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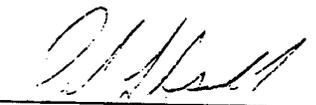
Operational Impact of the U.S. Anti-Personnel Land Mine Ban

By

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

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: 

13 May 1999

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DTIC QUALITY INSPECTED 4

19991122 144

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): Operational Impact of the U.S. Anti-Personnel Land Mine Ban (U)			
9. Personal Authors: LTC Paul L. Aswell, U.S. Army			
10. Type of Report: FINAL		11. Date of Report: 17 May 1999	
12. Page Count: 22			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: Antipersonnel Land Mines, Ottawa Mine Ban Treaty, counter mobility, Scatterable Mines, obstacles.			
15. Abstract: On March 1, 1999, the Ottawa Mine Ban Treaty (the Convention on the Prohibition, Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction) went into force. The NCA directed that the Department of Defense have alternatives to anti-personnel land (APL) mines in place so that by the year 2006 we end the use of all APL mines. It is unlikely alternative new technologies will be fully fielded by this date. This paper discusses the factors which led the President to direct the elimination of all anti-personnel land mines. The paper argues that the current DOD-wide assumption that the U.S. will retain self-destructing anti-personnel land mines in its arsenal is incorrect and presents operational implications of an APL ban without fielded alternatives.			
16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: C	

OPERATIONAL IMPACT OF THE U.S. ANTI-PERSONNEL LAND MINE BAN

U.S. armed forces will not be permitted to use self-destructing, scatterable anti-personnel land mines in future operations. Current literature and the latest doctrine, DOD-wide, assumes the U.S. will retain self-destructing, scatterable anti-personnel land (APL) mines in its arsenal. This assumption is unrealistic in the face of executive branch directives and the worldwide momentum to eliminate these mines. This paper discusses the factors that led the President to direct the elimination of all APL mines and presents operational impacts of a total APL mine ban.

The domestic and international momentum that led U.S. leaders to institute an APL mine ban is clearly shown in the Ottawa Treaty. On March 1, 1999, the Ottawa Mine Ban Treaty (the Convention on the Prohibition, Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction) entered into force. The Treaty went into effect six months after 40 countries, "deposited declarations with the UN Secretary-General that they adhere to its provisions."¹ States signing the treaty agreed to never use, develop, produce, otherwise acquire, stockpile, retain or transfer to anyone, directly or indirectly, APL mines.² Though primarily concerned with "dumb" (not self-destructing) APL mines, the treaty also prohibits self-destructing APL mines.

In Treaty terms, an APL mine is "designed to be exploded by the presence, proximity or contact of a person and that will incapacitate, injure or kill one or more persons." While the U.S. is not a party to the Treaty, it has been signed by nearly every other nation on earth including all other 18 NATO nations and Japan. Despite a lack of formal U.S. support for the Treaty, the President, with congressional support, has directed an APL mine ban. The motivation for both the Treaty and the U.S. ban are humanitarian concerns over decades of tragedy caused by APL mines worldwide. In the words of U.S. Secretary of State Madeleine K. Albright:

Near the start of this century, 90 percent of wartime casualties were soldiers. As the century

wanes, 90 percent are civilians . . . antipersonnel landmines have added greatly to the devastating impact of modern conflict on noncombatants. These hidden killers are cheap to buy, easy to use, hard to detect and difficult to remove. President Clinton has made it our goal to eliminate by the year 2010 the threat landmines pose to civilians. As he has said, "Our children deserve to walk the Earth in safety."³

In addition to committing to spend billions over the next decade on humanitarian demining and other efforts to eliminate existing APL mines, in 1997 the President instructed the Department of Defense to conform to most provisions of the Treaty. His decision to conform to the Treaty did come with a loophole. While directing the eventual removal and destruction of all "dumb" (non-self-destructing) APL mines from U.S. stockpiles, at the request of DOD he reserved, "The right to use so-called 'smart mines', or self-destructing mines, as necessary, because there may be battlefield situations in which these will save (the) lives of our soldiers."⁴ However, while technically permitting DOD to continue to employ self-destructing 'smart' mines, he directed that existing stocks be capped at present levels.⁵ This decision combined with the ban displays the President's intent to eliminate all APL mines. The President articulated the policy in Presidential Decision Directive 64 and also enunciated his intent in late 1997:

