

APPENDIX I

LIMITED VISIBILITY OPERATIONS UNDER MOUT CONDITIONS

With the rapid development of night vision devices throughout the world and AirLand operations doctrine that mandates continuous operations, US forces will continue to fight in built-up areas regardless of the weather or visibility conditions. To be successful, leaders must anticipate the effects of limited visibility conditions on operations and soldiers.

I-1. ADVANTAGES

When fighting in built-up areas during periods of limited visibility, attacking or defending forces have several advantages.

a. In most cases, US forces have a technological advantage in thermal imagery and light intensification over their opponents. This enables US forces to identify, engage, and destroy enemy targets before detection by the enemy.

b. AirLand operations stress continuous operations, day and night. This allows the attacking forces to conclude the battle decisively in a shorter period of time. It also allows the attacker to retain the initiative.

c. Direct-fire target ranges in the MOUT environment are greatly reduced. During periods of limited visibility, effective target acquisition ranges are even further reduced. This enables attacking forces to close to shorter ranges, thus increasing the lethality and accuracy of weapons. Attacking forces can also take advantage of the enemy's reduced visibility and can engage before being detected with thermal imagery or light intensification devices.

d. Air assault operations are best conducted during periods of limited visibility, since the enemy's air defenses are degraded.

e. Attacking during periods of limited visibility gives the attacker a greater chance of surprise.

I-2. DISADVANTAGES

When fighting in built-up areas during limited visibility, attacking and defending forces also face some disadvantages.

a. Command and control is difficult in any operation in a built-up area, and periods of limited visibility increase this difficulty.

b. Soldiers have an instinctive tendency to form groups during limited visibility. Constant attention must be given to prevent the soldiers from "bunching up."

c. Due to the low visibility and the characteristics of built-up areas, soldiers become disoriented easily.

d. Target identification becomes difficult in limited visibility conditions. Depending on the individual, the soldier may fire at anything he sees, or he may hesitate too long before firing. This is one of the leading causes of fratricide, so leaders must pay close attention to soldiers' target engagement.

I-3. FRATRICIDE AVOIDANCE

The risk of fratricide is much greater during periods of limited visibility. The key to avoiding fratricide is situational awareness by leaders and individuals coupled with training. Other considerations include:

- a. Graphic control measures should be clearly defined and obvious. Examples include distinct buildings, large boulevards, rivers, and so forth.
- b. Leaders must exercise firm control when engaging targets. Movements should also be tightly controlled.
- c. Cleared rooms and buildings should be distinctly marked to identify cleared areas and friendly troops to any base of fire supporting the maneuver.
- d. Visible markers (for example, glint tape or thermal strips) should be attached to individual soldiers.
- e. Far and near recognition symbols should be used properly.
- f. Units using close air support must exercise firm control and direct their firing. Failure to do so may lead to the pilot becoming disoriented and engaging friend and foe alike.

I-4. URBAN ENVIRONMENTAL EFFECTS ON NIGHT VISION DEVICES

The characteristics of built-up areas affect standard US NVDs and sights differently than do open areas. This may cause some confusion for soldiers operating during limited visibility, since the images they receive through their NVDs are unusual.

- a. Since most built-up areas have electric power, street lights and or building lights “white out” any light intensification devices unless the power is disrupted.
- b. The chance that fires will be burning in the area of operations is high. This causes problems not only for light intensification devices, but possibly for thermal devices as well.
- c. Subterranean areas and the interiors of buildings will not have ambient light if the power is off. Passive NVDs must have an artificial light source, such as infrared, to provide enough ambient light for the devices to work.
- d. The many reflective surfaces found in built-up areas may cause false images, especially for laser range finders and laser target designators.
- e. Large amounts of dust particles suspended in the air prevent thermal imaging devices from seeing through the dust cloud.
- f. Smoke also affects NVDs similar to the way dust does.
- g. Fog degrades long-range target acquisition from thermal sights, which may cause problems for any overmatching or supporting elements.
- h. Weapons flashes within enclosed areas appear to be much brighter. This causes soldiers to lose their night vision and washes out light intensification devices.

I-5. CONSIDERATIONS

The environment of built-up areas presents special challenges and considerations during periods of limited visibility.

