Winning in Korea Without Landmines

Alternatives to Speed Victory
And Reduce Allied Casualties

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Foreword: The Tiger and the Dragon

Korea is a land dominated by mountains. Dozens of mountain ranges separated by narrow valleys cut west to east across the peninsula, from the northern border with China to the southern port of Pusan. From the air, they make Korea look like it is wearing a striped sweater. Koreans say that each of the mountains in a west-east range consists of a Tiger and a Dragon. The Tiger is the western end of the mountain, the tall, rugged peak that breaks the north wind and provides a shelter for villages on the southern side. The Dragon is the long tail of descending, softer peaks that run east from the Tiger, before there is a gap and the next Tiger and Dragon in the range appear.

These Tigers and Dragons have molded Korean culture and history, serving as a defense against both unfriendly elements and unfriendly neighbors. Even today, they assist the allies in deterring and, if necessary, defeating a North Korean invasion. South Korea and the United States protect their key bases along invasion routes from North Korean artillery by building them behind Tigers, and they control the choke-points and valleys through which North Korean armor must pass by placing tank and infantry-killing weapons and their crews on top of the surrounding Dragons.

Another sort of Tiger and Dragon can be seen in the allied roles in the war plans of the Combined Forces Command, the joint U.S.-South Korean military body that will direct both the initial defense against an invasion and the planned rapid counter-invasion to reunify the peninsula.

The United States is the Tiger, which provides the cutting-edge technology in weaponry, surveillance, and communication that amount to a high, rugged peak against which North Korea's outdated weapons and communications will break. This advantage will quickly make the sea and the air exclusively allied areas of control, and permit the allies to track and direct a ground battle in which North Korea will be fighting blind, with badly out-ranged armor.

South Korea is the Dragon, providing the long tail of troops, aircraft, armor, weapons, and logistics needed to outlast the North's army as the allies' technological advantages wear it down in both defense and counter-invasion.

The Tiger and the Dragon have successfully pursued a strategy of deterrence by building formidable defensive and offensive capabilities and
demonstrating them repeatedly to North Korea in exercises. Americans and South Koreans should take pride in the success of this costly strategy of deterrence they have funded and their young warriors have implemented—with the added cost of lives lost in realistic, constant combat training.

Within this strategic context, what role do antipersonnel landmines that are banned by the Ottawa Treaty play in deterrence, and in the war-fighting plans of the allies? And what alternative weapons and tactics could be used in Korea that would fulfill President Clinton's mandate to the Pentagon and enable the United States to join the treaty without increasing allied casualties? As this report shows, these are complex questions. Alternatives could, as in the Pentagon's research, strictly replicate the tactical effect of today's antipersonnel landmines, or they could instead, as Lt. General Robert Gard Jr. advocated in the first monograph in this series, meet the strategic objectives of the combat systems of which antipersonnel landmines are only a part.

This monograph proposes concrete ways to compensate for the removal of allied antipersonnel landmines in Korea. A number of alternatives already exist, and many more can be adapted from systems that are under development.

In fielding these alternatives there must also be a Tiger and a Dragon, a single, firm civilian leader who insists on success, and a group of military officials who are dedicated to testing and refining effective solutions. Only direct orders from the commander-in-chief, backed up by negative consequences for those who fail to heed them, can turn the ideas in this monograph into practices that will maintain deterrence in Korea, improve the abilities and reduce the casualties of allied troops, and achieve the dream of a world where the mere act of walking no longer brings a risk of death or dismemberment to civilians and soldiers.
Executive Summary

This monograph is on alternatives to antipersonnel landmines in Korea. It is based on an on-the-ground assessment of potential North Korean invasion corridors and a week of in-depth interviews with South Korean military officials who are or have been in field command and war planning positions. It identifies currently available weapons and tactics that will permit the allies to achieve their goal of joining the Ottawa Mine Ban Treaty without reducing combat effectiveness or increasing casualties. In fact, these weapons and tactics would likely make both a North Korean invasion and the planned allied counter-invasion more lethal, more quickly, to North Korean forces.

A North Korean Invasion: Regime Suicide

There is no more important goal in U.S. national security policy than deterring a North Korean invasion of South Korea. This is not because the outcome of an invasion is in doubt. The over 500,000 soldiers in the modern, highly trained South Korean army and the small but significant U.S. contingent will be fighting from strong defensive positions behind rivers and complex barrier systems, and on mountains overlooking valleys and narrow passes. The allies' latest-generation tanks will be waiting behind protected choke points to mop up survivors. Backed from the air by unchallenged reconnaissance and strikes against the North's field forces and infrastructure, the allies will decimate in a matter of weeks, if not days, the initial waves of exposed infantry and the subsequent columns of antiquated armor.

All the South Korean military officials interviewed would agree with this assessment by a top U.S. Embassy official in Seoul: "The question of who will win this war is not really a question any more." Even the Pentagon's conservative computer wargame predicts that, with or without U.S. antipersonnel landmines, a North Korean invasion will be defeated before it reaches Seoul.

