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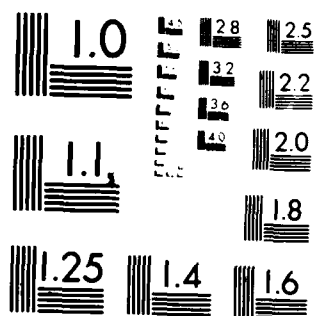
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STUDY PROJECT

AN ANALYSIS OF SCATTERABLE MINE DOCTRINE

BY

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USAWC MILITARY STUDIES PROGRAM PAPER

AN ANALYSIS OF SCATTERABLE MINE DOCTRINE

GROUP STUDY PROJECT

by

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Carlisle Barracks, Pennsylvania 17013
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Scatterable mines offer the Army and Air Force a powerful means to counter the battlefield mobility of any potential armored or mechanized enemy. However, the maneuver doctrine described in the AirLand Battle concept reinforces the requirement to preserve the full freedom of movement for friendly forces. A balance must be struck between these two competing demands. That balance can be attained by viewing scatterable mines as several distinct munitions, which are emplaced by different delivery systems and have unique strengths and weaknesses. Most importantly, commanders and planners at each level in the chain of command must carefully review warplans and provide subordinates with detailed guidance and restrictions--based on the factors of METT-T and on a thorough knowledge of Army doctrine--concerning the employment of each scatterable mine system.

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ABSTRACT

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This study summarizes the capabilities, strengths and limitations of scatterable mine systems; analyzes the doctrine concerning scatterable mine battlefield employment, command and control; establishes some proposed guidelines for the employment of scatterable mines in support of a main battle area defense against a Soviet/Warsaw PACT attack into Western Europe; and provides some broad conclusions on the integration of scatterable mines onto the modern battlefield.

Scatterable mines offer the Army and Air Force a powerful means to counter the battlefield mobility of any potential armored or mechanized enemy. However, the maneuver doctrine described in the Airland Battle concept reinforces the requirement to preserve the full freedom of movement for friendly forces. A balance must be struck between these two competing demands. That balance can be attained by viewing scatterable mines as several distinct munitions, which are emplaced by different delivery systems and have unique strengths and weaknesses. Most importantly, commanders and planners at each level in the chain of command must carefully review warplans and provide subordinates with detailed guidance and restrictions - based on the factors of METT-T and on a thorough knowledge of Army doctrine - concerning the employment of each scatterable mine system.

PREFACE

This Group Study Project was produced under the sponsorship of the US Army War College, Department of Command and Management. The genesis for the study came from the Director, Combat Development, US Army Engineer School. The study scope, objectives, research methodology and final product were developed by the authors. The authors are indebted to the many professionals visited, interviewed or contacted throughout the Army who provided frank and detailed information.

CHAPTER I
INTRODUCTION
CONCEPT

The principle objective for land mines has always been to fix, delay, disrupt, canalize and/or destroy an enemy. Because of the extensive preparation effort for mine field employment, mines were principally used in a defensive operation to restrict use of critical routes or terrains. The responsibility for use was held by the defensive commander, and the engineer elements of the defense usually provided the command and control of the mining effort.

With the advent of the electronic fused mine, mine warfare has and is undergoing a tremendous change. There are now two categories of mines i.e. permanent or conventional and the new scatterable self-destructing mines. The deficiencies of conventional mines are in employment, (difficult and time consuming emplacement as well as restriction in advance emplacement in Europe) and these necessitated the change to scatterable mines with the significant improvement in delivery systems. Scatterable mines can be delivered by helicopter, tactical air, artillery, engineers and combat units and can have variable self destruct times.

In order for minefield emplacement to be most effective and not restrict maneuver elements of the combat forces, coordination at all levels is essential.¹ As a result, all units having scatterable mine delivery systems must be trained to conduct mining operation during offensive, defensive, retrograde and rear area combat operations. To this end, the "Combined Arms Center is the proponent for integration of hand mine warfare concepts into joint operations and integration actions to complement this concept. The U.S. Army Engineer School is the proponent U.S. Army land mine warfare operations and development of mine warfare systems. The Field Artillery School is the proponent for artillery

delivered mines. The Army Aviation School is the proponent for Army aerial delivered mines."²

This study describes the capabilities of the various scatterable mine systems, which are currently in production or development. This study also summarizes the employment and the command and control requirements of these new mine systems as well as proposing guidelines for the employment of specific scatterable mines in a NATO main battle area. Finally, the study provides a series of recommendations concerning the future development of scatterable mine doctrine.

A summary of scatterable mine systems that are either in production or in development follows:

SYSTEM DESCRIPTION

NAME	ACRONYM	DELIVERY SYSTEM	SELF DESTRUCT FEATURE	TYPE* MINE
1. Area Denial Artillery munition	ADAM	Artillery	Factory set	AP Trip wire fuse
2. Remote Anti-Armor mine	RAAM	Artillery	Factory set	AT Magnetic fuse
3. Ground Emplaced Mine Scattering System	GEMMS	Trailer	Set on dispensing	AP Trip wire fuse AT Magnetic fuse Practice
4. Modular Pack System	MOPMS	Man-portable	Set at emplacement or by radio control	AP Trip Wire fuse AT Magnetic fuse Dummy dispenser
5. Air Delivered Scatterable Mine	GATOR	High Performance Aircraft	Set at loading	AP Trip Wire fuse AT Magnetic fuse
6. Helicopter Delivered Mine System	M56	Helicopter	Factory Set	AT Pressure fuse
7. Multiple Delivery Mine System	VOLCANO	Ground & Air Delivery	Set at Dispensing	AP Trip Wire fuse AT Magnetic fuse

* AP = Anti-personnel
AT = Anti-tank

CAPABILITIES

System Description

- Area Denial Artillery Munitions (ADAM)

The ADAM is a 155 mm howitzer round launched anti-personnel mine system. The round contains 36 wedge-shaped mines which are base-ejected over the target. When the ADAM mines come to rest on the ground three to seven trip wires are deployed and the mine becomes fully armed. The trip wire is a fine cloth thread which is dispensed from a spool from about 20 feet from the mine body. When the sensor is activated by pulling the thread, a small ball-like munition is propelled up 2 to 8 feet above the ground. The ball detonates, projecting approximately 600 pieces of 1.5 grain steel fragments in all directions. The mine has an anti-disturbance feature and will self destruct at a factory set elapsed time.³ The M692 has a greater than 24 hrs self destruct time and the M731 has a less than 24 hrs time. This system is currently in production and has been released to the field.

- Remote Anti-armor Mine (RAAMS)

The RAAMS is a 155mm howitzer launched anti-tank mine system. Nine anti-tank mines are packed into an M483 carrier round. The M718 and M741 rounds contain mines with long and short factory set self-destruct time respectively. This mine contains a magnetic impulse fuse which will attack the full width of a tank or vehicle. The RAAM is base ejected from the carrier round over the target and after a short delay to allow for mine free-fall, impact and roll, the fuse will arm. A number of the mines have an anti-disturbance feature which will cause the mine to detonate if they are moved or picked up.⁴ The RAAMS used a Miznay-Schardin plate kill mechanism which is propelled by approximately 3 pounds of explosive. RAAMS is in production and also has been released to the field.

- Ground Emplaced Mine Scattering System (GEMSS)

The GEMSS consists of a trailer mounted dispenser, M 74 anti-personnel mine M75 anti-tank mine, M 79 practice mine and an auxillary dispenser (FLIPPER). The GEMSS dispenser comprises of a two mine magazines with a capacity of 400 mines each, a conveyor reloading/unloading system, a launcher, an oscillator, a self contained diesel engine and a remote control console with cable. Mine dispensing is controlled from the towing vehicle which can be a 5 ton truck, M 113 series vehicle, M 9 ACE or M 729 Combat Engineer Vehicle. The dispenser operator has the capability to program the GEMSS mines for various self-destruct times and minefield width as well as densities according to the mission requirements. The M 74, M 75 and M 79 mines are shipped in a dedicated container. The container holds eight polyethylene sleeves, each contain five mines, for a total of 40 mines per container. The M 74 and M 75 mines weighs approximately 3 pounds and 3.8 pounds respectively and are cylindrically shaped, with a diameter of 4.75 inches and a height of 2.6 inches.⁵ The M 75 AT mine uses a magnetic influence fuse and two Miznay-Schardin plate kill mechanism similar in design to the RAAMS mine. The AP mine is a ground blast/fragmentation mine activated by the trip line sensors similar to the ADAM mine designs. A percentage of M 75 anti-tank and all M 74 anti-personnel mines have an anti-disturbance feature. The M 79 practice mine is inert and weighs approximately 3.6 pounds and is used in training in place of both the M 74 and M 75. The GEMSS auxillary dispenser known as FLIPPER is a manual one man operated dispenser that can implant mines at a rate of 1 mine every 10 seconds. The FLIPPER will initiate the mine arming sequence, set the self-destruct time and launch mines 20 meters from the vehicle to which it is attached. GEMSS components except for FLIPPER are in production and will undergo production acceptance testing prior to release. FLIPPER is in the early stages of development and its configuration has not been

finalized at this time.

- Modular Pack Mine System (MOPMS)

The MOPMS is a man-portable anti-tank or anti-personnel mine system. The system consists of XML31 dispenser with anti-personnel mines, XML32 dispenser with anti-tank mines, XML36 practice dispenser, and XM71 remote control or electrical blasting machine (10 or 50 cap) with electrical wire. The anti-personnel and anti-tank dispensers contain the command receiver and electronics in the module control unit (MCU), seven launch tubes containing three mines each and detonators for deploying mines. The dispenser weighs approximately 150 pounds and will be stored, shipped and emplaced without any additional containerization. During operation, the dispenser is prepared with command data that is generated by the XM71 remote control unit. Dispenser and mines then respond only to command data that contains the designated code. Upon receipt of the correct commands from the remote control unit via a radio frequency (rf) link or from a blasting machine through the electrical wire, the dispenser deploys the mines. The practice dispenser does not deploy mines but contains lights to indicate successful function of the dispenser. There are two types of mines used by the system AP and AT. These are similar in design to GEMSS mines in fusing and kill mechanism. The electronics used in the mines are similar to the GEMSS electronics but differ in that both type of mines can receive, store and interpret data or commands. If the dispenser had been prepared with the remote control unit, the mines can be detonated upon command from the remote control unit. The remote control unit, as presently configured, allows one operator to control as many as 15 groups of MOPMS modules. The MOPMS is currently in the Full Scale Development Phase. The Development Test II and Operational Test II have not been initiated at this time.

