previously mentioned, as much as 25 percent of the rounds fired from the MK-19 may skip or ricochet off hard surfaces without detonating.

TYPE	THICKNESS (inches)	HOLE DIAMETER (inches)	ROUNDS REQUIRED
Reinforced concrete	10	12	50
		24	100
	18	7	140
Triple brick wall	12	8	15
		26	20
Concrete block with single brick veneer	12	10	25
		33	45
Armor plate	1	Initial	1
Double sandbag wall	24	Initial	5
Log wall	16	Initial	1
Initial = penetration only, no loophole			

Table 4a. Structure penetrating capabilities of .50 caliber ball against typical urban targets (range 35 meters).

THICKNESS (meters)	100 METERS (rounds)	200 METERS (rounds)
2	300	1,200
3	450	1,800
4	600	2,400

Table 4b. Number of rounds needed (.50 caliber) to penetrate a reinforced concrete wall at a 25 degree obliquity.

NOTE: For statistics on the MK-19, see Table 2.

(6) **Rocket Launchers and Anti-Tank Guided Missiles (ATGM).** The M136 AT-4 and MK 153 SMAW (USMC) are the primary rocket launchers that will support a rifle company in MOUT. Javelins or TOWs may also support a company. These will be used to destroy enemy fortifications and light armored vehicles. AT-4s and SMAWS are extremely effective at destroying enemy positions within buildings. To maximize their effectiveness, they should generally be aimed beside or at the base of the intended target opening (window or door). If shot directly into the opening, the warhead may detonate behind the enemy or pass through interior walls, both of which will lessen the fragmentation effect of the round. When exploded next to the opening, the blast effect directly on the other side of the wall is magnified by the fragmentation produced from the construction materials themselves (concrete, brick, or wood splinters). SMAWs are also capable of creating man-sized breaches in exterior walls of most buildings. It will be least effective in this role against steel-reinforced concrete and heavy natural stone walls. **Regardless of the type, most masonry walls may require successive shots to create a man-sized hole.** Javelin

and TOWs are normally employed in a conventional role to cover likely mechanized avenues of approach and to destroy specific point targets during the attack or defense. Because of their shaped charge warheads, they will be less effective at creating large holes in structure walls, and the fragmentation created is limited. Much research has been done concerning the backblast of these types of weapons in MOUT.

Since the end of World War II, the U.S. Army has conducted extensive testing on the effects of firing recoilless weapons from within enclosures. The following were some of the findings of this testing:

(a) Generally, it has been found that the backblast created offers minimal danger to the gunners, even in enclosed positions. However, hearing loss is still a serious hazard that can be expected. This must be evaluated against the advantage gained in combat from firing from cover.

(b) Damage to the room and/or structural integrity of the building can be reduced by ensuring adequate ventilation (open window and/or door).

(c) Consideration should be given to other occupants of the building. The safest place for other soldiers in the room with the firer is against the wall from which the weapon is fired. Backblast, plastic ignition plugs, and flying debris are a deadly hazard to anyone standing directly behind a recoilless weapon when it is fired. More significant is the danger created by backblast when fired outside in MOUT. Streets and alleys tend to canalize the backblast effects. Dust, debris, and other objects created from urban warfare will also become problematic as they are kicked up and blown around by the backblast. Thermal sites on the Javelin and TOW may be of great use even during the day because of their ability to observe through smoke and dust.

(d) Minimum arming distances will be another consideration to take into account. To ensure sufficient distance is provided to allow the warhead to arm itself, rocket launchers and ATGMs may need to be placed in the upper levels of buildings or on rooftops. Shooting down from these positions will also be more effective against armored vehicles.