The economic disparity between North Korea and South Korea during the past decade has settled the strategic issue in Korea. As a South Korean general said: "We have won the war of the economy." The North's economy collapsed after the loss of economic and military subsidies from the Soviet Union. Unable to modernize or train their forces, North Korea's army now serves primarily as a barrier behind which the North Korean government can engage in missile and nuclear blackmail designed to win foreign aid.
The allies, who by 1990 had already achieved air and sea dominance and built strong defensive positions, engaged in a massive modernization program to give their ground forces overwhelming superiority in weapons, communications, and surveillance technology, as well as in training and mobility. The North must keep a substantial share of its forces inside North Korea to blunt the counter-invasion that the allies openly train for and publicly discuss.

Deterrence is crucial not because a northern invasion would succeed, but because it would touch off an allied counter-invasion and general war that, according to a secret Pentagon study, could cause 50,000 U.S. and 500,000 South Korean military casualties in the first three months of fighting. Such a war could also trigger the use of weapons of mass destruction by both sides, with all the devastation and uncertainty their use would entail.

To avoid such a disaster, allied forces have pursued a strategy of deterrence by building formidable defensive and offensive capabilities and demonstrating them repeatedly to North Korea in exercises—and in 1999 in actual combat in the air war in Yugoslavia and the West Sea incident, where South Korean naval forces overwhelmed technologically inferior Northern patrol boats.

A North Korean invasion of South Korea would be an act of regime suicide, the one act that would inevitably lead to the destruction of the North Korean state and its incorporation into the Republic of Korea. This does not mean, however, that Kim Jong Il or rogue military commanders might not decide to invade, especially if there is a perceived weakening in allied capability or resolve. Even as the allies sustain the Northern regime through aid and trade, therefore, the strategy of deterrence through readiness must continue for the indefinite future.

**Allied Weapons Banned by the Ottawa Treaty**

The Ottawa Treaty bans mines that are “designed to be exploded by the presence, proximity or contact of a person,” but makes an exception for anti-handling devices on anti-vehicle mines. Governments themselves decide which systems meet complex definitions. An anti-handling device, the treaty says, is,

“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.”
A number of signatories of the treaty possess both self-destructing and long-lived anti-vehicle mines that can be triggered by a person, in many cases regardless of whether the mine has an anti-handling device. Despite complaints from other countries and landmine campaigners, these signatories consider their mines legal and have not reported them as slated for destruction, as the Ottawa Treaty requires for banned weapons.

President Clinton has announced a goal of joining the Ottawa Treaty banning antipersonnel mines. He has ordered the Pentagon to search for alternatives that will fulfill U.S. military missions without increasing allied casualties. South Korea has announced its intent to adopt U.S. alternatives and join the treaty.

Self-destructing U.S. mixed systems—anti-vehicle mines protected by antipersonnel mines—are far safer for civilians than buried, long-lived anti-vehicle mines whose fuzes or anti-handling devices can be triggered by the presence of a person—those mines that some nations are treating as legal under the treaty. Despite this, this monograph treats mixed systems as banned. Since Vietnam Veterans of America Foundation believes that any mine that can be triggered by the unintentional act of a person is illegal under both the Ottawa Treaty and the First Protocol of the Geneva Conventions. This monograph treats U.S. anti-vehicle mines as legal under the treaty, on the assumption that they would be tested and, if necessary, modified to meet the treaty’s standard.

Landmines are integrated into both of the two closely related allied operations that will take place if North Korea invades South Korea: stopping the North Korean invasion, and mounting a counter-offensive to seize Pyongyang and reunify the country. Tactically, these landmines are not intended to harm North Korean troops and vehicles as much as to slow and channel them so that other weapons can target and destroy them.

One million South Korean long-lived antipersonnel and anti-vehicle mines, marked by barbed wire and signs as required by the Convention on Certain Conventional Weapons, are emplaced within ten miles of the Demilitarized Zone. These mines are deployed mostly in rough, hilly forests and as part of a barrier system with many other components, to guide North Korean troops down lanes and roads to killing zones.

Another one million U.S. and perhaps two million South Korean long-lived mines are available for placement during crisis or war, mostly by South Korean troops. Most of those mines will be placed on the mountains overlooking invasion valleys between the Demilitarized Zone and Seoul to protect allied fighting positions. Emplacing long-lived mines is time-
consuming and labor-intensive. Many analysts and military personnel question whether a significant number of landmines can actually be emplaced during a crisis or a war in Korea.

Long-lived landmines in Korea are not a “force multiplier,” as claimed by U.S. officials, because North Korea’s breaching methods (mine-clearing rockets, rollers, grappling hooks, or simple sacrifice of lead troops through a lane) require the allies to deploy forces to cover mined areas. They are instead a “task complicator.” They will force North Korean commanders to use waves of exposed infantry to neutralize allied antitank positions for the subsequent introduction of the armored exploitation forces. These North Korean commanders must devote time and personnel to clearing a path through mined areas.