- a. The use of glint tape, thermal tape, budd lites, or chemlites is an important consideration. These can be used to mark the forward line of troops, casualties, cleared buildings and rooms, weapons positions, and

individual soldiers. Their use must be clearly addressed in the unit's TAC SOP. When markers are used for extended periods, their meanings should change since the enemy may be able to capture or manufacture and use these marking devices.

b. The use of tracer and incendiary ammunition may be restricted to prevent fires. Also, the light of the fires "whites out" light intensification night vision devices and may interfere with thermal devices.

c. The control of power stations may be essential to operations during limited visibility. This enables friendly forces to control, to a degree, background illumination. Shutting off the power to the street lights is preferable to shooting the lights out. Commanders must balance the trade-off between force protection and maintaining law and order after the battle is over. During cold weather, the control of power stations may be critical for the welfare of the civilian population.

d. The identification between friendly soldiers, noncombatant civilians, and enemy troops becomes more difficult during limited visibility operations.

e. The location of the source of sounds becomes more difficult due to the natural echoing in built-up areas and the tendency of sounds to carry farther at night.

f. The location of booby traps and obstacles also becomes more difficult at night. Movement rates are slower than during normal visibility.

I-6. SPECIAL EQUIPMENT

Fighting during periods of limited visibility requires some specialized equipment to maximize maneuver and target engagement.

a. As a rule, thermal imaging devices, such as the AN/PAS-7 IR viewer (LIN Y03104) and the Dragon IR sight AN/TAS-5 (LIN N23721), are better for limited visibility operations than light intensification devices such as the AN/PVS-7 (LIN N05482). Light intensification devices are easily washed out from background light, weapons flashes in enclosed areas, and fires. Thermal devices, while also affected by fires, are not as easily washed out.

b. The AN/PAQ-4 infrared aiming device (LIN A34938) is similar to its civilian laser aiming sight counterparts except it is not visible to the naked eye. Pen lights can also be attached to weapons to provide a quick sight picture, illuminate rooms and hallways, identify obstacles and booby traps, and identify friendly forces.

c. Other night sights for weapons include the AN/TVS-5 (LIN N04596) crew-served weapon night vision sight, the AN/PVS-4 (LIN N04734) individual weapons night vision sight, and the AN/UAS-11 (LIN N05050) night vision set. The AN/UAS-11, while not easily man-portable, has the advantage of an integral laser range finder. It is also a thermal sight similar to the TOW 2 AN/TAS-4 night sight.

d. Trip flares, flares, illumination from mortars and artillery, and spotlights (visible light or infrared) can be used to blind enemy NVDs or to artificially illuminate the battlefield (Figure I-1). (See FM 7-90 for more information on illumination from mortars and artillery.)

e. Spare batteries for the NVDs should be carried to keep the devices operational. Soft, clean rags should be used to clean the lenses.