- Air Delivered Scatterable Mine (GATOR)

The GATOR mine system is a high performance aircraft delivered system. The system consists of an anti-tank mine BLU91 and an anti-personnel mine BLU92. These mines are similar to the GEMSS mines in kill mechanism and sensor functions. The mines look similar to the GEMSS but have a plastic square looking air foil which is attached to the outside of the mine. This air foil is used to reduce the impact velocity of the mine. The system uses two different delivery devices. The Air Force uses a SUU-66 dispenser which holds 94 mines and the U.S. Navy uses a modified MU7 dispenser, which holds 60 mines. These dispensers are loaded with a ratio of three AT to each AP mine. The dispensers are released from an aircraft and after some delay, a linear charge cuts the skin and the dispenser splits dispersing the mines aerodynamically.⁶ The mines are electronically armed by capacitors in the dispersion and the self-destruct times are set for each mine based on the dispenser timing. The GATOR system recently completed Full Scale Development and has entered into the production phase of the life cycle.

- Helicopter Delivered Mine System (M 56)

The M 56 helicopter delivered mine system was the first scatterable mine introduced into the U.S. Army. This system is delivered using the USAF SUU-13 bomb dispensed and currently can only be mounted on UH-1 helicopter. Each helicopter can carry two dispensers which contain forty canisters with two anti-tank mines each for a total of 160 mines.⁷ The dispenser control is mounted in the UH-1 control panel and the pilot controls the mine field density through aircraft ground speed and altitude. The greater the ground speed the bigger the mine field. The mine used in the M 56 system is different from the other scatterable mines discussed before in that it has a pressure fuse system which causes the mine to detonate as the vehicle passes over the mine. The mine has

only a blast kill mechanism which will break a tank track or destroy a wheel. The mine is not designed to penetrate the vehicle and kill personnel as are the other AT mines. The mine is equipped with a self destruct feature and a percentage of mines are equipped with a delay fuse as a counter-measure against the mine clearing roller. This permits the roller to pass over the mine and the mine to detonate under the roller pushing tank. The planned production for the system has been completed and all mines have been released to the field.

- Multiple Delivery Mine System (VOLCANO)

VOLCANO is a developmental system intended to replace the M 56 helicopter delivered mine system and ultimately provide a single mine delivery system for both ground and air delivery. Currently VOLCANO will utilize an unmodified GATOR mine. The system is to consist of three components; a mine module, a dispenser and the dispenser control. The mine module will be man-portable and contain the mines as well as a propulsion devise inside a tube-like housing.⁸ The dispenser will accommodate the mine modules in a series or grouping of racks. It will provide structural strength and mechanical support for the system outside of the helicopter or on top of the carrying vehicle. The operator, using the dispenser control unit, electrically controls the dispensing operation from within the carrying helicopter or vehicle. The system will use the host vehicle as an electrical power source. Early designs call for 28 mine modules in the dispensers each containing 5 mines. The system is in the initial stages of development and a contract was awarded. The use of the GATOR mine will allow the development to be compressed for accelerated delivery.

Strengths and Limitations of Scatterable Mine Systems

- Overall

Scatterable mines can meet the needs of the Air Land Battle Concept. These mines have a quick reaction emplacement time which greatly reduces the manpower logistics and effort over the use of conventional mines. These mines, except

for the M 56, can provide a tank kill capability not an immobilization damage easily corrected by crew maintenance. The self destruct feature can provide the tactical commander with an unrestricted counter-attack mobility.

- RAAM/ADAM

RAAM/ADAM along with GATOR are the systems used for interdiction mine field missions. They can also be used for point minefield missions. The short reaction time of these artillery delivered systems provide a commander with a fast and effective way to deliver a mine field. The long range capability of artillery provides immunity for personnel from enemy direct-fire when laying a mine field and provides a capability to emplace mines in the direct path of the advancing enemy. Like all scatterable mines the high cost to delivery and emplace mine fields is a definite drawback. In addition, errors in delivery make difficult identification of minefield boundaries and safe areas. A primary limitation is that this system is in direct competition with other high priority missions for 155 mm artillery.

- GEMSS

GEMSS, being under the control of combat engineers, provides the fastest and most reliable means of emplacing large pre-planned minefields. GEMSS can be emplaced at a rate of up to 800 mines in 15 minutes. Because of dispenser options, minefield densities and configurations can be optimized to meet the mission requirements. Pre-planned gaps or safe lanes can be provided for passage of friendly troops; however, the self-destruct feature of the mine can make safe lanes hazardous because of the effective kill radius of exploding mines. GEMSS requires a prime mover preferably a track vehicle for mobility. A dedicated vehicle is not now being provided to pull the GEMSS dispenser. The dispenser is easily recognizable and therefore highly vulnerable to any enemy fire. GEMSS mines must therefore be emplaced in friendly areas prior to any enemy attack. Until FLIPPER is developed, if the dispenser is damaged or requires maintenance

the GEMSS cannot be armed and emplaced.

- MOPMS

The advantages of MOPMS are that it is man-portable, self contained and command controlled. The system is designed for command emplacement and mine recycle or self-destruction. Each of these features increase the effectiveness of the system but also increase its cost. The more complex the system the greater the cost. MOPMS can be used to close gaps or safe lanes in pre-planned minefields as well as provide unit security. Current limitations are that AP and AT mines are contained in separate modules and are not a cost effective way of employing mines in comparison to the GEMSS system of 5 AT to 1 AP mine. Another limitation is in the size and weight of the system. The current design is difficult to manhandle and transport in combat vehicles.

- GATOR

GATOR is the only scatterable mine system that can be emplaced in the Corps area of interest or beyond. Like RAAM/ADAM it is to be employed in an interdiction mission. GATOR can be emplaced by close air support at choke points in the enemy's rear at the time most advantageous in delaying second echelon elements. GATOR must compete with other high priority to lose air-support missions. Missions in enemy territory expose aircraft to attrition which may be too high to warrant employment. In addition, since the minefield emplaced would not be covered by friendly fire, it would be easily susceptible to all countermine measures. Several dispensers would have to be emplaced in the same area to provide an effective minefield density.

- VOLCANO/M 56

A helicopter delivered anti-tank minefield provides a means to quickly close a gap or emplace mines in the path of an advancing enemy. The vulnerability of aircraft to enemy fire is the key limitation to emplacing mines by

helicopter in any areas other than friendly territory. With the limited number of helicopters and the number of sorties required to emplace an effective minefield; like GATOR, RAAM and ADAM, mining missions may conflict with other high demand missions. VOLCANO installed on a ground vehicle may provide a light force with a mining capability, but it may not be as economical to emplace a mine field as GEMSS. Since the M 56 is a pressure activated mine and not a tank kill munition, it has the added disadvantage of only disabling a tank or vehicle.

CHAPTER I

FOOTNOTES

1. TRADOC PAM 525-19, Land Mine Warfare, p. 8.
2. Ibid p. 9.
3. TC 6-20-5, Field Artillery Delivered Scatterable Mines p. D-3.
4. Ibid p. D-2.
5. Atkins, C.D. & Leake, C.R., Landmine Operations, p. 10.
6. Ibid, p. 13.
7. TCC 20-32-2, Employment of the M 56 Helicopter Delivery Mine System,
p. 3.
8. Atkins, C.D. & Leake, C.R., Landmine Operations, p. 12.

CHAPTER 2

EMPLOYMENT OF SCATTERABLE MINES

U.S. ARMY DOCTRINE

The Armed Forces of the United States must be prepared to fight in conflict ranging from localized operations against insurgents to general war. Scatterable mines, currently fielded or under development, can be employed throughout the entire spectrum of conflict. However, these systems offer the greatest potential contribution to winning the conventional battle against an armored enemy such as the threat that currently faces NATO.

The Soviet adversary facing NATO is an enemy whose doctrine states that in the offense overwhelming combat power will be massed to break through weaknesses discovered in the defense. After rupturing the defender's primary positions, the weight of the Soviet attack will be shifted to second echelons or operational maneuver groups. These follow on formations will then take the attack deep into the defender's rear, destroying command and control systems, combat service support structure and finally the defender's will to resist. Soviet doctrine focuses on the offense. The defense, which is based on establishing several defensive belts in depth and retaining armor heavy reserves for counter attacks, is seen as only a temporary condition until offensive operations can be resumed.¹

The U.S. Army turned its primary attention to the threat facing Western Europe in late 1972. At that time, as the war in Vietnam was entering the final stages, planners felt that the likelihood of mechanized warfare in Western Europe was low; however, this form of warfare represented the greatest conventional threat to the United States and its allies. Major and controversial changes were made to doctrine as the U.S. Army transitioned from the rice paddies of Southeast Asia to "fight outnumbered and win" on the plains of Europe. The 1976 edition of FM 100-5 stressed the concepts of "battle positions",

mobility and fighting in depth rather than the static defensive concepts that had emerged during the Vietnam War.²

In the field, this concept became known as the "active defense" and was viewed with skepticism by commanders who were making the mental transition from a static to maneuver oriented doctrine. One of the reasons for this skepticism was that during wargames the active defense normally proved to be effective against the enemy's initial thrusts but often failed when enemy follow on forces were committed to the battle by OPFOR players. Out of this and other experiences, the Army's doctrine evolved to the "Airland Battle" which envisioned the following three battlefield components: a close in fight at the forward line of own troops (FLOT) to destroy first echelon forces; a deep fight to delay and destroy the second echelon; and a heightened concern for rear area protection.³

An updated version of FM 100-5 was published in 1982. This new manual not only defined the concepts of the Airland Battle but also moved the basic tactical doctrine of the Army further from the firepower orientation of Vietnam toward a true maneuver doctrine. However, the manual recognized that maneuver is not an end in itself. Maneuver is only one part of a complex battlefield. Specifically, FM 100-5 stated that the destruction of enemy forces requires combat power that is an "appropriate combination of maneuver, firepower and protection by a skilled leader."⁴ However, the shift in emphasis was clearly toward maneuver where combat forces are moved about the battlefield to "focus maximum strength against the enemy's weakest point."⁵ Most strategists and historians have concluded that the greatest combat commanders have fully understood the criticality of maneuver. Winston Churchill, for example, stated: "Battles are won by slaughter and manoever. The greater the general, the more he contributes to manoever."⁶

During a briefing on Airland Battle concepts at the U.S. Army War College on 28 April 1983, LTC J. Fulton, Headquarters TRADOC, indicated that future Army units will be structured around the concept of maneuver. These units will be small, self-sufficient, highly mobile, extremely agile and capable of conducting fluid operations.⁷

It is in the context of the Airland Battle doctrine and future direction of U.S. force design that the current doctrine for employment of scatterable mines will be investigated in this chapter.