The allies have over 80,000 scatterable, self-destructing mines that will be deployed by air, artillery, and infantry in the event of a North Korean invasion. These will be used to slow and channel enemy armored units. If enemy armor stops for its engineers to clear a minefield or if it diverts to a new route, its mission will be disrupted and it can be subjected to air and ground attack from allied assets for a longer period. North Korean armored units are held in rear areas before being directed to a cleared invasion route, so they would be hit with scatterable mines both in North Korea and as they move into South Korea. The mines would also seal off counter-attacks in North Korea during the allied counter-invasion.

Nearly all of the 50,000 U.S. mines are deployed in containers that mix antivehicle mines with a smaller number of antipersonnel mines. The South Korean arsenal of over 30,000 mines includes these mixed system landmines as well as containers with only antipersonnel mines. The antipersonnel mines in mixed systems are visible to enemy infantry who are trying to move past them to place a detonating charge on the antitank mines, which are also visible. The triggering filaments of the antipersonnel mines are impossible to see as they spread out like spider webs. Enemy infantry are slowed until they clear a lane through these antipersonnel landmines to the antitank mines with mechanical devices and explosives. Obviously, a minefield that is observed and subjected to fire will take much longer to clear than one in which the enemy can work unimpeded.

**Alternative Weapons and Tactics**

The cost of the weapons and tactics proposed in this monograph is estimated at $2 billion if both the United States and South Korea join the Ottawa Treaty and $1.5 billion if only the United States joins. About $1 bil-
lion would purchase three Joint-Stars ground-targeting aircraft and their
ground station modules, and the remainder would develop or purchase from
NATO allies scatterable canisters of "pure" anti-vehicle mines, remotely de-
levered "off-route" anti-vehicle weapons and hovering munitions, cluster
bombs, Claymore mines, electronically driven and coordinated machine
guns, sensors, and flares. South Korea could be asked to share the cost.

**Long-lived mines:** South Korean emplaced mines and the South Korean
and U.S. mines that would be emplaced under current plans can be re-
placed in their roughly 2,000 sites by seeding the same areas with trip flares
and sensors to alert allied troops who would already be deployed in that
sector to guard against North Korean breaching. Local commanders could
then set off by radio or direct cord pre-placed Claymore command-deto-
nated mines and cluster bombs, both immediate-fuzed and with random, 30-
minute "popcorn" time-fuzing. Then, three coordinated machine-guns,
guided by a mechanical driver already in use on the AC-130 gunship, could
sweep the area, placing a round every few inches in a matters of seconds.

This system would be far more lethal, and far harder to breach, than the
current and planned minefields. Total needs might be 10,000 trip flares,
2,000 sensor packages, 20,000 Claymore command-detonated munitions,
2,000 time-fuzed and immediate-fuzed antipersonnel cluster bombs, and
6,000 automatic 7.62 mm mini-guns, guided by 2,000 mechanical firing
devices. If South Korea chooses not to join the treaty, these alternatives
would not be needed, because South Korea could simply retain its current
minefields and compensate for the one million stockpiled U.S. long-lived
mines from its own stockpile and on-going production.

**Self-destructing mines:** Antipersonnel mines in mixed systems could be
removed and replaced with additional anti-vehicle mines and "popcorn"
time-fuzed cluster bombs, both of which would slow enemy clearance, and
sensors. The sensors would alert allied commanders of attempted breaches
so that firepower could be directed to the area. The Pentagon might be
better off fielding systems that ignore the mixed system's intermediate
task of slowing vehicles and instead fulfill the ultimate combat task of
killing them.

Allied anti-vehicle mines, which can only kill a vehicle that passes directly
over them, could be replaced with "off-route" systems that fire munitions
that can destroy vehicles from the side or the top. Off-route systems are not
as vulnerable to enemy tampering as anti-vehicle mines. Germany, which
already deploys the side-killing ARGES system, is developing remote
delivery for the COBRA system, which fires parachute-guided, top-killing
projectiles when sensors read the characteristics of an armored vehicle.
As General Gard pointed out in a previous monograph in this series, the Pentagon already deployed the hand-emplaced U.S. Hornet Wide Area Munition, which fires top-killing munitions.

In addition, the Pentagon is developing a variety of air-delivered vehicle-killing weapons that (by hovering above the battlefield) provide longer coverage than regular anti-vehicle weapons. These include two parachute-guided munitions (the SADARM artillery projectile and the Sensor-fuzed Weapon, which are air-dropped or fired in air and sea-launched missiles) and the Brilliant Anti-Armor Technology glider, which is delivered to the battlefield by unpowered aircraft or cruise missiles.

Finally, the Pentagon and South Korea could purchase three Joint-STARS surveillance and targeting aircraft that would be based with allied forces. Assuming that one is always being serviced, the remainder would rotate, providing 24-hour tracking of the North’s vehicles, both in the initial combat area and in the rear-area exploitation forces. This information would be relayed to Joint-STARS ground station modules at the brigade level and to allied aircraft for rapid attack on precise coordinates. In collaboration, these three alternatives to antipersonnel mines in mixed systems—complicating clearance of existing anti-vehicle mines, fielding remotely deliverable off-route and hovering munitions, and deploying Joint-STARS and command ground stations—would surely increase vehicle kills and reduce allied casualties.