(7) **Mortars.** Mortars are a high-trajectory weapon. This makes them well suited for urban combat due to the height of buildings and the natural "canyons" they create. Mortars can be employed against enemy positions on rooftops, behind buildings, or in other defilade positions. Mortars can be used to fix enemy positions, isolate objectives, suppress, and destroy enemy positions or formations in the open. Suppressing enemy positions within buildings may be difficult or impossible due to building construction. Conversely, mortars may penetrate the rooftop or cause significant structural damage to lightly constructed buildings. To deny the enemy rooftop positions or limit the amount of rubble produced, HE/VT may be used. A major drawback is the ability of the unit calling for fire to observe the mortar fire which may be reduced due to buildings or rubble.

(8) **Armor/Mechanized assets.** In the offense, mechanized assets may be used to isolate the objective, destroy point targets, or suppress enemy positions. Tanks, Bradleys, M113s, AAVs (USMC), and LAVs (USMC) are extremely lethal in a direct fire role against enemy armored vehicles and fortified positions. The capabilities and limitations associated with armor and mechanized assets remain the same in MOUT as they do in other environments. Additional roles these assets may fill are smashing barricades, establishing mobile road blocks, acting as evacuation or civil disturbance platforms, and logistics carriers. The main armament of armor and mechanized vehicles can have devastating effects on buildings. In addition, armored vehicles also have secondary weapons (medium and heavy machine-guns) that can be used to support the attack or defense. Some mechanized assets also bring to the MOUT battlefield additional thermal sights that can be employed similar to the Javelin and TOWs. It is important to remember that with all the inherent strengths armored vehicles have, urban terrain is a

very dangerous environment in which to operate. The broken nature of the terrain, elevated firing positions, and limited maneuver space can allow the enemy to get close to armored vehicles and inflict serious, if not fatal, damage. **In the offense or defense, *the infantry* bears responsibility for protecting armored and mechanized vehicles from enemy dismounted armor-killer teams.**

(9) **Artillery/Naval Gunfire.** Because of their relatively flat trajectory, artillery and naval gunfire are limited in their ability to suppress or destroy point targets within an urban area. Both will have difficulty hitting targets hidden within buildings or in the natural defilade created by the buildings. Use of laser-guided munitions (Copperhead) may be useful to engage targets with pinpoint accuracy, but again the masking of those fires may be a problem. Artillery and NGF can be used to isolate urban centers or areas within the built-up area. They can also be used to illuminate areas within the city. Both artillery and NGF, when fired within urban areas, will create significant amounts of rubble and will cause considerable damage to structures. This may hinder follow-on operations and should be considered. Artillery may be used in the direct fire mode to rubble buildings or create a breach point. Depending on building construction, the danger of fires started by artillery and NGF should also be considered. Rules of Engagement (ROE) may prohibit the use of these fires within all, or a portion of, the urban area.

(10) **Non-lethal Weapons.** Much progress has been made in recent years on development of non-lethal weapons, and research continues to be done. One reason that this subject has received so much attention has been the need for dealing with large numbers of people when deadly force was not an option or not the best option to choose first. MOUT is an area where non-lethal weapons may be of great assistance due to the large number of civilians associated with urban areas. Non-lethal weapons may be an effective way of dealing with an enemy located within a civilian population without putting civilians at risk. Even without the presence of civilians, some non-lethal weapons may be an effective way of dealing with the enemy. For example, CS gas can be delivered, by any number of ways, into a building to drive the enemy out of their positions. Pepper spray or stinger ball grenades may be substituted for fragmentary or concussion grenades when clearing a building.

3. REFERENCES.

For more detailed information concerning weapon effects and employment, refer to **FM 90-10-1, *An Infantryman's Guide To Combat in Built-up Areas***, Chapter 8; and **MCWP 3-35.3, *Military Operations On Urbanized Terrain***, Appendix B.

APPENDIX D

AIRCREW MAP CONVERSION TECHNIQUES

by CPT John C. White, Military Analyst, CALL

1. DISCUSSION: Maps currently used for both mission planning and flight operations do not give aircrews the necessary detail to fly and fight on an urban environment. Both joint operational graphics (JOG) maps and tactical 1:50,000 scale maps do not provide the necessary detail. Aircrews must have maps that accurately portray the terrain within the city, man-made features in the city, and hazards to flight. Aircrews can use both the JOG and 1:50,000 maps for en route navigation to the city and then transfer to maps that offer greater detail. The Air, Land, Sea Application Center's draft manual, ***Aviation Urban Operations***, provides a technique to convert a civilian city map for use.