MOBILITY/COUNTERMOBILITY

As stated earlier, the latest published version of FM 100-5 indicates that combat power involves the appropriate combination of maneuver, firepower and protection. Combat engineers have historically provided a unique interface with all aspects of combat power through their primary missions of mobility, countermobility and survivability.⁸

Combat engineers have traditionally conducted mobility operations which preserve the freedom of maneuver of friendly forces by reducing natural or man made obstacles. Similarly, countermobility operations conducted by combat engineers have attempted to obstruct the movement of enemy forces in locations where friendly fire and maneuver could be multiplied against a more vulnerable enemy force.⁹ As far as the protection component of combat power is concerned, the combat engineer mission of providing protective construction has long been critical to the survivability of friendly forces.¹⁰

For the foreseeable future, it appears that the combat engineers will retain a preeminent position in the battlefield mobility and survivability roles. However, the introduction of scatterable mines (under the control of USAF, artillerymen, Army aviators, engineers and small unit commanders) takes countermobility out of the once almost exclusive purview of the engineers. Obstacle

planning will still remain an engineer task, but the role of real time integration of scatterable mine systems into the scheme of maneuver must now fall to the commander/G3/S3--the individuals who have control over all of the units possessing scatterable mines.

As the battlefield commander integrates countermobility measures with the scheme of maneuver he has to carefully balance the following two factors:

- FACTOR 1: The commander must rapidly and decisively use all available scatterable mine systems throughout the battlefield--along the FLOT, during rear area protection missions and well forward, deep into the enemy's rear--to reinforce terrain, fix enemy forces, and multiply the effects of fire and maneuver. The result of these operations will be to slow, disorganize and canalize enemy forces. According to C.V. Donnelly who wrote in the "International Defense Review" the Soviets are concerned about the U.S. development of scatterable mines. Specifically, he says that Soviet tacticians feel our ability to "deliver mines remotely right into the depths of attacking forces" is the most dangerous part of NATO's increased ability for creating obstacles.¹¹

- FACTOR 2: The commander must balance the increased lethality of scatterable mines against enemy forces with the requirement to preserve full freedom of movement for friendly forces. This is a complicated problem: Scatterable mines do not distinguish friendly from enemy; each scatterable mine dispensing system has an associated delivery error; the precise location of each mine is unknown; a scatterable minefield placed--unmarked--in enemy held territory a few hours ago may now block a counterattack route that could deliver a killing blow to an overextended enemy attacker. Therefore, the Army must develop a doctrine that integrates the employment of all scatterable mine systems. This is critical if friendly forces are to seize the initiative and to quickly maneuver to take every advantage of employing offensive tactics--especially

during defensive operations, as described in FM 100-5. Failure to carefully integrate all aspects of countermobility into the battle plan could result in our losing the initiative and also becoming hostage to our own scatterable mines.

GENERAL CONCEPTS FOR THE EMPLOYMENT OF SCATTERABLE MINES

It has been proposed that the "traditional concept of large linear minefields across contested areas between two forces is no longer viable except perhaps in desert warfare."¹² This idea may be based, in part, on results of the Middle East wars where extremely lethal weaponry resulted in very short and decisive battle outcomes. However, this raises two issues. First, the U.S. military possesses large quantities of conventional mines and only limited stocks of scatterable mines. Second, conventional mines provide a significant combat capability. Therefore, conventional mines must be employed by commanders whenever possible during countermobility operations. Conventional mines remain ideal for employment when any of the following factors exist:

- Obstacles emplaced well behind the FLOT (or on the friendly side of an international boundary prior to the initiation of hostilities).
- Large minefields placed in depth along likely enemy avenues of approach.
- Time and manpower is available for conventional minefield emplacement and standard minefield marking.
- Transportation assets are sufficient to move appropriate quantities of conventional mines forward.
- The minefield may be permanent.
- The minefield may have to be completely removed in the future.

Although conventional obstacle producing operations will remain important, the future thinking in countermobility will focus on small, rapidly emplaced scatterable minefields to compliment the small, mobile, and agile maneuver

units of tomorrow. Scatterable minefields offer the commander the following advantages:¹³

- Timely emplacement and flexible siting by a variety of dispensing systems.
- Significantly reduces manpower requirements for emplacement.
- Provides lighter and more lethal munitions mine-for-mine.
- Reduces logistical requirements due to diminished weight and bulk.
- Automatic clearing (self-destruction).

Scatterable mines must be treated as a scarce resource. Use of these systems "should be reserved for employment in those circumstances where rapid response is essential and enemy plans or dispositions are clearly established."¹⁴

During offensive operations the commander and planner are normally concerned with mobility operations.¹⁵ That is, reducing the effects of natural or manmade obstacles to insure that the attacking friendly force is able to retain the initiative and maximize the use of terrain for unobstructed maneuver.¹⁶ In the offense, the decision maker must carefully weigh the advantages that scatterable mines would produce by providing flank protection and reducing the enemy's ability to move about the battlefield against the disadvantages of future restrictions to friendly maneuver and denial of areas for future use by friendly combat support and combat service support units. When considering these factors, commanders at each level will undoubtedly place many more restrictions on subordinate commanders concerning the employment of scatterable mines in the offense than in the defense. In fact, scatterable mine employment during the offense will probably be approved on a case-by-case basis at division and lower levels. Some of the likely uses of scatterable mines during offensive operations will be:

- Rapid protection of a flank¹⁷ when an enemy counterattack is identified.

- Use in an economy of force sector of the battlefield while forces are massed for offensive operations elsewhere.¹⁸

- Deep interdiction of the defending enemy's rear area (resupply routes, assembly areas for reserves and airfields/helicopter operating bases to name a few).

Current doctrinal manuals list other uses for scatterable mines during the offense which could be integrated into a main or supporting attack. In these circumstances, the commander should provide detailed guidance for each proposed use to insure that the scheme of maneuver and future operations will not be restricted. Example uses of scatterable mines directly supporting the attack are:

- Suppress and disrupt enemy security forces once contact has been made.¹⁹

- Secure bridge and fording sites.²⁰

- Fix and hold by passed enemy forces.²¹

- Fix targets of opportunity for engagement with direct fire.²²

- Isolate the objective area by hindering the enemy's ability to withdraw, reinforce, counterattack or resupply.²³

Current literature also mentions other general uses for scatterable mines during the offense. Examples are isolating the battlefield, closing off the most probable enemy avenues for counterattack or conducting area denial operations. However, limited availability of assets would most likely preclude the employment of scatterable mines on large scale missions such as these--in the defense as well as the offense.

It is during defensive operations that the full worth of scatterable mines will be realized. The defender is usually outnumbered in all aspects of combat power and must use all countermobility assets available to fix, delay, disrupt and canalize the attacker. The goal of these countermobility actions is to "multiply" the effects of the defender's weapons, inflict damage on the enemy and create the opportunity for future offensive operations.²⁴ Some of the critically important uses of scatterable mines by the defender are to

- Close gaps and lanes in conventional minefields.²⁵
- Reinforce existing obstacles.²⁶
- Disrupt enemy river crossing operations.²⁷
- Delay or disrupt attacking forces.²⁸
- Provide counterfire or suppression of enemy air defense.²⁹
- Develop targets for long range anti-tank weapons.³⁰
- Assist in blunting enemy penetrations.³¹
- Disrupt movement and commitment of second echelon forces.³²
- Secure exposed flanks.³³
- Quickly reinforce hasty defensive positions.³⁴
- Add depth and density to existing minefields.³⁵

Similar to doctrine for offensive employment of scatterable mines, the literature also mentions several generalized uses for these systems during the defense that may well exceed the logistical availability. Some examples are

- Deny enemy unrestricted use of areas.³⁶
- Block enemy avenues of approach.³⁷
- Canalize and restrict enemy maneuver.³⁸

The above listed uses for scatterable mines are broad and do not consider the unique capabilities of each scatterable mine system. Draft FM 5-100 correctly points out that the terms "scatterable" and "Family of Scatterable

Mines (FASCAM): are generic terms "only applicable in the most general sense when discussing doctrine."³⁹ For greater precision, the Army community must use the specific scatterable mine system such as Modular Pack Mine System (MOPMS), Ground Emplaced Mine Scattering System (GEMSS), Area Denial Artillery Munitions (ADAM), Remote Anti-armor Mine (RAAM), Air Delivered Scatterable Mine (GATOR), Helicopter Delivered Mine System (M 56), and Multiple Delivery Mine System (VOLCANO) when addressing the employment of "scatterable mines." A few examples of specific countermobility missions applicable to scatterable mine systems and their means of delivery follow:⁴⁰

<u>Countermobility Mission</u>	<u>Delivery System</u>	<u>Scatterable Mine System</u>
Deep Interdiction	High performance aircraft	GATOR
Counterfire	Artillery	ADAM/RAAM
Large scale preplanned minefields	Trailer mounted/ vehicle mounted dispenser	GEMSS/Ground Employed VOLCANO
Close lanes and gaps in conventional minefields	Portable dispenser remotely controlled	MOPMS
Protect flanks	Helicopter	M 56/VOLCANO

CHAPTER 2

FOOTNOTES

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CHAPTER 3

COMMAND AND CONTROL

GENERAL

Command and control is the exercise of command, the means of planning and directing campaigns and battles. Its essence lies in applying leadership, making decisions, issuing orders, and supervising operations. At the organizational level it concerns the organizations, procedures, facilities, equipment, and techniques which facilitate the exercise of command. Command and control doctrine assumes that subordinate commanders exercise initiative within the context of the higher commander's concept. Staff assistance and coordination are indispensable to conducting sustained operations, but the mutual understanding which enables commanders to act rapidly and confidently in the crisis of the battle.¹

This chapter explores existing literature as it relates to the command and control of scatterable mines. Secondly, current thinking is analyzed with an effort to establish a rational basis from which a coordinated doctrine can be developed for scatterable mine employment.