**The Pentagon’s Search for Alternatives**

The research for this monograph uncovered unwillingness in the Pentagon to search aggressively for alternatives to antipersonnel landmines as the President pledged, first in October 1994. Initial progress on developing alternatives for low-tech, long-lived mines has been jeopardized by the Pentagon’s insistence on including a feature that violates the Ottawa Treaty. The far more challenging search for alternatives to mixed systems, which lies at the heart of the Korean problem and was described by President Clinton in 1996 as “urgent,” has made little progress in six years. According to the director of this effort, the search is still in the “idea-generating” or “concept-development” phase.
Allied Strategy: Deterrence, Defense, Counter-Invasion

The Combined Forces Command of the United States of America and the Republic of Korea pursues a strategy of deterrence on the Korean peninsula by constantly upgrading its formidable, forward-based defensive and offensive capabilities, and demonstrating them repeatedly to North Korea in exercises. The core of the allied war plan that will be implemented in response to a North Korean invasion (known as OPLAN 50-27) was developed by Combined Forces Commander U.S. General James Hollingsworth in 1973.

Prior to Hollingsworth’s tenure, OPLAN 50-27 focused primarily on defeating a North Korean invasion. It envisioned the allies staging a 50-mile fighting retreat along the primary armored invasion route from the Demilitarized Zone (DMZ), and taking up strong positions south of the broad Han River where it bisects the South Korean capital of Seoul. There, allied forces would wait for U.S. reinforcements before counter-attacking.

Concerned that the U.S. withdrawal from Vietnam might lead North Korea to question America’s commitment to defend South Korea, Hollingsworth changed OPLAN 50-27 to a forward-based offensive strategy. His goal was to convince North Korea that an invasion could bring an end to its regime. Hollingsworth moved most allied artillery, tanks, and infantry forward toward the Military Control Zone (MCZ), which runs five miles south of the DMZ, and publicly announced plans to strike north even as these forces defeated the invasion. He assigned two brigades of the U.S. 2nd Division to seize the North Korean staging city of Kaesong just across the DMZ, and promised around-the-clock raids on the North by B-52 bombers and a “violent, short war” to capture the capital of Pyongyang.

It was unclear to observers, and to the North Koreans, whether Hollingsworth intended to request the use of the U.S. tactical nuclear weapons then on the Korean peninsula if the North Korean invasion forces overwhelmed the allies. The Congressional Budget Office predicted that without nuclear weapons, the new strategy could result in the initial loss of Seoul. Allied relations were tense in this period, and to keep the South Koreans from unilaterally invading the North, the United States kept them “on a short string, logistically,” which hampered their war-fighting capabilities.

During the 1970s and 1980s South Korea increased and modernized its forces, creating a forward-based conventional deterrent behind well-
Seven Misconceptions about a North Korean Invasion

1. This will be a “no warning” or “standing start” war. North Korean tanks are gassed up on the DMZ, ready to go. In fact, superb allied intelligence systems monitor the North, and would provide at least five days (and as much as two weeks) warning of the sort of mobilization needed to attempt a breakthrough. North Korea has never practiced such a mobilization, probably because it might cause a South Korean attack. North Korea’s armored exploitation forces, which all analysts agree would be needed to seize Seoul, are held from 25 to 50 miles north of the DMZ, both to mask which route their infantry will try to clear for them and to defend the regime against the expected allied counter-invasion or instability.

2. It is only 25 miles to Seoul. As the crow flies from the North Korean bank of the Imjin River, this is true. But the Imjin is three miles wide at that point, and any operation to bring over tanks or significant numbers of troops would disappear in a storm of pre-placed allied firepower. The tanks might try to bridge the Imjin where it narrows to 400 meters, 15 miles northeast, but by this point, South Korea occupies up to five fortified miles of the northern bank as well. The shortest feasible armored route is actually 50 miles to Seoul, through a series of rugged mountain passes, with the U.S. Army’s 2nd Division waiting halfway at Camp Casey, at a narrow choke point between mountains.

3. North Korean artillery will destroy Seoul. In an invasion, the few thousand unguided SCUD missiles and artillery tubes that can reach Seoul will more likely be used to weaken allied defenses along the invasion routes. However, if targeted on Seoul and its 11 million people, they could cause tens of thousands of casualties before being destroyed or forced into hiding by counter-battery fire and allied aircraft operating with complete air control. If North Korea includes weapons of mass destruction in the attack, of course casualties could be far higher. The United States has warned North Korea, as it warned Iraq before the Gulf War, that the use of such weapons could cause nuclear retaliation.