I'm directing the Department of Defense to develop alternatives to anti-personnel land mines so that by the year 2003 we can end even the use of self-destruct land mines -- that is, those, again, that are not causing the problem today because they destroy themselves on their own after a short period of time. We want to end even the use of these land mines, everywhere but Korea. As for Korea, my directive calls for alternatives to be ready by 2006, the time period for which we were negotiating in Oslo. By setting these deadlines, we will speed the development of new technologies that I asked the Pentagon to start working on last year. In short, this program will eliminate all anti-personnel land mines from America's arsenal.⁶

The Secretary of Defense further implemented the ban with guidance to the Chairman of the Joint Chiefs of Staff to, "Direct the Services to begin development of tactics and Service doctrine eliminating the need to rely on self-destructing APL in anticipation of prompt international agreement to ban all APL."⁷ Unfortunately, no DOD technology demonstrator, doctrine or weapon system devel-

opment initiative, or procurement program is currently ongoing which could fully field self-destructing APL mine alternatives before the President's 2006 deadline to eliminate all anti-personnel land mines from America's arsenal.

In light of the delay in developing tactics, doctrine or alternatives to self-destructing APL mines, will the next President halt the implementation of the ban? The momentum of the crusade to eliminate all landmines and the operational characteristics and performance of current U.S. self-destructing APL mines may combine to preclude a halt in implementing the ban. In addition, the planned ban may be extended to current U.S. self-destructing anti-tank (AT) mines as well. The operational characteristics and performance issues which caused the ban of current U.S. self-destructing APL mines are present in current U.S. self-destructing AT mines and may also expose them to a ban.

Two operational characteristics/performance issues may preclude any halt of the ban and extend the ban to AT mines. These issues are fratricide in the operational use of the systems and the failure of self-destruct mechanisms of current U.S. systems. Years of experience at Army training centers shows that despite their potential effectiveness, current self-destructing mine systems are rarely used properly at any of the U.S. Army Combat Training Centers and their use almost invariably either is operationally ineffective, or more often than not, results in fratricide.⁸ Both operationally during DESERT STORM and during training, fratricide from friendly minefields:

Is a major problem due to lack of coordination, failure to disseminate obstacle plan, and failure to accurately report obstacle locations back up the chain. (During DESERT STORM) CENTCOM Air Force (CENTAF) flew over 35 GATOR missions (the exact number is not known), without reporting, or recording missions...During the ground offensive, units found themselves maneuvering in GATOR minefields, without any knowledge of their existence.⁹

Furthermore, the expected failure rate of the self-destruct mechanisms of current fielded U.S. systems in practice is consistently at five percent or more.¹⁰ This contradicts official DOD and administration claims of nearly perfect self-destruction performance for current scatterable AT mines, re-

ported to either explode at their pre-set time (4 hours, 48 hours, or 15 days) or to deactivate (using their self-deactivating feature of an expended battery) to render 99.99 percent of these mines inert within 90 days.¹¹ In fact, following the only known operational uses of U.S. self-destructing mines, during DESERT STORM, a single U.S. mine clearance contractor working in one small part of Kuwait reported it found some 1,700 mines equipped with self-destructing devices (out of 1,314 GATOR CBU-78/89s used in the war¹²) that, "Failed to self-destruct within the time specified in their design."¹³

Dud U.S. self-destructing mines are highly likely to detonate if disturbed. Army Materiel Systems Analysis Activity studies showed 40 percent of duds were hazardous and for each disturbed dud there was a 13 percent probability of detonation.¹⁴ This has been a cause of fratricide casualties. During encounters with unexploded ordnance, of which dud self-destructing mines represented a significant number, there were 21 U.S. Army personnel killed and 53 injured during DESERT STORM.¹⁵ With the Presidential cap on replacement of existing self-destructing mine stocks, as current stocks age self-destruction failure rates will inevitably climb.