BACKGROUND

With the approval and publication of the new FM 100-5, Operations, in August 1982, and its emphasis on deep attack supported through the use of air and artillery delivered scatterable mines, new command and control challenges must be dealt with by the commander and his staff. The deep attack concept and remotely emplaced mines require that the traditional role of the engineer in the planning and execution of obstacles be reexamined.

The planning for and emplacement of obstacles has long been a major engineer contribution to the combined arms team. Although other units, including other combat units are assigned scatterable mine emplacement missions consistent

with their capabilities and availability, the engineer will continue to play a vital role in the planning process.

GENERAL CONCEPTS FOR THE COMMAND AND CONTROL OF SCATTERABLE MINES

Scatterable mines are obstacles and must be considered and included in the planning process as part of a specific tactical operation. The restrictions that minefields impose on friendly mobility, as well as enemy mobility, dictate the need for positive and effective command control of mine employment. The echelon of command vested with the authority to emplace mines varies with the purpose of the minefield and type of mines. Minefields that restrict maneuver to a greater degree require a higher echelon of authority. In all cases, the responsible commanders must insure that the proposed field is coordinated with adjacent higher, and subordinate units.²

Scatterable mines can hinder mobility for both a "red" enemy and a "blue" friendly force if not carefully and positively controlled. Over the past few years, doctrine has evolved to more precisely define specific command responsibilities and control measures for the employment of "colorblind" scatterable mines. Some of the broad categories of these controls are

- Overall employment authority
- Authority to approve employment of specific types of minefields
- Time
- Phase of the defensive battle
- Authority to approve employment of specific scatterable mine systems
- Graphical controls
- "Austraptaktik"

Each of these categories for control of scatterable mines will be discussed in turn.

Overall Employment Authority. The basic authority to use scatterable mines is vested with the unified or joint commander.³ The unified/joint commander establishes broad guidance for his subordinate land component (ARFOR) and air component (AFFOR) commanders.⁴ For example, a Reconnaissance and Interdiction Planning Line (RIPL) or Corps Forward Terminating Line (FTL) may be the primary control used by the unified or joint commander to delineate planning responsibilities for the employment of scatterable mines. In this case, the AFFOR commander should direct planning for the employment of scatterable mines from the theater rear boundary forward to the RIPL or some other specified FTL. The AFFOR commander should plan for the use of scatterable mines in deep interdiction beyond the RIPL/FTL. Within the ARFOR, the corps commander is key to planning countermobility operations. The corps commander is the employment authority for all minefields containing scatterable mines in the corps area of operations (AO). Guidance for employing scatterable mines throughout the corps is normally contained in paragraph 3 of the corps operations order/plan and in the corps obstacle plan.⁵ Usually, the corps commander will delegate obstacle employment authority in general and specific scatterable mine employment authority--subject to corps level restrictions--within the division AO to the division commander. In turn, the division commander may delegate authority to brigade/division artillery level. Earlier literature on scatterable mines discussed further delegation to the battalion commander. However, recent documents such as draft FM 5-102 are tending to hold primary employment authority at least at brigade level--with the exception of the authority to employ MOPMS. This is a doctrinal move in the right direction. Considering the "color blindness" of scatterable mines, the brigade commander has a sufficiently large AO and planning time frame to insure that scatterable mine employment and future operations are carefully integrated. The brigade commander may elect, in

special circumstances, to delegate this authority to battalion level. However, delegation to battalion commanders is not the norm except perhaps during the covering force battle.

Authority to Approve Employment of Specific Types of Minefields. Traditionally, engineers have controlled the proliferation of conventional minefields on the battlefield by doctrinally specifying the employment authority for minefields as follows (see Appendix 2, Types of Minefields):⁶

Type Minefield	Authority to Employ	Authority may be Delegated to
Hasty Protective	Bn Cdr	Co Cdr/Plt Ldr
Deliberate Protective	Installation Cdr	
Point	Div Cdr	Bde Cdr
Tactical	Div Cdr	Bde Cdr
Interdiction	Corps Cdr	Div Cdr
Phony	Same as minefield being simulated	

These categories of minefields are still applicable to the employment of preplanned scatterable minefields such as those employed by GEMSS, Ground Emplaced VOLCANO and occasionally by MOPMS. However, the rapidity with which scatterable mines can be emplaced has caused some changes in doctrinal thinking on minefield employment authority. Draft FM 5-102 proposes the following:

Type Minefield	Authority to Employ	Authority may be Delegated to
Hasty Protective	Bde Cdr	Bn Cdr
Deliberate Protective	Div Cdr or Installation Cdr	
Point	Bde Cdr	Bn Cdr
Tactical	Div Cdr	Bde Cdr
Interdiction	Corps Cdr	Div Cdr
Phony	Same as minefield being simulated	

The most important issue raised by these proposed changes is that the brigade commander becomes the focal point for the emplacement of immediate obstacles.⁷ Employment authority for point minefields was reduced from division to brigade while authority for hasty protective minefields was raised from battalion to brigade. Due to the speed with which scatterable mines can be emplaced, the division commander or staff does not have time to approve the emplacement of each point minefield. Rather, division headquarters should provide brigades with detailed guidance and

restrictions to ensure that any point minefields employed by the brigade commander are synchronized with the division's scheme of maneuver. As mentioned previously, the brigade commander's larger AO, longer planning time frame and knowledge of the division scheme of maneuver make strong arguments to raise the employment authority for hasty protective minefields from battalion to brigade level--with the exception of hasty protective minefields created by MOPMS. MOPMS should remain under the control of the battalion commander, subject to any restrictions directed by higher headquarters.

Time. An original contribution of Airland Battle doctrine is the concept of commanders viewing the battle in terms of standardized future time frames. FM 100-5 gives each commander from echelon above corps (EAC) to battalion the following time frames that define areas of influence and areas of interest:

	<u>Area of Influence</u>	<u>Area of Interest</u>
EAC	Up to 96 hours	Beyond 96 hours
Corps	Up to 72 hours	Up to 96 hours
Div	Up to 24 hours	Up to 72 hours
Bde	Up to 12 hours	Up to 24 hours
Bn	Up to 3 hours	Up to 12 hours

Since these time frames divide the battlefield into areas of responsibility for various levels of command and since scatterable mines have built in self-destruct (SD) times the concept of controlling the employment of scatterable mines by time appears to be convenient. However, on further analysis, time has limited applicability as a specific scatterable mine control means.

Doctrine published to date has generally divided self-destruct times for all scatterable mine systems into two categories: long duration (SD 24 hours or more) and short duration (SD less than 24 hours). A debate has ensued over equating long and short duration SD's with the appropriate commander's area of influence. Realizing that the times selected for separating areas of influence as well as categorizing long and short SD's are somewhat arbitrary, a purely quantitative analysis could lead to the following recommendations:

<u>Authority to Employ Scatterable Mines</u>	<u>Area of Influence</u>	<u>Self-Destruct Time</u>
Corps	Up to 72 hours	Long Duration SD
Division	Up to 24 hours	Short Duration SD

The Fort Leavenworth FASCAM Study argued that "authority to employ FASCAM Systems must be established with as few limitations as possible."⁸ The authors of the FASCAM study felt that since the division commander's area of interest extends to 72 hours the division commander should have employment authority for long duration SD scatterable mines.⁹ The problem is complicated by the facts that

- The corps commander normally is the lowest level commander to have direct access to intelligence sensors that can provide a reasonably accurate picture of the battlefield 24 hours in the future.

- The division commander's aviation assets, organic artillery and usual attachments of corps artillery are capable of delivering long SD mines.

- Battlefield situation can change very rapidly providing both the corps and division commanders the opportunity to launch decisive offensive operations that could be precluded by previously delivered long duration SD mines.

It is relatively easy for a commander to quickly delegate employment authority for a long duration SD scatterable mine system to a subordinate. Alternatively, it may be nearly impossible to neutralize an active scatterable minefield that is blocking the initiation of a decisive attack into an enemy flank or rear. Therefore, considering the arbitrariness of the time frames used, if time is to be considered as a means of controlling scatterable mines, the following approach probably has the fewest disadvantages:

<u>Self-Destruct Time</u>	<u>Employment Authority</u>	<u>Employment Authority may be Delegated to</u>
Long Duration (24 hours or more)	Corps Cdr	Div Cdr
Short Duration (Less than 24 hours)	Div Cdr	Bde Cdr with delegation possible to Bn level and to Co level for MOPMS

Phase of the Defensive Battle. Another means of addressing control of scatterable mine systems is through phases of the defensive battle--covering force area, main battle area, and rear area. During the defensive battle individual scatterable mine systems have to be integrated into the battlefield to take full advantage of each system's strengths.

Prior to the covering force battle, GEMSS can be used along the most likely enemy avenues of approach to reinforce natural obstacles. MOPMS can be placed in front of delay/defense positions for possible detonation as a part of close in defenses. Once the covering force battle begins, artillery delivered systems can be placed in front of or on top of advancing enemy forces.

Prior to the main battle, terrain and other conventional obstacles can be reinforced by GEMSS and VOLCANO/M 56. MOPMS can be situated for on order closing of gaps and lanes in conventional minefields. As the main battle is joined, GEMSS can continue to emplace minefields in depth. VOLCANO/M 56 can establish minefields in depth or to protect assailable flanks prior to exposure to enemy action. ADAM/RAAM can be used to reseed breached minefields; continue to place scatterable mines in front of and on top of advancing enemy forces; close minefield lanes and gaps; preclude unrestricted movement of enemy artillery and air defense weapons; and disrupt commitment of reserves. Simultaneously, MOPMS can close minefield gaps/lanes and provide close in defensive protection as GATOR is being employed in depth on deep interdiction targets.¹⁰

In the rear area MOPMS can be carefully emplaced for on order detonation

to provide close in protection of installations, service support units and assembly areas for reinforcing formations arriving in theater.