4. North Korea plans to seize Seoul and hold it hostage for negotiations. The allies have described their war plan to North Korea, and demonstrated it in exercises as they substantially upgraded their defensive and offensive forces in the 1990s. Under the war plan, even as they halt the invasion, the allies will devastate North Korea’s infrastructure from the air and sea, and set in motion a counter-invasion to seize Pyongyang and reunify the peninsula. A North Korean invasion would be an act of regime suicide that, once started, will be ended not by negotiation, but by an allied occupation of the North.
5. **North Korea has a good chance of taking Seoul.** President Clinton once claimed this could happen if the United States gave up antipersonnel mines. However, the Pentagon’s conservative computer war game predicts that the allies will defeat a North Korean invasion before it can reach Seoul, with or without U.S. landmines. All other war game analysts concur. Allied advantages in surveillance and modern firepower over exposed invaders fighting “blind” with antiquated weapons, along with complete air and sea superiority and strong ground positions, will destroy the invasion force. North Korea’s economic collapse of the 1990s, paired with the allies’ substantial improvements, has turned its army into a barrier behind which to conduct nuclear and missile diplomacy rather than a credible invasion threat.

6. **“Quantity has its own quality”—North Korea will make up for its poor weapons and communications technology with numbers, sending twice as many infantry and tanks as the allies have.** The Pentagon estimates that 65 percent of North Korea’s 923,000-man army and 3,000 tanks is deployed within 60 miles of the DMZ. However, a good share must remain in the North to defend against a counter-invasion against Pyongyang, which is 75 miles from the DMZ. The allies can initially deploy most of their 586,000 ground troops and 2,390 tanks in the zone between Seoul and the DMZ, so the ratio of forces in mountainous, reinforced terrain that typically requires a three to one advantage for the attacker will be roughly even. The North fields 700 credible main battle tanks, its 1960s-technology T-62s, while the allies have 1,040 whose guns outrange them: 800 M1A1-based South Korean Type 88s, 80 Russian T-80Us, and 160 US M1A1s.

7. **Antipersonnel mines will delay North Korean forces for a critical 30 minutes.** This claim has figured prominently in Pentagon arguments about the importance of landmines, but nobody there can explain how it was formulated. Delay depends on a number of factors, such as other components of allied barriers (such as observation and direct firepower, heavy woods, tank-blocking ditches, tank traps in flat areas, road-blocking “rock drops” suspended over highway passes, and bridges and roads that are pre-chambered with explosives) and on the quality of North Korean breaching tactics (which include rocket-line charges to clear gaps in minefields, bombs and other artillery that trigger sympathetic detonations of mines, and rollers that clear mines well in front of the handler). As one Pentagon expert said in an interview: “When people use these sorts of number, I know they’re not engaged in a serious discussion. It all depends on other conditions on the battlefield.
prepared natural barriers of mountains and rivers along the few natural invasion corridors. Today, South Korea provides nearly all the ground forces in the combat zone, packing into the few suitable invasion corridors 12 full divisions from its 560,000-man army and most of its 2,130 main battle tanks. The United States deploys 18,000 of its 26,000 ground troops and most of its 160 main battle tanks around a key, third-line base on a main invasion route, but focuses its contribution mostly on intelligence, naval and air power, logistics, and reinforcements of over 500,000 troops for a counter-invasion. The United States bases 90 combat aircraft in Korea, with over 200 nearby in Japan and afloat, and flies U-2 and other reconnaissance aircraft from Korean bases.

Even in these areas, however, South Korea is rapidly taking a lead role, as befits a nation of 47 million people with a booming economy facing an enemy of 25 million whose economy has collapsed. It is buying surveillance and command aircraft and building a modern navy, has deployed 488 combat aircraft, and has made plans to call up four-and-a-half million reserves for a 48-division counter-invasion. The allies have a robust schedule of field exercises and maintain a high state of readiness.

North Korea has also increased its forces, building up a 923,000-man army with 3,000 main battle tanks, and one of the “densest air defense” systems in the world. However, its equipment is antiquated and its training is spare. In air and naval power, and in other situations where modern communications and one-on-one combat capabilities are crucial, it is (as a South Korean military official puts it) “outclassed” and will (as a Pentagon official delicately states it) “get smoked.” North Korea’s hopes for an invasion hinge on using its numerical edge over South Korea in artillery (2.3-1), troops (1.6-1), and main battle tanks (1.4-1) to overrun allied defensive positions quickly and in poor weather, so as not to permit rapid targeting of allied air and sea-based weapons.