2. TTP: Civilian Map Conversion

Units may also convert civilian maps to the military grid reference system (MGRS) using the technique below. There must be enough maps so that both the air and ground units can use them. If military grid coordinates are required for navigation or targeting, the civilian map must be overlaid with the MGRS using the following method:

Determine two known locations (surveyed grid, GPS, or extracted from tactical land map) identifiable on the civilian map. Designate these locations as points #1 and #2.

EXAMPLE: Point #1 = PK 1733-4354
Point #2 = PK 2691-3802

Subtract the smaller northing value from the larger. Express difference in KM.
4354-3802=552 -or- N = 5.52 KM

Subtract the smaller easting value from the larger. Express difference in KM.
2691-1733=954 -or- E = 9.54 KM

Determine the actual distance ("H") between the points. Express in KM.

Formula: $H = (N + E)$

$H = (5.52) + (9.54)$

$H = 30.4704 + 91.0116$

$H = 121.482$

$H = \sqrt{121.482}$

$H = 11.02$ KM

Measure the distance ("M") between the points on the map to be used. Express in cm.

EXAMPLE: On the Killeen/Ft. Hood, TX residential map, the distance between points #1 and #2 equals 35.7 cm.

-or-

M = 35.7 cm

Determine the scale of the map to be used. Express in cm per KM and ratio.

M/H = 35.7 cm / 11.02 KM = 3.24 cm per KM

-and-

H/M = 11.02 KM / 35.7 cm = 0.30868

-or-

Scale = 1:30,868

Determine the northing and easting differences ("Nm" and "Em") expressed in cm of map distance. Nm = N * (M/H), Em = E * (M/H)

Nm= (5.52) (3.24) = 17.88 cm Em= (9.45) (3.24)= 30.62 cm

Mark the northing and easting differences (measured in cm) along two adjacent edges of a blank sheet of paper.

Difference Markings

Position the paper on the civilian map with each mark on the paper edges over points #1 and #2. Place a mark on the map at the corner of the paper between the two edges used. This is the grid north reference point. If the points and marks will not line up with the paper lying flat, an error has been made in the previous steps or the map is distorted.

With a pencil and a straight edge, connect both points #1 and #2 to the reference point. Extend these lines through the reference point in each direction. These are the N-S and E-W reference lines.

Based on the known grid locations of points #1 and #2, determine the distance to the nearest whole-numbered grid line.

#1: 0.33 KM from 17 N-S grid line
#2: 0.02 KM from 38 E-W grid line

Determine the map distance to the whole-numbered grid lines.

#1: (0.33)(3.24) = 1.07 cm from N-S reference line
#2: (0.02)(3.24) = 0.06 cm from E-W reference line

With a quality metric ruler, measure the distance from the reference lines in the appropriate direction and draw grid lines parallel to the reference lines. Label these with the whole number grid line value.

- Measure 1.07 cm west from the N-S reference line, plot at least two points parallel to the reference line, connect the points, and label this line "17".

- Measure 0.06 cm south from the E-W reference line, plot at least two points parallel to the reference line, connect the points, and label this line "38".

Working in 1KM intervals (M/H) from the labeled grid lines, create a grid pattern on the map or on an overlay. Label the grid lines with the appropriate whole numbers along the margin. Verify that points #1 and #2 map grids correspond with the known positions. Establish a grid pattern originating from the intersection of the initial grid lines with each grid square equaling 3.24 cm on each side. Label the grid lines along the map or overlay edges.