This scenario does not exhaust all possibilities for employment of scatterable mines but does point out that employment of specific systems must be tailored not only to the phase of the battle but also prior to the battle starting and after the battle has been initiated.¹¹

Authority to Approve Employment of Specific Scatterable Mine Systems. Based on the foregoing discussion it is possible to outline broad employment authority for each scatterable mine system as follows:¹²

System	Employment Authority				
	<u>Corps</u>	<u>Div</u>	<u>Bde</u>	<u>Bn</u>	<u>Co</u>
GATOR	X				
ADAM/RAAM (Long Duration)	X	O			
ADAM/RAAM (Short Duration)		X	O		
GEMSS		X	O		
VOLCANO/M 56		X	O		
MOPMS				X	O

X - Employment Authority

O - Authority may be delegated to

According to draft FM 5-100 the most important consideration in determining when to delegate employment authority is that "the more restrictive to maneuver mine operations are, the higher the authority in the chain of command."¹³ Additionally, allocation of limited resources must be considered.¹⁴ The more limited the asset, the higher employment authority must be held.

Graphical Controls. Standard graphics superimposed on maps provide commanders and staffs a means of precisely communicating the concept and execution of an

operation. Some graphical controls that may be especially applicable to the employment of scatterable mines are¹⁵

- Coordinated Fire Line (CFL)
- Engineer Work Line
- Fire Support Coordination Line (FSCL)
- Forward Line of Own Troops (FIOT)
- Forward Terminating Line (FTL)¹⁶
- Free Fire Area (FFA)
- Gap
- Lane
- Minefield
- No Fire Area (NFA)
- Numbered targets on an obstacle plan
- Reconnaissance and Interdiction Planning Line (RIPL)
- Restrictive Fire Area (RFA)
- Restrictive Fire Line (RFL)
- Obstacle Free Area
- Target Reference Point (TRP)
- Unit boundaries (extended forward to the corps or division FTL)

A tactical commander's guidance, restrictions on employment authority (as listed in paragraph 3 of the OPORD/OPLAN), appropriate graphics (on the operations overlay) and detailed systemic plans (as indicated on obstacle, fire support, tactical air support and aviation annexes) can insure that scatterable mines slow, canalize and inflict damage on the enemy while not restricting friendly maneuver or precluding seizure of the initiative during future operations.

"Austragtaktik." Perhaps the most important method to insure that scatterable mines--and all battlefield systems--are properly employed is to insure, as German General Van Manstein of World War II fame stated: "All members of the military (must be) imbued with certain tactical or operational axioms."¹⁷ The German Army has long used the term "austragtaktik" to describe the independent action taken by a commander based on full understanding of his Army's doctrine and his superior commander's style of operation.

The U.S. Army has made commendable strides forward in defining broad doctrine for the employment of scatterable mine systems. However, there is still a requirement to provide more detailed guidance on the interrelation of the various scatterable mines throughout the battlefield if field commanders are to carry out mission type orders concerning these systems. The development of this "austragtaktik" is especially difficult when considering:

- Different scatterable mine systems can be under the direct control of commanders ranging from air component to company level.
- Scatterable mines can be employed rapidly over the entire battlefield.
- The stocks of scatterable mines are limited.
- Different scatterable mine systems have different self-destruct times. The specific times still remain classified--which tends to stifle discussion, at lower levels, on the proper employment of those systems.
- The divergence of worldwide missions that the Army must be prepared to undertake with units ranging from forward deployed theaters to small unconventional warfare units.

The key to integrating these systems not only falls on the shoulders of TRADOC but also on field commanders who must analyze their wartime missions and develop detailed guidance for employment of scatterable mines on projected battlefields.

STAFF RESPONSIBILITIES

Staffs are assigned functional areas of interest and staff responsibility for accomplishing actions in those areas.¹⁸ Five functions are common to all staff officers: providing information, making estimates, making recommendations, preparing plans and orders, and supervising the execution of plans and orders.¹⁹

The fielding of scatterable mines have caused few if any changes to normal staff operations. However, they do increase the number of weapon systems that must be considered for employment during planning and operation, and have added to the number of tasks to be performed by most staff members for their employment, control, and support.

The corps and lower level staffs have similar functions and responsibilities as it pertains to scatterable mines.

These functions and responsibilities are as outlined below:

G3/S3. The G3/S3 has the primary staff responsibility for scatterable mines planning and employment. Specific responsibilities include:

- Supervising and coordinating the development of all obstacle plans.
- Recommending the general areas of scatterable mine employment and their integration into the overall obstacle and tactical plans.
- Recommending priorities for allocation of resources (type mines and delivery means) in support of obstacle employment.
- Recommending the assignment of tasks to subordinate units.
- Maintaining accurate records of all scatterable mines employed to include time of emplacement, self-destruct time, location, and number of mines by type.
- Recommending delegation of employment authority, where appropriate.

G2/S2 - The G2/S2 has staff responsibility for intelligence aspects of obstacle tactics. Specific responsibilities include:

- Receiving data and information to be refined into intelligence material.

- Providing the G3/S3 and the commander with intelligence data regarding enemy activity and when scatterable mines can best be employed.

- Directing the flow of information and intelligence data pertaining to scatterable mines.

- Providing intelligence regarding enemy counterobstacle tactics.

G4/S4. The G4/S4 is responsible for coordinating the logistic support required for overall obstacle operations. Other specific responsibilities include.

- Forecasting requirements for scatterable mines and transportation based on obstacle and tactical plans.

- Insuring that necessary items are requisitioned, shipped forward, and stocked in depots and supply points to be available when required.

- Providing logistic recommendations and plans supply routes and ammunition supply points while coordinating the logistics flow to support combat operations.

- Allocating scatterable mines in accordance with priorities established by G3/S3.

- Insuring that combat service support planners are informed of any scatterable mines employed on the friendly side of the FLOT.

Engineer. The Engineer has specific responsibilities to include:

- Advising the commander and G3/S3 of all aspects of obstacle employment, including scatterable mines.

- Preparing portions of the obstacle plan under the general staff supervision of the G3/S3.

- Assisting the G2/S2 in terrain studies for information needed to analyze areas of operations and the evaluation of type of obstacles and targets.

- Assisting the G4/S4 in developing obstacle logistic estimates.
- Planning and supervising all engineer activities pertaining to obstacle (scatterable mines) employment.
- Recommending to the G3/S3 the allocation of engineer resource and the assignment of engineer units to emplace engineer peculiar scatterable mines.

Fire Support Coordinator

- Planning conventional field artillery fires and artillery delivered scatterable mines to support the obstacle plan.
- Advising G3/S3/Engineer an availability and use of artillery delivered scatterable mines.
- Placing requests for artillery delivered scatterable mines into field artillery channels.
- Providing advice on preparation of logistics estimates and constraints on the use of artillery delivered scatterable mines.
- Recommending to G3/S3 appropriate fire support coordination measures that will allow artillery delivered scatterable mine employment to facilitate both the current scheme of maneuver and future operations.
- Providing technical information and suggestions in concert with the Ammunition Officer for ammunition supply points and ammunition supply routes for subordinate units.

Aviation Officer. The Aviation Officer coordinates aviation support for army aviation delivered scatterable mines missions. Specific responsibilities include:

- Specifying delivery units.
- Maintaining status of aircraft which can be used for minelaying.
- Assuring that designated delivery units are assigned missions in accordance with the obstacle plan.

Forward Air Controller. The Forward Air Controller is responsible for

- Providing information and recommendations for use of Air Force delivered scatterable mines.
- Providing technical assistance to the commander and staff for aircraft capabilities, limitations, and air delivery methods for scatterable mines.
- Providing and maintaining air/ground communications for control and emplacement of scatterable mines.

Ammunition Officer. The Ammunition Officer is responsible for insuring that critical obstacle munitions (scatterable mines) are supplied. Specifically, his responsibilities include:

- Consolidating requirements and notifies the supporting ammunition supply point (ASP) of requirements; including the number and type of scatterable mines.
- Notifying the ASP to prepare mine dispensers for army aviation loading.

NOTE: The above staff functions and responsibilities were extracted from several source documents.

SCATTERABLE MINEFIELD REPORTING, MARKING

AND RECORDING

- Reporting. The reporting of scatterable minefields differs from the reporting of conventional minefields primarily due to the extended time required to emplace conventional minefields as opposed to the relative short time for scatterable minefields. Conventional minefields require a report of intention which doubles as a request when initiated at levels below those with authority to employ, and is submitted as soon as it is decided to lay the minefield.²⁰ This report is similar to the report of intention-to-lay report for scatterable

minefields, but differs since no report is required once planned scatterable minefields have been incorporated on coordinated obstacles overlays and the emplacement unit has been given authority to employ.

The second major difference between conventional and scatterable minefields reporting is conventional minefields require a report of initiation. This report is submitted to higher headquarters by the laying unit when installation begins and is used to inform that the area is no longer safe for friendly movement and maneuver.²¹ Since scatterable minefields can be emplaced in a fraction of the time required for conventional minefields, the scatterable minefield completion report serves this purpose.

Thirdly, the report of change required for scatterable minefields is a report peculiar only to scatterable minefields. The ability to reseed/add mines to a scatterable minefield is a feature not normally associated with conventional minefields and no such report requirement exist.

Finally, the report of completion serves the same purpose for both conventional and scatterable minefields.

The following paragraph provides a review of each report required for reporting of scatterable minefields:

--Report of Completion. A minefield completion report is most important and will be submitted on each scatterable minefield. It will be submitted through operational channels to the authorizing command headquarters by commanders of emplacing units. Information will be furnished to intelligence officers who process the data, integrate with terrain intelligence, and disseminate with other intelligence. The following information must be reported by the emplacing unit, through operations channels to the commander who authorized the minefield by the most expeditious secure means:

- TYPE emplacing system
- Unit conducting mining
- Tgt/obstacle number if applicable
- DTG of start
- DTG of completion
- Minefield self-destruct period
- Grid coordinates of aim points or corner points of the minefield
- TYPE mines
- Size safety zone
- DTG of Report

This information serves as a completion report for scatterable minefields.