The allies’ plans to “go North” in a counter-invasion to reunify the peninsula obviously complicate North Korea’s ability to devote forces to an invasion. Testifying before a National Assembly Committee during the 1994 crisis over North Korea’s nuclear capabilities, the South Korean Defense Minister shocked U.S. officials by openly describing OPLAN 50-27 and its massive counter-invasion to take Pyongyang. More recently, the Ministry of Defense issued a “subtle but blunt” warning to the North in its 1999 White Paper, stating its ability to “detect early indications that the North may be moving to utilize chemical weapons,” its “plans to destroy this capability” before the weapons can be deployed, and its commitment to a “simultaneous attack against the North should North Korean weapons being tracked reveal signs of offensive movements or should they begin to fire.”
The outcome of a North Korean invasion is not in doubt. All the South Korean military officials interviewed for this monograph would agree with this assessment by a top U.S. Embassy official in Seoul: "The question of who will win this war is not really a question any more." Nevertheless, deterrence remains the allies' highest priority: an invasion by the North would spark a general war that, according to a secret Pentagon study provided to President Clinton during the 1994 crisis, could cause 50,000 U.S. and 500,000 South Korean military casualties in the first three months.¹ Mountains providing excellent defensive positions cross the peninsula not just in the South, but throughout the North as well. A determined enemy could extract a terrible toll during the allied advance.

In such an all-out battle, both sides may be moved to use the weapons of mass destruction they possess. Facing extinction, the regime of Kim Jong Il would have little incentive to hold back on its chemical weapons or its potential nuclear weapons, and this could bring U.S. nuclear weapons into the battle. In addition to having terrible human and environmental consequences in Korea, U.S. use of nuclear weapons would damage U.S. relations throughout Asia and badly undercut another crucial goal of U.S. national security policy: to stop the spread and to deter the use of weapons of mass destruction throughout the world.

**The Success of the Strategy**

The allied strategy of deterrence through defensive strength and offensive plans has worked. North Korea has good reason to believe that an invasion would be an act of regime suicide. Its investment in air defense shows that it expects heavy bombardment of Pyongyang. North Korean leaders have watched U.S. power at work in the Gulf War and Yugoslavia, and they know that allied forces engage in realistic assault exercises. They recall how U.S. artillery slaughtered exposed North Korean and Chinese infantry in their assaults once the peninsula-wide mountain defense line was established in 1951, and the success and ferocity of U.S. air strikes against the North's cities and rice irrigation dams.⁵ They know that the allies would again deploy behind defensive mountain positions, would again achieve complete air control for surveillance and attack, and would have weapons many generations more lethal than those in use in the 1950s.

Allied intelligence and surveillance constantly provide a detailed picture of North Korean activities. According to U.S. officials this capability provides roughly five days' clear warning and up to two weeks ambiguous warning of North Korean mobilization.⁶ According to top South Korean military officials, even during crises North Korea has never engaged in
that sort of mobilization, perhaps out of fear that it would result in pre-
emptive allied air strikes."7

South Korean strategists stress that North Korea remains a formidable foe
because its conventional forces provide a barrier behind which it can prac-
tice nuclear diplomacy to gain foreign assistance. A South Korean Ministry
of Defense strategist, formerly an air force officer, war planner, and senior
official in military intelligence, said: "Drop your old conceptions about what
the war will be like. We are mostly concerned now not with invasion, but
with weapons of mass destruction." He sees the highest priority in defense
as being convincing South Koreans to practice using gas masks: "We will
have 48 hours warning of a chemical or nuclear attack with our intelligence
about launch capabilities. In this year's exercise, only three percent of
Koreans even held onto their gas mask."8

A former field general now serving on the National Assembly's Defense
Committee agrees that a North Korean invasion, which he believes the
allies can defeat, has been replaced by a new threat: "If the North attacks,
it will not be like in the past, not with tanks but with SCUD missiles and
irregular army. If it happens, we'll hit from the sky, with air first, at Pyong-
yang." Allied strategy is also focused on the problem of engaging with the
North to make the inevitable end of the North Korean regime a peaceful
one. A top foreign policy advisor and negotiator with North Korea in the
office of President Kim Dae Jung, said: "It's not total war we are concerned
about, but a North Korean collapse. We have to keep North Korea stable, so
we guarantee its survival for the time being and help it maintain minimum
standards of living."9

The Pentagon's conservative computer war games as well as analyses
based on other Pentagon force-equivalence models predict that a North
Korean invasion will be destroyed by the allies. The Pentagon's study
makes it clear that, with or without U.S. landmines, North Korean forces
will be stopped before they reach Seoul.10 The only question is how costly
the planned counter-invasion will be.

University of Pennsylvania analyst J. J. Suh has exhaustively applied static
and dynamic combat models to a North Korean invasion. Suh finds that
even with conservative assumptions that ignore South Korea's substantial
advantages in real-time battlefield intelligence (over North Korea's essen-
tially blind assault troops), South Korea alone, without U.S. forces, would
handily defeat an invasion.11 Ham Taek-young of Kyungman National
University has concluded that: "Compared on the basis of the Method of
Military Capital Stock, the South is believed to have secured a military ad-
vantage over the North." He states that "since 1990, North Korea has been
unable to compete owing to its outdated conventional military weapons," and has instead focused on procuring long-range weapons (170 and 240 mm cannons and missiles) to threaten Seoul and is playing its "nuclear card" to extract U.S. guarantees and money.  