A second concern with the U.S. APL mine ban is the likelihood that it will be extended to all U.S. systems, including U.S. self-destructing anti-tank (AT) mines. Two reasons the APL ban on all current U.S. APL mines may extend to all U.S. self-destructing mines is the mine mix and the issue of anti-handling devices (AHDs). U.S. self-destructing land mines are one of three types: a) All APL mines (Area Denial Artillery Munition, Pursuit-Deterrent Munition); b) APL mines mixed with AT mines (Remote Anti Armor Mines, GATOR SCATMINE, Modular Pack Mine System, and most Flipper and Volcano systems); c) "Pure" AT mines equipped with some kind of AHD (Selectable Lightweight Attack Munitions used as mines and some Flipper systems. The HORNET Wide Area Munition and a few Volcano systems only have defacto AHDs, that is they detonate when disturbed or moved, and do not have separate AHDs).¹⁶

The President's ban will eliminate any APL equipped mine systems by 2003. This eliminates almost all current stocks of U.S. scatterable mine systems, APL or AT. This ban may extend to the few remaining AHD-capable, pure-AT mine systems as well. The Ottawa Treaty describes AHDs as, "A device intended to protect a mine and which is part of, linked to, attached to or placed under the mine and which activates when an attempt is made to tamper with or otherwise intentionally disturb the mine."¹⁷ Anti-tank mines with these devices are not specifically considered by the Treaty to be APL mines, however the international community has consistently considered AHD-equipped AT mines as defacto APL mines. International pressure has formed which includes AHD-equipped AT mines in the interpretation of mines prohibited by the APL mine ban.¹⁸

The main reasons for international consideration of AHD-equipped AT mines as defacto APL mines is the lethality of AHD-equipped mines and the ease with which they can be detonated by a person. The slightest movement or change in orientation of AHD-equipped mines can result in a detonation which can be lethal a *minimum distance of 235 meters* from the outer edges of any minefield.¹⁹ The basis for this lethality are the phenomena of sympathetic detonations where a single mine can detonate many other mines in a huge series of explosions, and "kick outs", where live scatterable mines can be thrown away from any initial high order detonation to detonate in an area outside the minefield.²⁰ This lethality is heightened by the small size of current U.S. AHD-equipped scatterable AT mines, making them so difficult to detect that in some terrain, such as in ice or snow, dense foliage, tall grass, or uneven ground, they can be as difficult to detect as buried mines.²¹

Also, AHD-equipped AT mines require the same minuscule level of disturbance to activate as an APL mine. The very sensitivity of their AHDs gives these AT mines all the characteristics of APL mines, that is, they will detonate in the presence, proximity or in contact with a person and that they will incapacitate, injure or kill one or more persons. Lethality and ease of detonation makes AHD-

equipped AT mines extremely vulnerable to domestic and international pressure to include them in the APL mine ban. Any discussion of the operational impact of a U.S. ban on APL mines should consider the ban to extend to AT mines.

Another factor may even outweigh operational characteristics and performance issues in making any lift of the mine ban unlikely. Contrary to past conflicts where division-level or lower-level commanders had authority to direct the employment of scatterable APL mines,²² current directives now require that employment of any mines receive prior NCA authorization. In addition, the use of mines in allied territory is only permissible with both host nation and NCA authorization.²³ Both the NCA and the leaders of allied nations have made their positions clear on opposing or even prohibiting the use of mines. It would be hard to imagine a future circumstance where the NCA would authorize the use of mines short of a catastrophic defeat or national cataclysm. Together, these factors make it unlikely current U.S. self-destructing mines will ever be used again.