The information will be plotted on operations maps and will be furnished to intelligence officers who integrate the data and disseminate the location of minefields with other intelligence.²²

--Intention-to-Lay Report. For preplanned mine missions the inclusion of the planned minefield on coordinated obstacle overlays, which are prepared by the engineer, serves as the intention to lay report. For targets of opportunity, the delegation of authority to emplace is understood as an intention to lay. For example, if a brigade commander delegates to a battalion commander the authority to employ scatterable mines in his sector, it is understood that the battalion commander intends to employ those mines. He need not submit an intention to lay report if he has the authority to employ.²³

--Report of Change. If a scatterable minefield is changed or reseeded with additional mines, a new report as above is submitted.²⁴ The report is submitted through channels to the authorizing headquarters immediately upon any change to a minefield. It is made when mines are removed from or added to protective minefields, point minefield, or tactical minefields. Reports are

submitted by the commander making the minefield change. They are also sent through channels to the headquarters responsible for maintaining theater mine records.²⁵

- Marking. Air- and artillery-delivered scatterable mines should always be employed in enemy controlled territory and, therefore, not marked. Scatterable--self destructing--mines delivered by ground systems are marked as necessary to insure protection for friendly troops. Gaps and lanes will be marked to facilitate passage by friendly troops and vehicles. Procedures for reporting, marking, and recording of scatterable mines are summarized in table 3-1.²⁶

Table 3-1. Scatterable (Self destruct) Minefield Reporting, Marking, and Recording.²⁷

TYPE OF MINEFIELD	MARKING REQUIRED	REPORTS REQUIRED	RECORDS REQUIRED
1. Long Duration (24 hours or more before self- destruction).	Air- and artil- lery-delivered, none. Ground delivered, as required to pro- tect friendly troops.	Intention to lay To higher and adjacent units Preplanned mine- fields only Com- pletion report to authorizing headquarters.	Hasty Minefield Report-- DA Form 1355-1R or local substitute Submit through channels to authorizing headquarters.
11. Short Duration (Less than 24 hours before self-destruc- tion).	Air- and artil- lery delivered, none. Ground delivered, as required to pro- tect friendly troops.	Intention of lay, to higher and adjacent units. Pre- planned mine- fields only. Completion report to authorizing headquarters.	Hasty Minefield Report-- DA Form 1355-1R or local substitute Submit through channels to authorizing headquarters.

- Recording. The recording of both conventional and scatterable minefields is a must. The record data is similar for both conventional and scatterable minefields and serves the same purpose. However, mines within a

conventional minefield can be accurately recorded as well as the field itself. Scatterable minefields cannot be recorded as accurately, but as a minimum, the recorded data must show the location, type of mines, density, and projected self-destruction time.

The scatterable mine emplacing unit commander, the one responsible for control of the delivery system, must prepare and submit records through operations channels to the authorizing headquarters. Artillery units submit minefield records through the fire support coordinators. USAF records are submitted through the air liaison officer. Army aviation records are submitted through the staff aviation officer to the engineer officer of the authorizing forces. He provides the information to the intelligence section for integration with terrain intelligence data for dissemination.

Upon expiration of the active life of the scatterable mines, the minefields must be removed from intelligence, operations, and obstacle plan overlays. The records will be kept in files until areas have been proofed to verify that all mines are cleared. Destruction of records may then be ordered by the theater commander.²⁸

CHAPTER 3

FOOTNOTES

1. FM 100-5, p. 7-3.
2. FM 5-102, Draft, p. 5-12.
3. FASCAM Study, op. cit., p. 11.
4. TRADOC Pam 525-16, p. 1-4.
5. FASCAM Study, op. cit., p. 71.
6. FM 5-100, p. 4-21.
7. FASCAM Study, op. cit., p. 32.
8. Ibid., p. 31.
9. Ibid., p. 31.
10. Ibid., pp. 24-26.
11. Ibid., p. 32.
12. Ibid., adapted from p. 30.
13. FM 5-100 (draft), p. 8-22.
14. FASCAM Study, op. cit., p. 12.
15. Sec FM 101-5-1.
16. Forward Terminating Line (FTL) is a phase line proposed by the Combined Arms Center, Ft Leavenworth which delineates the forward edge of a commander's area of influence and area of interest.
17. Kirk. op. cit., p. 2.
18. FM 101-5, p. 1-3.
19. Ibid., p. 1-2.
20. FM 5-102 (Draft), p. 5-16.
21. Ibid., p. 5-17.
22. FM 5-102 (Draft), p. 8-27.
23. Ibid., p. 8-28.
24. Ibid., p. 5-28.

25. FM 5-100, p. 8-23.

26. Ibid., p. 8-25.

27. Ibid., p. 8-25.

28. Ibid., p. 8-25.

CHAPTER 4

SOME GUIDELINES FOR THE EMPLOYMENT OF SPECIFIC

SCATTERABLE MINE SYSTEMS

Due to the factors of METT-T (mission, enemy, terrain, troops and time available) scatterable mine systems will be employed differently by various commanders throughout the world. However, each commander in the chain must provide guidance on the employment of these systems to insure unity of effort and to eliminate ambiguity.

This section proposes some guidelines for the employment of specific scatterable mine systems applicable to U.S. Forces defending the Western European Main Battle Area (MBA) against a Soviet/Warsaw PACT attack. The MBA fight in the European Theater was selected for analysis for the following reasons:

- Conventional war in Europe poses one of the most significant threats to U.S. worldwide interests.
- All scatterable mine systems will eventually be available for employment by the U.S. military in Europe.
- By the time that the MBA fight is joined, it is likely that the political authority will have authorized the employment of aircraft and munitions across the violated international border and may well have authorized cross border operations for NATO maneuver forces. Therefore, the full compliment of scatterable mines will be available for employment.
- The General Defense Plan (GDP) for Europe has been developed to the point that all battlefield systems are well integrated into the scheme of maneuver. This provides a relatively stable background onto which "new" scatterable mines can be superimposed.

The defense mission is selected for this analysis because countermobility is a primary consideration of a defender in Europe. As mentioned previously, scatterable mines can and will be employed during offensive operations. However, the requirement to maximize friendly maneuver during the offense will result in heavier restrictions being placed on the use of scatterable mines in the offense than in the defense. Employment of these systems during the offense will be highly situation dependent and may well be approved on a case-by-case basis at division and lower levels.

The suggestions contained in this section provide a start point for forward deployed U.S. Forces to develop detailed plans for the employment of scatterable mines. Within the European theater, these guidelines would have to be reviewed and modified by each level of command to fit that unit's specific General Defense Plan. Similarly, detailed guidance for the emplacement of scatterable mines during the covering force and rear area battle--not addressed in this study--would also have to be integrated into each unit's GDP.

GATOR.

- Delivered By: High performance aircraft.
- Employment Authority: Since GATOR may be employed in different missions by both the Air Force and the Army, the employment authority for this system will be no lower than army group level. By establishing a Reconnaissance and Interdiction Planning Line (RIPL) or Forward Terminating Line (FTL) the army group commander can delineate responsibilities between Air Force and subordinate corps commanders. The corps commander would be responsible for planning the employment of GATOR from the corps rear boundary forward to the RIPL/FTL (although actual employment would normally be forward of the maximum range of artillery delivered scatterable mines). The Allied Tactical Air Force (ATAF) commander would be responsible for planning the employment of GATOR in support of the

air battle against airfields and logistical installations beyond the RIPL/
FTL.

- Primary Targets:

--The ATAF commander will be primarily concerned with the delivery of deep preplanned GATOR minefields on enemy airfields or other locations critical to the enemy's air effort.

--The army group and corps commanders will be concerned with employing GATOR against deep targets of opportunity after the enemy has initiated forward movement. GATOR delivered on enemy assembly areas or on top of/in front of advancing enemy forces (primarily follow on forces) can get inside the enemy's decision cycle to disrupt enemy time tables and make the attacker susceptible to other battlefield air interdiction (BAI) weapons. These actions will gain additional time for the defender and reduce the effective strength of the second echelon as it is committed to the close in battle.

- Typical Priorities for Employment: The primary priority for GATOR will be deep interdiction--in support of the Joint Airland Battle.

- Normal Graphical Controls: The FSCL and RIPL will be the principle graphical controls for GATOR. As mentioned earlier, the army group or corps commander will normally employ GATOR from the maximum range of artillery delivered scatterable mine munitions (approximated by the FSCL) out to the RIPL; the ATAF commander will normally employ GATOR beyond the RIPL--subject to any restrictions necessary for future ground operations.

- Normal Restrictions for Next Higher Headquarters: Army group or higher headquarters will control the use of GATOR through the apportionment process. A certain percentage of available GATOR missions will be apportioned to the ATAF for deep interdiction in support of the air battle. The remaining

percent of available GATOR will be apportioned for maneuver commanders to nominate BAI targets. Higher headquarters may designate obstacle free zones or restrictive fire areas for GATOR in circumstances such as the political restrictions against the use of these munitions in certain areas or if a deep maneuver operation such as a counterattack by a reinforcing corps is being planned.

- Normal Marking Requirements: GATOR scatterable mines are delivered in enemy held territory and are not marked.

- Recorded By: GATOR delivered beyond the RIPL is recorded by the ATAF staff. GATOR delivered in support of BAI targets nominated by the army group/corps commanders will be recorded by the respective DCOS-OPS (Deputy Chief of Staff for Operations)/G3 Air officers.

- Reported to: The ATAF Staff reports GATOR delivered beyond the RIPL to the army group DCOS-OPS and within the ATAF staff as necessary. For GATOR delivered on the friendly side of the RIPL the army group/corps DCOS-OPS/G3 Air officers report this data to the next higher headquarters G3 equivalent. Additionally, within the army group or corps staff the following officers are notified of GATOR emplacement: the DCOS-OPS/G3, engineer officer, intelligence officer and subordinate/flank units as appropriate. The intelligence/G2 staffs are key players in planning scatterable mine operations. The intelligence/G2 staffs are involved with selecting potential GATOR emplacement sites during the intelligence preparation of the battlefield (IPB); providing the DCOS-OPS/G3 with recommendations on how to best use GATOR against identified second echelon forces; providing feedback to DCOS-OPS/G2 on the effectiveness of GATOR against targeted formations; and informing subordinate G2's of GATOR emplacements that may have a significant impact on enemy operations.

- Other: GATOR is requested through normal air request channels/ procedures.

LONG DURATION (24 hour or more) SD ADAM/RAAM.

- Delivered by: Artillery.

- Employment Authority: To preclude long duration SD ADAM/RAAM from restricting friendly future operations the corps commander retains employment authority for this scatterable mine system. However, actual delivery of long duration SD ADAM/RAAM is delegated to the division commander who directs the delivery of these mines with organic artillery or attached corps artillery units. Employment authority for long duration SD ADAM/RAAM is not normally delegated below division level.