Manufacture a grid protractor with at least 100 meter degree of accuracy (50 meter or 10 meter accuracy preferred, depending on scale). Cut a 5" x 8" card in half lengthwise. Take the halves and overlap them with one oriented horizontally and the other vertically. Align the edges of both cards at a common corner and tape or paste the cards together. Beginning at the apex of the inside right angle described by the two cards, make ten prominent marks, one every 0.324 cm. These represent 100 meter intervals. Label these 1-10. Total distance from the apex to the tenth mark should be exactly 3.24 cm. Halfway between each of the numbered marks, place a smaller mark to define the 50 meter interval.

Ruler

Validate the accuracy of the grid pattern and protractor. If available, use a third known position, extract the grid using the protractor on the newly prepared map, and compare it with the known grid location. If a significant discrepancy exists, either an error has been made in the preparation process, or the map being used is distorted in relation to the actual terrain (i.e., the map is a hand-drawn tourist-type map without a basis on satellite/aerial imagery or survey data).

APPENDIX E

TASK SUMMARY SHEET

This task summary sheet was extracted from the Live Fire - Mission Book for the MOUT Complex at the Joint Readiness Training Center. The tasks for the Live Fire Unit are listed although all may not be observed during one live-fire exercise. This summary sheet is provided as reference material only for the JRTC MOUT LIVE FIRE.

TASK SUMMARY SHEET

MISSION: MOUT

TASK TITLES	T&EO NUMBER	OBSERVATIONS			
		T	P	U	N
1. PREPARE FOR COMBAT	7-3/4-1606				
2. DEVELOP & COMMUNICATE A PLAN	7-3/4-1605				
3. MOVE TACTICALLY	7-3/4-1134				
4. TAKE ACTION ON CONTACT	7-3/4-1107				
5. EXECUTE ASSAULT	7-3/4-1103				
6. PERFORM OVERWATCH/SPT BY FIRE	7-3/4-1108				
7. CLEAR A BUILDING	7-3/4-1110				
8. CONSOLIDATE AND REORGANIZE	7-3/4-1607				
9. TREAT AND EVACUATE CASUALTIES	7-3/4-1504				
10. EMPLOY FIRE SUPPORT	7-3/4-1200				
11. PERFORM AIR ASSAULT	7-3/4-1126				

TASK PERFORMANCE SUMMARY BLOCK

TOTAL TASKS AND STANDARDS OBSERVED ☐

MISSION SUMMARY

T	P	U

RISK ASSESSMENT

LOW 0-100 MODERATE 101-200 HIGH 201-300

OBSERVER/CONTROLLER'S SIGNATURE _____

NOTE: OCs prepare a separate task summary sheet for each mission observed. OCs comments may be placed on an enclosure to the task summary sheet.

APPENDIX F

SIMPLE MARKING DEVICES FOR URBAN OPERATIONS

by Arthur A. Durante, Deputy Chief of Doctrine, U.S. Army Infantry School

Units have long identified the need to mark specific buildings and rooms during urban operations. Sometimes rooms need to be marked as having been cleared, or buildings need to be marked as containing friendly forces. The U.S. Army Infantry School is currently testing a remote marking device that can be used to mark doors from as far away as across a wide street.

In the past, units have tried several different field expedient marking devices, some with more success than others. Chalk has been the most common. It is light and easily obtained, but not as visible as other markings. Some other techniques have been to use spray paint and paint ball guns.

- Canned spray paint is easily obtained. It comes in a wide assortment of colors, including flourescent shades that are highly visible in daylight. It is not removable once used. However, spray cans of paint are bulky and hard to carry with other combat equipment. Paint is not visible during darkness nor does it show up well through thermal sights.

- Commercial paint ball guns have been purchased by some units and issued to small unit leaders. Some models can be carried in standard military holsters. They can mark a building or a door from about 30 meters. However, the ammunition and propellant gas is not easily obtainable. The ammunition is fragile and often jams the gun if it gets wet. The available colors are not very bright and just like spray paint, cannot be seen at night or through thermal sights.