Operational Impact. A total mine ban has significant operational impacts. These impacts are based on how U.S. forces now use APL and other scatterable mines. Under current directives, U.S. self-destructing APL/AT scatterable mines are used either alone or with other physical measures to act as barriers. In joint doctrine, barriers are obstacles used to channel, direct, restrict, delay, or stop the movement of an opposing force and to impose losses in personnel, time, and equipment on that opposing force.²⁴ Barriers which have operational significance would normally either restrict enemy maneuver options or create friendly maneuver options. In addition, barriers and obstacle systems, including APL and other mines, can deny an enemy use of resources. Construction of barrier and obstacle systems can be used not only in combat but also as a flexible deterrent option to demonstrate U.S. resolve.

Mines significantly amplify the other effects of non-mine components of obstacle systems.

Current U.S. self-destructing mines are all scatterable. Scatterable mines used in a deep strike role can quickly block the escape routes of a defeated enemy and facilitate the pursuit and destruction of the enemy force. In the deep strike role these mines can also delay the repair of damaged air bases and degrade an air base's ability to launch or recover aircraft. Scatterable mines directed against either mobile or static air defense (in a SEAD role) or against fire support systems can degrade their movement and inhibit effective operations. In addition, scatterable mines used against logistic support bases can disrupt sustainment operations even in rear areas.²⁵ Scatterable mines can also be used to disrupt counterattacks, protect the flanks of friendly forces; close breaches in friendly obstacles, and disrupt enemy river crossings, landings, and amphibious operations. Scatterable mines offer operational commanders a powerful, effective resource which will be difficult to replace.

However, the loss of scatterable mines is not insurmountable. There are measures operational commanders can implement to offset their elimination. Operational commanders can employ other non-mine barriers and obstacles to replace current U.S. scatterable mine capabilities to enhance their force's ability to mass combat power for offense or defense, sustain the force, achieve surprise, and to use key terrain. The use of deception can become even more significant without mines as friendly forces keep the enemy uncertain of friendly plans and the location and disposition of friendly forces. Below is a discussion of the impact on the operational factors of Time, Space, and Forces that losing scatterable mines may have on U.S. forces conducting both offensive and defensive operations.

Factor of Time: The greatest operational effect of any barrier or obstacle system is the time expended by forces moving through the system. The time a defender or attacker is delayed by any obstacle system covered by fire allows friendly fires to further attrit the enemy.

For the operational commander on the offense, the priority of barrier and obstacle employment is to enhance and protect friendly maneuver, first by not delaying friendly movement and second by

delaying or degrading the maneuver and fires of enemy ground forces and slowing or degrading operations of enemy airbases. Barriers and obstacles can also affect the offense by delaying or inhibiting an enemy's ability to counterattack, commit reserves, or to reinforce. They can also provide time for friendly forces on the offense to commit their own reserves, reconstitute, regenerate combat power, or to bring up reinforcements. By isolating the area of operations, barriers and obstacle systems can allow time for friendly forces on the offense to complete maneuver or to counter enemy maneuvers and to concentrate friendly forces or to counter enemy force concentrations. By delaying enemy counteraction, barriers and obstacle systems allow friendly forces to maintain their offensive tempo.

In most circumstances during offensive operations, barriers and obstacle systems without scatterable mines can have the same effects on the factor time as obstacle systems with mines if additional natural and reinforcing obstacles are employed to offset the loss of mines. Expanded use of additional non-mine barriers and obstacles, for example natural terrain features like lakes, rivers, streams, swamps, mountains, deserts, and snow- or ice-covered areas, can be used to enhance non-mine obstacle systems. These natural barriers and obstacles can be strengthened with other additional reinforcing obstacles. These non-mine reinforcing obstacles can be demolition obstacles like road craters or blown bridges and tunnels; constructed obstacles like wire and tank ditches; or expedient obstacles like junk cars, rubble buildings, pushed over trees, flame field expedients (burning brush or flammable-filled ditches), smoke, or deliberate flooding. The same delaying obstacle effect can be obtained using additional non-mine barriers as with obstacle systems with mines.