- Primary Targets. Targets of opportunity.

- Typical Priorities for Employment: Upon receiving approval from corps, the division commander typically employs long duration SD ADAM/RAAM in these priorities:

(1) On top of, or in front of, advancing enemy units.

(2) Reseeding breached obstacles.

- Normal Graphical Controls: Long durations SD ADAM/RAAM is delivered from the FLOT forward to the maximum range of these artillery delivered munitions.

- Normal Restrictions from Next Higher Headquarters: Obstacle free zones or restrictive fire areas are designated along planned army group/corps counterattack routes and along corps covering force withdrawal routes. Long duration SD ADAM/RAAM will normally be precluded from employment of the friendly side of the FLOT. Due to limited stocks of ADAM/RAAM authority for the use of this system for area denial missions (such as blocking a potential enemy avenue of approach) will be retained by the corps commander.

- Normal Marking Requirements: Long duration SD ADAM/RAAM are delivered in enemy held territory and are not marked.

- Recorded By: The responsibility for recording ADAM/RAAM belongs to the division G3 who delegates the requirement to keep detailed information on these emplaced munitions to the division fire support element (FSE).

- Reported To: The division FSE routinely provides employment data on long duration SD ADAM/RAAM to the corps field artillery section (FAC); assistant division engineer (ADE); division G3; and subordinate/flank units whose planning may be influenced by specific ADAM/RAAM missions.

- Other: Due to restrictions placed on this system, division artillery basic loads of ADAM/RAAM should consist primarily of short duration SD munitions. The basic loads of corps artillery units should include long duration SD ADAM/RAAM.

SHORT DURATION (less than 24 hours) SD ADAM/RAAM.

- Delivered By: Artillery.

- Employment Authority: Division commander with delegation authorized to the brigade/division artillery (DIVARTY) commander.

- Primary Targets: Targets of opportunity.

- Typical Priorities for Employment:

--Usual priorities that the division commander follows to employ short duration SD ADAM/RAAM are

- (1) On top of or in front of advancing enemy units.
- (2) Emergency closing of conventional minefield gaps or lanes. (MOPMS is the primary scatterable mine system that should be used for closing minefield gaps or lanes.)
- (3) Reseeding breached obstacles.
- (4) Counterfire.
- (5) Suppression of Enemy Air Defense (SEAD).
- (6) Protecting an exposed flank.

--When employment authority is delegated to the brigade (or cavalry squadron when performing an independent mission) the brigade commander's usual priorities are

- (1) On top of in front of advancing enemy units.
- (2) Emergency closing of conventional minefield gaps or lanes.
- (3) Reseeding breached obstacles.
- (4) FEAL.
- (5) Protecting an exposed flank.

--The DIVARTY commander's priority for employment of short duration ADAM/RAAM, when authority is delegated by the division commander, is counterfire. ADAM/RAAM employed in this manner will reduce the enemy's ability to rapidly displace to new firing positions and make enemy artillery units more susceptible to other counterfire operations.

- Normal Graphical Controls: Short duration SD ADAM/RAAM is delivered from the FLOT forward to the artillery's maximum range for delivering these munitions. The brigade commander controls all ADAM/RAAM scatterable mine missions fired between the FLOT and CFL. The DIVARTY commander employs short duration SD ADAM/RAAM for counterfire in the area forward of the CFL-- subject to restrictions placed by the division and brigade commanders in sector.

- Normal Restrictions from Higher Headquarters: Obstacle free zones or restrictive fire areas are designated along counterattack routes and covering force withdrawal routes/passage points. When the division commander delegates employment authority to brigade/DIVARTY commanders he provides guidance on the percent of available scatterable mine munitions to be used for countermobility (for example, 70%) and counterfire (in this example, 30%). Limited stocks of ADAM/RAAM will normally preclude use in area denial missions. Therefore, the division commander retains approval authority for using short

duration ADAM/RAAM in area denial operations.

- Normal Marking Requirements: ADAM/RAAM missions are delivered in enemy held territory and are not marked.

- Recorded By: The division G3 is responsible for recording all scatterable mine systems delivered in the division AO. The requirement for retaining detailed records concerning ADAM/RAAM is delegated to the division FSE. When employment authority is delegated to brigade or DIVARTY level recording is the responsibility of the brigade/DIVARTY G3.

- Reported To:

- The division FSE routinely reports the employment of division directed ADAM/RAAM missions to the ADE, division G2 and subordinate/flank units as necessary.

- When employment authority has been delegated to brigade level, the brigade S3 reports ADAM/RAAM missions to the division G3, brigade engineer, brigade S2 and subordinate/flank units as applicable.

- Similarly, when delegated authority, the DIVARTY S3 reports scatterable mines fired in counterfire missions to the division FSE and forward brigades/flank division artillery headquarters as necessary.

GEMSS/GROUND EMPLACED VOLCANO

- Delivered By: Trailer mounted dispenser (GEMSS), vehicle mounted dispenser (Ground Emplaced VOLCANO).

- Employment Authority: Division commander with delegation authorized to brigade commander.

- Primary Targets: Preplanned minefields/obstacles.

- Typical Priorities for Employment: Normal priorities for employing GEMSS/ground emplaced VOLCANO for the division commander (or brigade commander when delegated authority) are

(1) Establish large scale preplanned tactical or deliberate protective minefields. (Emplacement usually starts as soon as authority to initiate scatterable mine operations is received.)

(2) Reinforce existing obstacles--once enemy main and supporting attacks have been identified.

(3) Reinforce key defensive positions, in depth, when enemy scheme of maneuver is revealed.

- Normal Graphical Controls: Due to the vulnerability of the delivery systems, GEMSS/ground emplaced VOLCANO are employed from the division rear boundary (brigade rear boundary when employment authority is delegated to that level) forward to one terrain feature behind the FLOT.

- Normal Restrictions from Higher Headquarters: Detailed guidance for the employment of preplanned scatterable minefields, to include any applicable restrictions, is included in the higher headquarters obstacle plan.

- Normal Marking Requirements: Since GEMSS/ground emplaced VOLCANO is emplaced on the friendly side of the FLOT these minefields will be marked using standard minefield marking techniques.

- Recorded By: The division G3, as stated earlier, retains overall responsibility for recording all scatterable mine munitions emplaced in the division AO; however, the requirement for keeping detailed data on GEMSS/ground emplaced VOLCANO is delegated to the ADE. When employment authority is delegated to brigade level, the brigade S3/brigade engineer have parallel responsibilities with their counterparts at division.

- Reported To: The ADE reports information on GEMSS/ground emplaced VOLCANO emplaced munitions to the ACE, division G4 and subordinate/flank units as necessary. It is important that the G4 be informed of any scatterable mine systems employed on the friendly side of the FLOT that could adversely

impact on logistical operations. The G4 transmits this information to the DISCOM headquarters who in turn forwards the data to all combat service support (CSS) units operating in the vicinity of these minefields. When employment authority is delegated to the brigade level, the brigade engineer reports data to the ADE, brigade S4 and appropriate subordinate/flank units. The brigade S4 provides this information to the brigade support battalion (BSB) commander who notifies all CSS units in sector.

M 56/VOLCANO

- Delivered By: Helicopter.
- Employment Authority: Division commander with delegation authorized to the brigade commander.
- Primary Targets: Targets of opportunity.
- Typical Priorities for Employment: The division (or brigade when so delegated) commander's usual priorities for emplacing M 56/VOLCANO are
 - (1) Augment GEMSS/ground emplaced VOLCANO to reinforce existing obstacles when enemy main and supporting attacks have been identified.
 - (2) Reinforce critical defensive positions in depth.
 - (3) Create an obstacle to slow an enemy penetration while other elements of combat power are being shifted to blunt the enemy breakthrough.
 - (4) Protect an assailable flank.
- Normal Graphical Controls: Due to the vulnerability of helicopter delivery systems, M 56/VOLCANO is employed from the division rear boundary (or brigade rear boundary when the brigade commander has been delegated as the employment authority) forward to one terrain feature behind the FLOT. When employed to protect an exposed flank these systems are, as a minimum, provided protective cover by Army aviation attack assets and are employed with at least one terrain feature between the enemy and delivery system.

- Normal Restrictions from Higher Headquarters: When used to reinforce existing obstacles, M 56/VOLCANO are emplaced in accordance with higher headquarters obstacle plans. When used against targets of opportunity, M 56 will be emplaced on a case-by-case basis with precise guidance provided by the employing headquarters. M 56/VOLCANO will normally be emplaced under positive control by means such as direct radio contact panel markers, ground guides and careful delineation of easily recognized terrain features.

- Normal Marking Requirements: Since M 56/VOLCANO is emplaced on the friendly side of the FLOT these munitions will be marked. Time considerations will normally preclude standard marking techniques for M 56/VOLCANO. Therefore, there is a need to develop a hasty minefield marking procedures to insure that friendly units do not become entangled with these scatterable mines. Execution of hasty minefield marking procedures must be simple enough to be performed by aviation pathfinders, MP's, engineers or other troops in the area as dictated by the situation.

- Recorded By: The division G3 delegates the requirement for keeping specific data on M 56/VOLCANO emplaced mines to the assistant division aviation officer (ADAVNO). At brigade level, M 56/VOLCANO is recorded by the brigade S3.

- Reported To: The ADAVNO provides information M 56/VOLCANO to the ADE, division G4 and subordinate/flank units as necessary. The brigade S3 reports this data to the ADAVNO, brigade engineer, brigade S4 and subordinate/flank units as appropriate.

MOPMS

- Delivered By: Manportable dispenser.
- Employment Authority: Battalion commander with delegation authorized to the company commander.
- Primary Targets: Preplanned obstacles/close in defenses.

- Typical Priorities for Employment:

--The combat battalion commander normally employs MOPMS in the following priorities:

(1) Close gaps and lanes in conventional minefields. (Combat engineers may emplace the dispensers and turn the remote control activation devices over to the defending combat units.)

(2) Reinforce other natural or man-made obstacles when the enemy's actions are revealed.

(3) Establish small hasty protective minefields (when authority has been delegated to battalion by the brigade commander).

--When the company commander is delegated employment authority he either executes one of the battalion commander's three priority missions, as listed above, or employs MOPMS as an integrated part of the company's close in defenses.