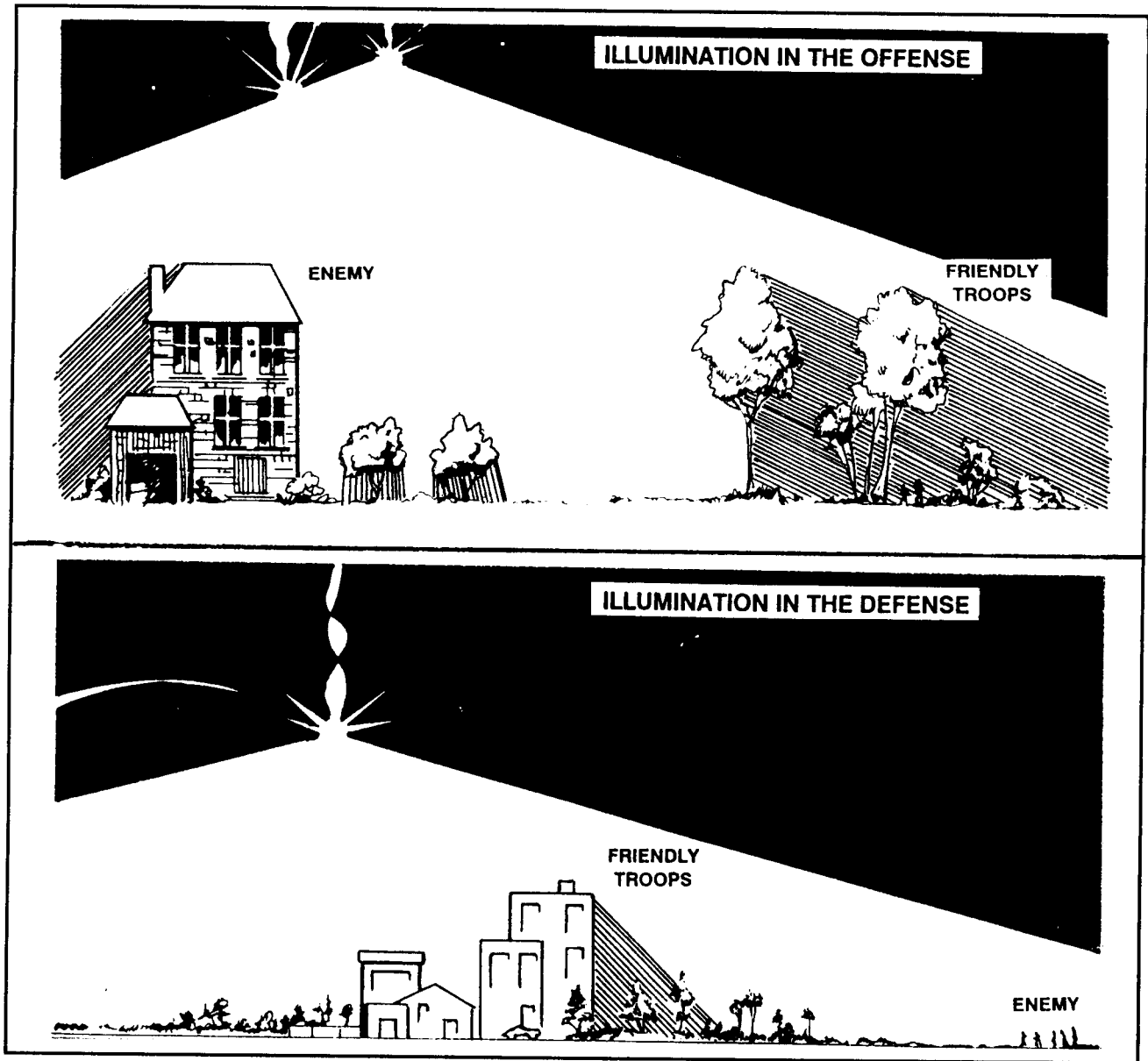


Figure I-1. Use of indirect fire illumination during MOUT.

I-7. COMBAT SUPPORT

Loss of synchronization is one of the major concerns to commanders and leaders during limited visibility operations under MOUT conditions. The concentration of forces and fires at the point of decision is facilitated by US forces' technological edge and by clear orders.

a. Any degradation of artillery fire will be due to the limited target acquisition assets. While the field artillery FOs and combat observation and lasing teams (COLTs) have thermal sights and laser range finders, most soldiers on the battlefield do not have devices that will enable them to accurately call for fire. The following are some devices and techniques to acquire targets for indirect fires.

(1) The AN/UAS-11 determines accurate coordinates with its thermal imaging sight coupled with a laser range finder. For the AN/UAS-11 to obtain accurate coordinates, the crew must first have an accurate location. The same technique can be used by any attached armor unit. The BFV can be used as well if it is equipped with a laser range finder.

(2) Preregistered TRPs are effective only if the TRPs can be observed and the observer has clear communications to the firing unit.

(3) Reflective surfaces found in built-up areas may affect laser designators.

(4) Counterfire radar should be employed to cover likely areas of enemy mortar, cannon, and rocket use. Because of the masking effect of built-up areas, counterfire radars are not normally emplaced within the built-up area.

b. Fixed-wing aviation assets face a lower ADA threat during periods of limited visibility. However, the need for command and control is greater to prevent fratricide. The best fixed-wing aircraft available for fire support is the AC-130 because of its target acquisition capabilities, deadly and accurate fire, and long loiter time.

c. Army aviation operates on similar limitations and considerations as fixed-wing aircraft. Most US Army attack helicopters have a forward-looking infrared (FLIR) night sight. Coupled with the slower speed and hover capability of the helicopter, Army aviation assets can deliver highly accurate and responsive fire on enemy targets. However, helicopters are more susceptible to enemy air defense artillery assets and, therefore, should only be employed where the enemy air defense threat is light. Commanders must identify clear land marks for the pilots to navigate to and from the objective.

d. ADA is significantly degraded during periods of limited visibility. Visual detection, identification, and range estimation are all difficult, if not impossible. Radar guidance systems have difficulty determining the target from ground clutter.

e. The lack of thermal imaging devices may hamper engineer units. Locating and clearing mines and booby traps also become more dangerous and difficult. The method of marking cleared lanes should be determined and coordinated in advance to avoid confusion with other limited visibility markers (glint tape, infrared strobe lights [budd lites], chemlites, and so forth).

f. Military intelligence relies primarily on human intelligence assets to gain information about the enemy in urban environments.

(1) GSR and REMs have limited use in the center of built-up areas. They are best employed on the outskirts to monitor traffic into and out of the built-up area. If necessary, GSR can be used to cover large open areas such as parks and public squares. REMs can be used in subterranean areas such as sewers and utility tunnels.

(2) Military intelligence units equipped with the AN/UAS-11 can use it in a variety of target acquisition and surveillance roles.

(3) Based on the time available before the operation or the urgency of need, satellite photographs of the built-up area may be available.