However, the loss of scatterable mines from barriers and obstacle systems does adversely impact offensive operations in some circumstances. Several situations which can occur during operational offensives call for delays on enemy movement or maneuver which can be difficult to obtain with non-mine barriers and obstacles. Efforts to hinder movement of reserves and logistics along axes of

advance or other routes deep in enemy territory will be extremely difficult without scatterable mines. Degrading enemy airbases and fixing fleeing enemy forces during pursuit and exploitation will also be difficult without scatterable mines. As discussed earlier, in the only known U.S. operational uses of scatterable mines, during Operation DESERT STORM, Marine aircraft attacked Iraqi airbases with scatterable mines and U.S. Air Force aircraft created a series of scatterable minefields to block fleeing Iraqi forces. Current U.S. scatterable mines are extremely effective in quickly achieving significant operational effects on the factor time against these types of targets with expenditure of almost negligible resources. A handful of fixed or rotary wing aircraft sorties can block a supply or escape route or can render an airfield unusable for hours or even days. The only apparent operational options without scatterable mines for attacking these types of targets would involve allocating additional maneuver or fire support forces (particularly interdiction or deep attacks with air or missile systems) to achieve the desired operational effects.

Unlike offensive operations, in most circumstances during defensive operations, barriers and obstacle systems without scatterable mines can be effective at imposing delays on an enemy if additional natural and reinforcing obstacles are employed to offset the loss of mines. The priority of barrier and obstacle employment for the operational commander on the defensive is to degrade the enemy's ability to maneuver and to attrit attacking forces. Again, the time a defender or attacker is delayed by any obstacle system covered by fire allows friendly fires to further attrit the enemy. However, in both offense and defense, the time required to create non-mine barriers far outweighs the time required to emplace scatterable minefields. While a 400 by 400 meter non-mine obstacle can take a day or more to create, depending on engineer equipment and troops available,²⁶ a similar-sized FASCAM minefield can be emplaced by an artillery battalion in less than three minutes and a similar-sized VOLCANO or GATOR minefield can be emplaced literally in seconds.

Other facets of defensive operations are also less affected than offensive operations by obstacles with or without mines. Friendly forces on the defensive are less vulnerable to the effects of friendly obstacles since less movement typically occurs during defensive operations and since defenders are normally in control of terrain and have more opportunity to develop obstacle systems which will not delay friendly movement. Time delays inflicted by barriers and obstacles on enemy forces can affect the defense by facilitating friendly counterattacks and future offensive operations.

In almost all circumstances during defensive operations, barriers and obstacle systems without scatterable mines can be effective if additional natural and reinforcing obstacles are employed to offset the loss of mines. As with offensive employment, operational commanders on the defense who are denied the use of mines can use other barriers and obstacles to offset the loss of mines. Well planned and resourced non-mine barriers can create massive obstacle belts to enable key terrain to be held and to inflict enormous delays on an attacker.

Factor of Space: The operational effect of a barrier or obstacle system on space is less than the level of effect on the factor time. Barrier and obstacle systems significantly affect time but are unable to alter all space. Barrier and obstacle systems shape the size of an operating area by either channeling forces onto particular routes or by lengthening the distances forces moving through the area must travel. Barrier and obstacle systems can deny an enemy use of terrain and divert an enemy maneuver into terrain more favorable to friendly forces. For the operational commander on the offense, barriers and obstacle systems can protect flanks of attacking forces, shrink the operating area, and eliminate enemy maneuver options. Barriers and obstacle systems can protect friendly maneuver by preventing enemy counterattacks from reaching attacking forces. For the operational commander on the defense, barriers and obstacle systems can channel enemy attacks into areas most vulnerable to friendly fires.

In most circumstances, as with their operational effects on the factor time, non-mine barriers

and obstacle systems can significantly affect space if additional natural and reinforcing obstacles are employed to offset the loss of mines. Defenders at choke points can develop almost impassable barrier systems using natural and reinforcing obstacles alone. However, denying the enemy the use of air-bases, C2 nodes and IADS and fire support systems close to the FLOT using barriers and obstacle systems is much more difficult without scatterable mines. Again, the only apparent operational options without scatterable mines for attacking these types of targets would involve allocating additional maneuver or fire support forces (particularly interdiction or deep attacks with air or missile systems) to achieve the desired operational effects. In addition to simply allocating additional maneuver forces to achieve the same operational effect as scatterable mines in attacking these targets, higher numbers of the latest anti-armor munitions could also be effective. Some of the newly fielded or developing systems which could potentially have even greater operational effect than current scatterable mine systems are the USAF/USN Sensor Fused Weapons (Skeet submunition), U.S. Army Brilliant Anti Tank (BAT) munitions in the ATACMS missile, and the Sense and Destroy Armor Munition (SADARM) fired by U.S. Army and USMC cannon artillery.