Units in Germany have developed a simple, effective, easy to make, lightweight device, dubbed a "Wolf Tail," to mark buildings, doorways, and windows. One unit has changed its tactical standing operating procedures (TSOP) to require that each infantryman carry one of these devices in his BDU cargo pocket. Wolf Tails, when used in accordance with a simple signaling plan understood by all members of the unit, can aid in command and control, reduce the chances of fratricide, and speed up casualty collection during urban combat.

The Wolf Tail marking device is simple to make and versatile. Rolled up, it makes a small, easily accessible package that can be carried in the cargo pocket of BDUs. It can be recovered easily and used again if the situation changes. All its components can be obtained easily through unit supply. It combines a variety of visual signals (colored strapping and one or more chemlites of varying colors) with a distinctive heat signature that is easily identified through a thermal weapon sight. An infrared chemlite can be used either as a substitute for the colored chemlite(s) or in addition to the chemlite.

Constructing the Wolf Tail marking device requires the following material:

- A 2-foot length of nylon strap (the type used for cargo tie-down)
- Approximately five feet of 550 cord
- A small weight such as a bolt or similar object
- Duct tape
- Chemlites (colored and/or IR)
- Two 9-volt batteries

Assemble the items by tying or taping the cord to the small weight. Attach the other end of the cord to the nylon strapping, securing it with duct tape. Attach the 9-volt batteries in pairs to the lower end of the strapping with several wraps of duct tape, making sure that the negative terminals are opposite the positive, but not actually touching. Use more duct tape to attach the chemlites, approximately two inches above the batteries, to the strapping (see Figure 1).

When you want to mark your position, push the batteries together firmly until the male and female plugs lock. This shorts out the battery, causing it to heat up rapidly. The hot battery is easily identified through the thermal sights of tanks or BFVs. The batteries will remain visible for about 45 minutes. Activating the chemlites provides an easily identified light source visible to the naked eye. You can use infrared chemlites if you want them to be seen through night-vision devices.

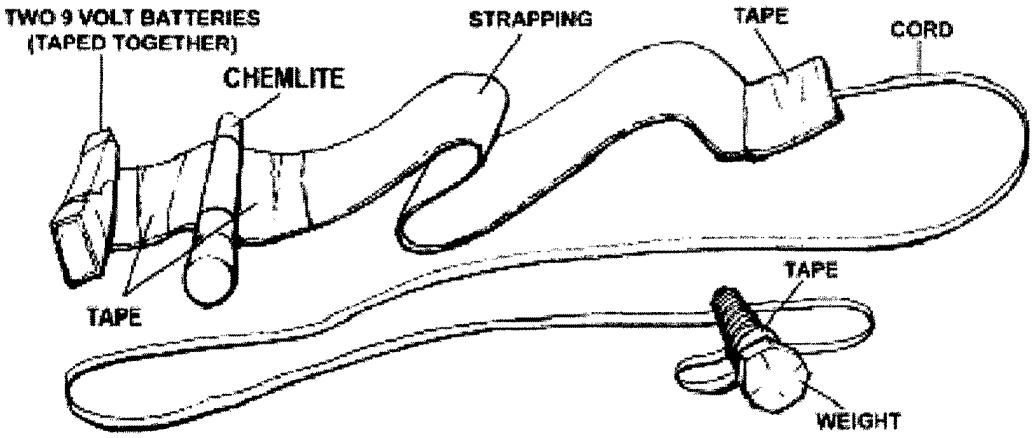


Figure 1

Use the cord and the small weight to hold the Wolf Tail in position by tying or draping it out a window or hanging it on a door, wherever it is best seen by other friendly troops. Squads or platoons can vary the numbers and colors of chemlites, or use multiple battery sets to identify precisely what unit is in which building. Medics and combat lifesavers can carry a standardized variation that can be used to clearly identify a building containing wounded personnel needing evacuation.