Brookings Institution analyst Michael O’Hanlon also applied accepted military models to the invasion, and found a stalemate north of Seoul, even with conservative assumptions: "Seoul does not appear in serious danger of being taken by Northern forces, even in the early days of battle when North Koreans would be enjoying the maximum benefits of surprise." He finds that advantages in heavy equipment and training make South Korean forces superior to North Korea's. O’Hanlon notes that South Korea has modern tanks, modeled after the U.S. Abrams M1A1, while "North Korea, by contrast, has Soviet and Chinese-style equipment that is even more obsolete than Iraq's weaponry of 1991." He argues that a North Korean armored assault will be like "putting metal through a metal grinder," because of the high kill-ratios by allied tanks and antitank weapons.

O’Hanlon assesses actual equipment-effectiveness through the Pentagon's TACTFORM scoring system, rating North Korea at five heavy division equivalents, the same as South Korea and less than Iraq. He finds the allies far stronger in battlefield movement and readiness, due to North Korea's Soviet-style "scripting" of battle orders that leaves little room for mid-unit initiative, and its lack of large-scale combined arms exercises because of cost and limits on materiel.

The disparity in allied and North Korean capabilities was revealed in the West Sea "bumping" battle of June 15, 1999, when North Korean patrol boats suddenly opened fire on South Korean patrol boats that had modern radar and computer-guided fire control. These included the Korean Naval Tactical Data System, purchased from the United States in 1995. This system makes all ship locations available on a screen, using ground radar, ship radar, and data from P-3C Orion aircraft, and it automatically inputs and calculates firing data, permitting real-time firing decisions. The South Korean ships sank one enemy craft and badly damaged five or six others, killing between 30 to 80 North Korean sailors. Using radioed information from other ships, binoculars and hand-turned guns, the North Korean's 1960s-vintage Soviet ships caused slight damage to five South Korean craft and wounded six sailors.

Operating under strict rules of engagement so as not to "make a war out of an incident," the South Korean ships broke off the battle as soon as North Korea ceased firing. A South Korean officer remarked that it was as if the North Koreans were a "386 computer" fighting in the internet age. This assessment was too generous.
A member of the National Assembly’s Defense Committee commented: “The antiquated North Korean navy’s morale is low, the modern South Korean navy’s morale is high—and the results of this battle will make both more so.” A general at the South Korean Ministry of Defense offered this conclusion: “Our technology is superior, our systems are hardened, our maneuvering and computer systems are higher-tech. In general, this disparity can be applied to all the services.”

The Elements of Success: Meeting North Korea’s Challenges

Allied deterrence is strong because of the resources that have been devoted to defeating the various components of a North Korean invasion. The North Korean campaign plan is severely constrained by terrain and time. North Korea must move most of its tanks through just a few mountain passes near the center of the Demilitarized Zone.

The mountain ranges to the east are impassable for armour. The Imjin and Han tidal rivers to the west, behind which lie a broad flat avenue to Seoul, are often from two to five miles wide, making bridging under fire a very complicated task for North Korea. According to a Pentagon official providing a U.S. Forces Korea briefing, “There aren’t a lot of ways for people to come South.” South Korean planners expect that, as in the North Korean invasion in 1950, the 50-mile Chorwon corridor to Seoul, which funnels through a number of heavily fortified mountain chokepoints to U.S. Camp Casey after 25 miles, will figure prominently in the attack.

To block 500,000 U.S. reinforcements from arriving, North Korean forces must seize a significant portion of South Korea within weeks of an invasion. But to have a chance of doing that against allied air control, they must break through the heavily built-up defenses north of Seoul within days, during what they hope will be a period of horrendous weather that grounds allied aircraft. According to U.S. and Korean military reports and officials, the attack will come in three quick stages:

First, massed artillery hidden in mountains will hammer allied bunkers on the invasion routes and forward airfields, while rear area airfields are attacked by missiles and sabotaged by pre-infiltrated special operations forces.

Second, waves of elite infantry will storm allied defenses at barriers and on ridges to degrade antitank weapons as engineers try to clear tank barriers. At the same time, a larger number of special operations forces will be infiltrated to disrupt airfields and staging areas behind the allies’ lines.
Finally, hundreds of tanks in the "exploitation force" that have been held 25 to 50 miles north of the Demilitarized Zone (so as not to reveal their precise route) will attempt to move past the areas degraded by infantry, to cut off allied units and Seoul while speeding farther south. During this phase, infantry will move ahead of the tanks and continue to storm allied mountain firing positions, to degrade the threat to the tanks as they move down South Korea's valleys.

North Korea's strategy is unique, as a South Korean general points out: it has infantry protecting tanks, rather than the other way around. This is because, as a U.S. Army engineer in Korea has said: "A blitzkrieg by armored forces through open terrain can potentially be defeated by precision strike capabilities. The opening onslaught in Korea, however, is more likely to resemble the tough infantry fights of the World War I era," and will be a close infantry "machine gun war." In World War I and every "machine gun" encounter, where well-protected defenders employ a theater-wide barrier system, exposed attackers have been slaughtered. That North Korea planners would risk their first echelon troops in this way shows that they believe that a tank breakthrough is the key to success. Everything in North Korean strategy is devoted to achieving that tank breakthrough.