One effect on the factor space, that is denying an enemy access to an area, may be achieved with non-mine barrier and obstacle systems used as a deterrence measure rather than as a physical constraint. When used as a flexible deterrent option, such a system could signal friendly resolve and achieve psychological deterrence. This would achieve the same operational effect as a barrier or obstacle system which included mines.

Other issues concerning the factor space may minimize the impact of the loss of mines on the operational commander. Unlike the factor time, some aspects of the factor space can mitigate against the use of mines of any kind in barrier and obstacle systems. Political considerations and the physical characteristics of a given operating area may make the use of scatterable or other mines impossible or

at best unwise in some parts of the world. As discussed earlier, the leaders of most nations and almost all U.S. allies, Israel and Korea excluded, have declared their total opposition to any use of mines by or near their forces and certainly not on their territory. In most areas of the world, future U.S. efforts to use mines would be strongly opposed, perhaps to the extent of ending a coalition. In a recent command post exercise, a British brigade commander serving as part of a combined force with a U.S. division refused to allow the U.S. commander to emplace a scatterable minefield in the area of operations since using mines violated his nation's laws.²⁷ The areas of the world where leaders will be reluctant to permit U.S. forces to use mines is likely to expand as more nations sign the Ottawa Treaty.

Physical characteristics of space may also mitigate against the use of mines, particularly scatterable mines, and make their loss to operational commanders insignificant. Weather, particularly ambient moisture and extremely high or low air temperatures; the trafficability and surface of the terrain, particularly swampy soil, ice, snow or desert sand, foliage, or tundra, and even the degree of slope can greatly increase the dud rate of scatterable mines; and can make them difficult to detect.²⁸ Heavy rains in jungle areas, avalanches or repeated thawing and freezing in cold regions, and high winds and blowing sand in deserts can all cause current U.S. scatterable mines to malfunction or even inadvertently detonate. These conditions can in general make mine use undesirable to the operational commander. In addition, the trafficability of some terrain, including the combination of slope and vegetation (particularly with high moisture or in dense forest), can be so low that it acts as a natural barrier without any need for mines or other obstacle reinforcement by friendly forces.

Other physical characteristics of space that can mitigate against the use of mines include urbanization and high population density. Urbanization, particularly structures placed closely together and tall buildings, makes it difficult or impossible to lay effective scatterable minefields, and high population density may make it extremely unwise to expose noncombatants to concentrations of lethal

scatterable minefields.

While operational commanders can mitigate the loss of mines on the operational factor space using natural and reinforcing obstacles alone, some facets of operations, including denial operations (interdicting routes in and around the battlefield) and pursuit and exploitation, are much more difficult to accomplish without scatterable mines. Operational commanders will be forced to modify their force mix and use additional fire support systems and deep strikes to accomplish the same operational effects. Considerable effort must be placed in using non-mine barriers and obstacles and in the acquisition, storage, maintenance, distribution, and security of the needed barrier material and equipment.

Factor of Forces: Unlike the other two operational factors, barrier and obstacle systems with mines affect the factor of forces more directly. By increasing casualties on forces encountering them, mines indiscriminately attrit friendly or enemy strength alike. The inclusion of mines in barrier and obstacle systems allows friendly forces to exhaust an enemy's capability to conduct sustained combat before even coming in contact. The demoralizing effects of minefield encounters, as well as the expenditure of ammunition, countermine munitions and other counterobstacle resources, can prevent an enemy force from maintaining the morale, strength or sufficient maneuver capability to even reach its objectives.