--In the event that MOPMS is issued to combat support or combat service support units, those units employ MOPMS for close in defense.

- Normal Graphical Controls: MOPMS is emplaced from the battalion rear boundary forward to the FLOT.

- Normal Restrictions from Higher Headquarters: Brigade or higher headquarters may establish obstacle free zones for MOPMS and other scatterable mine systems to insure that counterattack routes, covering force withdrawal routes/passage points and main supply routes remain open for friendly unit use. When employed as part of close in defenses, the MOPMS dispenser will generally not be activated until enemy contact is imminent.

- Normal Marking Requirements: MOPMS emplaced on the FLOT to augment close in defenses are not activated until enemy contact is imminent and are, therefore, not marked. MOPMS used to close conventional minefield gaps and

lanes are under continuous surveillance prior to activation; after activation the friendly side of the gap or lane is marked using standard minefield marking procedures. Finally, when MOPMs is used to create a small protective minefield behind the FLOT, standard or hasty minefield marking procedures will be followed.

- Recorded By: The battalion S3 retains specific data on all activated MOPMs systems.

- Reported To: The battalion S3 routinely provides information on activated MOPMs to the brigade engineer, battalion S4 (if emplaced behind the FLOT) and subordinate/flank units as necessary.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

Scatterable mines have provided the US Army with a superb countermobility "multiplier" for today's battlefield. The rapidity of employment and flexibility offered by the full spectrum of scatterable mines are also ideally suited to complement the small, agile and highly mobile units envisioned for the Army's future. Doctrine on scatterable mine employment has evolved rapidly over the past several years. In the view of the authors, this evolution has been sound and is on the right path for continued refinement.

CONCLUSIONS

- The doctrinal employment of scatterable mines must be keyed to the Airland Battle maneuver doctrine that battles are won through offensive action. Therefore, commander's must provide subordinates with detailed guidance to insure that the rapid emplacement and lethality of scatterable mines is exploited to slow, disorganize, canalize and inflict damage on an enemy force. At the same time, commanders must establish restrictions and positive control over scatterable mine systems to insure that full freedom of maneuver is retained by friendly forces.

- Scatterable mines will be used during both offensive and defensive operations. However, during the offense the commander is usually more concerned with mobility than countermobility operations due to the criticality of retaining freedom of maneuver for the friendly force. Therefore, many more restrictions will be placed on subordinate commanders concerning the employment of scatterable mines in the offense. In other words, scatterable mines have limited applicability in the offense when compared to the defense. The full impact of scatterable mines of the battlefield will be felt during defensive operations.

- Future doctrine concerning the employment of scatterable mines must continue to focus on integrating scatterable mines with other battlefield systems. Similarly, field commanders and planners at every level must review their wartime missions and provide detailed guidance and restrictions for each scatterable mine system during each phase of the projected battle.

- Commanders and staff officers provide detailed guidance for the employment of scatterable mine systems in the following portions of the OPORD/OPLAN: Paragraph 3 (Execution), operations overlay, obstacle annex, fire support annex, and Army aviation annex. However, classification of self-destruct times and other vital information on scatterable mines tends to stifle discussion and preclude detailed battlefield analysis.

- The three traditional roles of combat engineers are mobility, countermobility, and surviveability. Combat engineers will retain the dominant position in the battlefield mobility and surviveability roles during the foreseeable future. However, the introduction of scatterable mine systems under the control of Air Force, Army aviation, artillery, engineer and small unit commanders shifts the responsibility for real time integration of countermobility operations to the maneuver commander/G3/S3. The basic planning function for countermobility operations will remain with the force engineer.

- The concept of specifying approval authority for various types of minefields is an appropriate technique for controlling some scatterable mine systems. Specifically, systems that are normally used to emplace preplanned minefields such as GEMSS and MOPMS. Other scatterable mine systems are normally used against targets of opportunity after the enemy force has revealed his actions. Rapid and precise emplacement of scatterable mines against targets of opportunity can be facilitated by using target reference points (TRP) or other graphics that delineate proposed scatterable mine locations.

- Normally accepted graphics are a means to allow commanders to communicate guidance for the emplacement of various scatterable mine systems. The most important accepted graphical controls are FLOT, CFL, FSCL, unit boundaries (extended forward to the appropriate FTL), and RFA. In addition, the Army must institutionalize the concepts of Forward Terminating Line (FTL), Reconnaissance Interdiction Planning Line (RIPL) and Obstacle Free Area (OFA).

- The Army needs to develop a hasty marking procedure for scatterable mines that are normally employed on the friendly side of the FLOT. The M 56/ VOLCANO (the exact emplacement of which can be controlled by radio contact between pilot and ground unit, panel marker, ground guide and careful delineation of terrain features) is perhaps the prime candidate requiring complementary hasty marking procedures. Marking should be simple enough to be easily executed, with minimal training, by aviation pathfinders, MP's, engineers and other soldiers in the vicinity of the scatterable minefield.

- Scatterable mines are a limited resource. These systems will normally be employed when rapid delivery is essential and enemy actions are revealed. It is unlikely that sufficient assets will be available to allow emplacement of scatterable mines on broad area denial missions. The issue of logistical support and resupply of scatterable mine munitions requires additional study.

RECOMMENDATIONS

- A single source document be provided for all commanders and staff personnel which explains the operation, employment and battlefield integration of all scatterable mine systems.

- A study be conducted on the logistical impact of introducing scatterable mines onto the battlefield.

- The Army institutionalize the use of graphical controls such as Forward Terminating Line (FTL), Reconnaissance Interdiction Planning Line (RIPL), and Obstacle Free Area (OFA) to facilitate employment of scatterable mines.

- Doctrinally, combat engineers must remain the primary planners for countermobility operations--to include scatterable mines. Whereas, the Commander/G3/S3 must integrate real time scatterable mine employment into the overall battle.

- A hasty minefield marking system be fielded that has an emplacement time compatible with the scatterable mine systems normally employed on the friendly side of the FLOT (i.e., GEMSS, MOPMS and M 56/VOLCANO).

- The self-destruct times for all fielded scatterable mine systems be declassified.

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APPENDIX 1

LIST OF ACRONYMS

ADAM	Area Denial Artillery Munitions
AFFOR	Air Force Forces
AO	Area of Operations
ARFOR	Army Forces
ATAF	Allied Tactical Air Force
BAI	Battlefield Air Interdiction
CFL	Coordinated Fire Line
FASCAM	Family of Scatterable Mines
FFA	Free Fire Area
FLOT	Forward Line of Own Troops
FSCL	Fire Support Coordination Line
FTL	Forward Termination Line
GATOR	(Name of) Air delivered scatterable mine
GDP	General Defense Plan
GEMSS	Ground Emplaced Mine Scattering System
IPB	Intelligence Preparation of Battlefield
MBA	Main Battle Area
MOPMS	Modular Pack Mine System
NATO	North Atlantic Treaty Organization
NFA	No Fire Area
OPFOR	Operational Forces
OPLAN	Operational Plan
OPORD	Operational Order
RAAM	Remote Anti-Armor Mine
RIPL	Reconnaissance and Interdiction Planning Line

RFA	Restrictive Fire Area
RFL	Restrictive Fire Line
SD	Self Destruct
SEAD	Suppression of Enemy Air Defense
TRADOC	Training and Doctrine Command
TRP	Target Reference Point
USAF	United States Air Force
VOLCANO	(Name of) Helicopter/vehicle delivered mine

APPENDIX 2

TYPES OF MINEFIELDS*

There are five types of minefields: protective, point, tactical, interdiction and phony. A description of each type of minefield follows:

Protective minefields. There are two types of protective minefields--hasty and deliberate.

- Deliberate minefields are used for static installation protection as part of the perimeter defense.

- Hasty minefields are used for close-in defense and are covered by observation and fire. The unit that lays the minefield is responsible for picking it up or transferring it to another unit when the laying unit gets ready to move out. No boobytraps or antihandling devices are used and only metallic mines are used to insure ease of removal.

Point minefields. Point minefields normally are irregular in size and may contain the full range of available mines and antihandling devices. This type of minefield can be used for mining the following: a road crater or other obstacles, likely avenues of approach to develop targets for AT weapons; routes (during a delay); streams and fords; likely LZs and DZs.

Tactical minefields. Tactical minefields are different from the first two types in that they are most often laid in a standard pattern and have a specific density of mines by type. In addition to laying mines by hand tactical minefields may also be laid using the M 57 mine dispensing system, which gives a row pattern. This type of minefield normally is planned at division and/or brigade level and fits into the overall tactical plan of that headquarters. Tactical minefields are used to stop, delay, or disrupt an enemy attack; assist in the reduction of enemy mobility; assist in blocking penetrations;

* Extracted from FM 5-100, pp. 4-21 - 4-22.

strengthen manned positions; protect friendly flanks.

Interdiction minefields. Interdiction minefields are employed by corps or divisions beyond the range of organic division weapons to entrap the enemy or cause harassment behind the enemy lines.

Phony minefields. Phony minefields are used when lack of time, personnel or materials prevents laying a live minefield; to deceive the enemy into thinking an area is mined; to extend or supplant live minefields (camouflage gaps).

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Commanding General Combined Arms Center ATTN: ATZL-SWT; - SWP; - CAD-C Fort Leavenworth, KS 66027	(6)	Commanding General US Army Artillery Center and Fort Sill ATTN: Combat Developments Fort Sill, OK 73503	(5)
Commanding General Logistics Center ATTN: ATCL-C Fort Lee, VA 23801	(2)	Commandant U.S. Army Military Police and Chemical School ATTN: ATZM-MP Fort McClellan, AL 36205	(2)
Commanding General 3d Infantry Division (Mechanized) ATTN: G3 APO NY 09036	(1)	Commanding General US Army Engineer Center ATTN: ATZA-CD Fort Belvoir, VA 22060	(10)
Commanding General 8th Infantry Division (Mechanized) ATTN: G3 APO NY 09111	(1)		

Commanding General (10)
US Army Test and Evaluation
Command
ATTN: DRSTE-CT-T
Aberdeen Proving Ground, MD 21005

Commander (5)
3d Brigade, 9th Infantry
Division (Mech)
ATTN: LTC(P) Lehowicz
APO NY 09028

Commanding General (2)
Armaments Division
ATTN: AD/YAM
Eglin Air Force Base, FL 32542

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