APPENDIX G

THE BATTLE FOR GROZNY AND THE BATTLE FOR SHUGART-GORDON: SIMILARITIES AND DIFFERENCES

by Lester W. Grau, Military Analyst, Foreign Military Studies Office

The author recently witnessed a heavy-light brigade attack at the Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana. The main attack was a reinforced battalion attack against the 29-building hamlet of Shugart-Gordon. The attack disclosed that despite their many differences, the American force experienced several of the same problems that the Russian Army encountered initially during their battle for Grozny in late December 1994 and early January 1995.

The Russian force that entered Chechnya and struck at the capital city of Grozny was not ready for combat. There had not been a single regimental or division exercise for two years, and very few battalions had more than two weeks' field training during the same time. There was not a single ready division in the entire Russian Army. In desperation, the Russian planners assembled composite units with elements from all over Russia. The commanders had no time to train this force, and important combat, combat support, and combat service support systems were missing when the Russian Army moved into Chechnya. The battle for Grozny would prove long and bloody, but eventually the Russian Army forced the Chechen combatants out of the ruined city.

On the other hand, the American force that entered Shugart-Gordon was well trained and equipped. However, its light and heavy components did not have a traditional affiliation and integrated for the first time at the Intermediate Staging Base in Alexandria, Louisiana. The composite force only had a few days to work together before they were committed to the attack.

The situations were clearly dissimilar. Grozny covers over 100 square kilometers, while Shugart-Gordon's 29 buildings cover a little over a square kilometer. The Chechen combatants had a large variety of antitank weapons, while the OPFOR lacked any antitank weapons except for a few antitank mines. The Russians used a lot of artillery in the direct fire mode, while American artillery stayed well back from the fight. The initial Russian entry was a rapid, high-tempo, reckless push into the city, while the American effort was agonizingly slow, methodical, and predictable. Still, there were some striking similarities:

- A common first step in urban combat is to surround the urban area and seal it off to prevent the enemy from reinforcing, escaping, or extending his maneuver space. Both the Russians and the Americans failed to seal off their objective before entering the urban area.

- Modern urban combat has demonstrated that leading with pure armor can lead to disaster. Both the Russians and the Americans entered the urban area leading with tanks and separated from dismounted infantry.

- The primary role of armor in urban combat is to follow and support. Both the Russians and the Americans continued to lead with tanks and, once infantry had linked with armor, allowed opposing action to separate them again.

- Clean drinking water is vital for force well-being. During the winter months, 15 percent of one Russian brigade was sick from viral hepatitis–a condition that resulted from inadequately treated drinking water. It took the American force four days to produce its first gallon of clean water. There were no hand-washing facilities near the American latrines.

- Movement along streets is highly hazardous; movement should be conducted by blowing holes in walls and moving between buildings. Both the Russians and the Americans moved along the streets initially. The bulk of Russian and American casualties were on streets and in the open areas between buildings. The chief casualty-producers were mortars and snipers.

- Refueling and ammunition resupply are difficult in a constricted city. Withdrawing tanks can panic supported infantry. The Russian forces had initial difficulty handling these resupply tasks. The American tanks ran out of fuel and ammunition in the city at a critical point of the fight. This was due to the exceedingly slow American advance. The force was at a loss as to how to rearm and refuel tanks under fire.

- Communications between the infantry and tanks was sporadic at best in both the Russian and the American units. This was particularly evident between the American heavy and light forces and attached non-divisional assets.

- Both the Russians and the Americans used helicopter gunships for close-air support. The Russians kept their helicopters over their own force, and these helicopters hovered behind tall buildings, popping up to engage targets. The American helicopters, which were not instrumented for MILES, were far more aggressive and free-ranging.

- Scouts in both forces had a difficult time getting eyes on the objective and determining what was really going on.

- Both the Russian and the American main attacks were defeated, and the units were combat ineffective within four hours of first entering the urban area.

Any comparison between an actual battle and an exercise is not valid, but it can surface common problems. The purpose of training and exercises is, after all, to address those common problems so that soldiers do not have to pay the ultimate price while units play "catch up" on the real battlefield.