On both offense and defense, of particular importance to operational commanders is the use of barriers and obstacles as an economy of force measure. These economy of force measures are extremely significant if used to provide security to the flanks of attacking forces to protect them from counterattack. While barrier and obstacle systems with mines are more direct in their effects on the factor forces, non-mine barriers can still magnify friendly firepower effects as well as reinforcing choke points to enable them to be held by smaller forces. Enemy forces engaged in breaching obstacle systems are not available to act as reserves, reinforcements, or counterattacking forces. Even without

mines, as advancing enemy forces encounter obstacles that disrupt and slow their advance, succeeding units can be forced to combine with those to their front, creating a lucrative target. Enemy forces are required to deploy from march formations to negotiate obstacles and must expend breaching and bridging assets to clear the barrier.

Friendly forces using current scatterable mine systems have less exposure to enemy counteraction than forces in direct contact. Artillery and air delivered scatterable mines also make it possible to attack enemy forces indirectly without the fire support system or attacking aircraft being engaged by enemy air defense or other systems accompanying or in direct support of enemy units.

Since friendly forces on the defense are more likely to be within range of the bulk of friendly fire support systems, natural barriers and obstacles integrated with other reinforcing obstacles and covered by fires can minimize the impact of the loss of mines. Forces on the defense have the opportunity to carefully plan and resource non-mine barriers to create deep obstacle systems to enable key terrain to be held by small forces.

Unfortunately, forces without scatterable mines have significant additional manpower and equipment requirements to achieve the same operational effects as barrier and obstacle systems with mines. Additional engineer and logistical support must be allocated if non-mine barrier and obstacle systems are expected to have the same effects as systems with mines.

The leadership and training facets of the factor forces may prevent full acceptance and operational employment of non-mine barrier and obstacle systems as a means of mitigating the loss of mines. Physically altering the battlespace does not necessarily itself destroy an enemy. Measures which directly attack an enemy forces' strength are stressed in our operational planning and execution and in the conduct of our training. Time spent in peacetime training on constructing or planning and distributing actual resources for elaborate non-mine obstacle systems is minimal. The damage to the

environment, the excessive time required for the amount of perceived benefit, and the cost of resources expended when these systems are constructed in peacetime all combine to keep our leadership and training focused on scatterable mines as our primary countermobility tool.

Conclusions. The loss of scatterable mines will have a significant affect on the operational factors of time, space and forces. As discussed above, operational commanders must be prepared to fight and win without APL mines. It is unrealistic to assume existing NCA directives and the world-wide momentum to eliminate APL mines will go away. No current program, DOD-wide, can fully field self-destructing APL mine alternatives before the President's 2006 deadline to eliminate all APL mines from America's arsenal. Congress appropriated \$19 million in FY99 for:

Identification, adaptation, modification, research, and development of existing and new technologies and concepts that (A) would provide a combat capability that is equivalent to the combat capability provided by non-self destructing anti-personnel landmines; (B) would provide a combat capability that is equivalent to the combat capability provided by anti-personnel submunitions used in mixed anti-tank mine systems; or (C) would provide a combat capability that is equivalent to the combat capability provided by current mixed mine systems.²⁹

Congress also directed DOD to submit reports in April of 2000 and 2001 on DOD progress on the, "Search for existing and new technologies and concepts that could provide a combat capability equivalent to the combat capability provided by anti-personnel submunitions used in mixed mine systems or an alternative to mixed munitions."³⁰ These reports and less than \$19 million in R&D funds will not replace current scatterable mine system stocks valued in excess of \$1 billion by the 2003 or even 2006 deadlines. Efforts to develop the Anti-Personnel Landmine-Alternative (APL-A) and at the 1998 World Wide Landmine Alternative Conference have not resulted in a system which can be fully fielded before the deadline is reached.

Recommendations. U.S. forces must recognize that self-destructing, scatterable APL land mines can no longer be part of our arsenal. In the absence of alternatives, operational commanders

must use existing forces, weapons, doctrine and tactics to achieve the operational effects current scatterable APL mines produce.

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