(4) Military intelligence officers at brigade level and below should obtain city maps of the area of operations. The normal 1:50,000 map scale is virtually useless to soldiers fighting in a built-up area. The Defense Mapping Agency maintains various city maps with either a 1:10,000 or 1:12,500 scale. These maps are created based on the need for contingency operations and

noncombatant evacuation operations (NEO). If no maps are available for the area, the S2 at battalion level can request that the division topographic section produce some products based on Terrabase and satellite imagery. If the division topographic section cannot produce the map, the request should be forwarded through channels to corps.

I-8. COMBAT SERVICE SUPPORT

Maneuver unit commanders and their soldiers are not the only individuals that must adjust to combat under limited visibility conditions in MOUT operations. Logisticians at every level must anticipate requirements for this unique environment.

a. Units conducting resupply operations during periods of limited visibility should remember the following:

(1) Drivers and vehicle commanders should be issued night vision devices so the vehicles going to and from logistic release points do not need any illumination. This also prevents the enemy from acquiring resupply locations by following vehicles with blackout lights on.

(2) Strict noise and light discipline should be maintained.

(3) Vehicles should follow a clearly marked route to avoid any obstacles and prevent the resupply vehicle(s) from becoming disoriented.

(4) Radios should be redistributed to resupply vehicles whenever possible, in case of further instructions.

(5) Each vehicle should have a map of the area of operations (preferably a city map with the street names).

b. Combat units operating for extended periods during limited visibility should have enough batteries to keep the NVDs functioning at optimum power and sensitivity.

c. A large operational readiness float of night vision devices, especially thermal sights such as the AN/TAS-4 or AN/UAS-11, should be maintained.

d. Casualty collection during periods of limited visibility is much more difficult. Clear methods for marking any casualties must be established before the operation begins.

e. CSS operations in existing structures at night must not be visible from along distance. This includes limiting vehicle traffic to an absolute minimum, sealing doors and windows to prevent light leakage, and dispersing assets as much as possible.

I-9. OFFENSIVE CONSIDERATIONS

US forces conduct attacks during periods of limited visibility to gain or sustain the momentum of the attack. Before conducting a limited visibility attack, the commander must balance the risks and ensure that every soldier understands the intent and control measures. Rehearsals and strict command and control reduce casualties and greatly enhance the chances for mission accomplishment.

a. Soldiers should clear buildings and rooms using the same techniques they use during periods of unlimited visibility to reduce confusion. The soldiers are well rehearsed in these techniques and, therefore, more confident. The only major difference is in equipment used. (See the paragraph on special equipment in this appendix.)

b. Movement rates are slower. Each soldier must be alert for mines, booby traps, and enemy positions. Although thermal imaging devices can

detect the difference in the temperature of the soil, light intensification devices are usually better for detecting recently disturbed dirt. Thermal imaging devices are better for identifying personnel; however, light intensifiers can identify friendly soldiers, noncombatants, and enemy troops better than the thermals.

c. Squads and fire teams should be equipped with a mixture of both thermal imaging and light intensifying devices whenever possible. This enables the squads and fire teams to obtain a better picture of the night environment and enables the soldiers to balance the strengths and weaknesses of each type of night vision device.

d. When moving through buildings, the assault teams must mark cleared rooms and buildings, and communicate with the support team(s). This communication is critical if more than one assault team is in the same building.

e. Soldiers should maximize the use of ambient light whenever possible for two reasons: to conserve the batteries of the night vision devices, and to make detection of attacking US forces harder for the enemy.

f. If flashlights or chemlights are used, they should be held away from the head or chest area. This will make it harder for enemy soldiers firing at the light to kill the soldier holding the flashlight or chemlite.

g. The assault team must have clear communications with all supporting elements, whether they are organic, in DS, under OPCON, or attached. Supporting units should not fire unless they have good communications with the assaulting elements and are sure the targets they are engaging or suppressing are the enemy.

h. Units must know where everyone is during offensive operations. Not only does this reduce the risk of fratricide, but it also increases the time of identifying, locating, and treating casualties. Also, it greatly reduces the chance of soldiers becoming disoriented and separated from the unit.

i. Assault teams should be aware of adjacent fires that diminish the effectiveness of night vision devices. Weapons flashes within small rooms cause soldiers to lose their night vision and wash out light intensification devices. Also, enemy soldiers may use flares inside and outside of buildings to render night vision devices ineffective.

j. Leaders must ensure that all soldiers follow the rules of engagement and the laws of land warfare. This is critical if the enemy is intermixed with the local civilian population. Also, soldiers and leaders must follow all control measures, especially graphic control measures.

I-10. DEFENSIVE CONSIDERATIONS

Enemy forces can be expected to use periods of limited visibility for the same reasons US forces do. (See the paragraph on advantages in this appendix.) Enemy forces may have access to sophisticated night vision devices manufactured in Europe, the United States, Japan, Korea, and the former Soviet Union. (See Chapter 4 for more information on defensive techniques.)