The great unknown in a North Korean invasion is the role of weapons of mass destruction. North Korea has stockpiled a large amount of missile and artillery-deliverable chemical weapons, and may have the means to construct and deliver biological and nuclear weapons.

North Korea knows that it is U.S. policy to consider using nuclear weapons in response to a chemical, biological, or nuclear attack on U.S. forces. President Clinton made one part of this policy remarkably explicit on a visit to South Korea: "It is pointless for (North Koreans) to try to develop nuclear weapons, because if they ever use them it would be the end of their country." The uncertainties surrounding weapons of mass destruction make it all the more important for the United States to maintain deterrence in Korea.

The Challenge of the Artillery Barrage

North Korea's most dangerous invasion asset is its thousands of chemical-capable artillery pieces and missiles hidden in mountains near the Demilitarized Zone. Former Combined Forces Command General Gary Luck predicted that in an invasion, 5,000 rounds of artillery could hit Seoul within 12 hours, despite the allies' robust ground and air-based suppression fire. Michael O'Hanlon has a lower floor of at least 1,000 rounds hitting Seoul before the tubes are tracked and silenced. He predicts tens of thousands of deaths from the barrage.
Some of the differences in these estimates come from different interpretations of the capabilities of the North’s artillery. Citing a Korean Ministry of Defense White Paper, O’Hanlon says that only 250 of the North’s 10,000 tubes have the range needed to hit Seoul. These are the weapons of 170mm and above, primarily 170mm self-propelled artillery and the 240mm multiple rocket launcher. In contrast, a Pentagon official providing a U.S. Forces Korea briefing stated that “thousands” of tubes of 130mm and above can hit Seoul. In an invasion North Korea may choose to ignore Seoul and devote every available artillery tube, along with a good share of its 8,000 mortars, to degrading first-line allied bunkers to pave the way for their infantry assault.

Allied positions are well-fortified with concrete and have protected firing sites that can operate under bombardment. Few troops will be exposed during the barrage. However, the damage to allied surface defenses will be substantial unless the artillery can be silenced quickly.

"In those aspects of the fight where technology makes a difference, North Korea is outclassed," says the former U.S. chief of engineer plans in Korea. Counter-battery fire is certainly an area where technology will be of critical importance. Much of the North Korean artillery can be rolled in and out of caves dug deep into the sides of mountains, providing a small target for allied weapons. The allies will use a combination of ground, sea, and air-launched weapons for counter-battery fire, including radar-guided multiple launch rockets, pre-targeted artillery assisted by forward observers, radar and laser-guided air to ground missiles and “smart” bombs, and naval stand-off missiles. B-52s and other bombers from outside the theater will fly continuous raids with cluster munitions and large “bunker-buster” bombs.

North Korea has deployed at least 30 SCUD and 24 FROG surface-to-surface missiles and a few medium-range ballistic missiles. It recently halted flight-testing of the longer-range Daepodong missile as part of an agreement with the United States. These missiles would likely be targeted on airfields, but while their range is adequate for many of the targets, their accuracy is weak. Their sites or mobile launchers would also be targets of intense allied bombardment once they reveal themselves. Patriot anti-missile systems will be targeted against the missiles themselves.

The Challenge of the Infantry Assault

U.S. officials often claim that the allies’ technological advantages in weaponry, surveillance, and communications and their defensive advantages in terrain and protected firing positions will be offset by a North Korean advantage in the number of infantry they can deploy. However, it
will be difficult for North Korea to achieve a numerical infantry advantage along the invasion routes, except briefly. While North Korea has an army of 923,000 compared to the allies’ 586,000, it must retain substantial forces between the Demilitarized Zone and Pyongyang to defend against the expected counter-invasion. Further, the allies’ advanced intelligence-gathering, communications, and mobility will allow rapid reinforcement of targeted avenues to reduce temporary numerical disparities.

The North Korean numerical advantage can only be achieved in succeeding waves, because the battle front is too narrow to absorb the full North Korean deployment. Using Soviet-style tactics, North Korea's second echelon will follow the first by between 18 and 72 hours.40 South Korea deploys 12 full divisions in the invasion routes, dug in along a set of dense, interlocking barriers and on mountain ridges.41 This provides a "force to space" ratio that is twice as dense as that usually designed to cover a battlefront with modern weapons.42

According to O’Hanlon, in dense positions that are anchored, the attacker needs superior firepower and fire control systems to push back the defender. North Korea has neither. The allies have several times the firepower actually needed to stop the infantry assault.43 They have enough artillery and mortars alone to hit all North Korean infantry at least once for each time they advance 100 meters, making a North Korean soldier’s "odds for survival extremely low."44 North Korea has only 2,500 armored personnel carriers and its much-discussed invasion tunnels do not clear the Demilitarized Zone. In the vast preponderance of encounters the majority of North Korea's infantry will be on foot and exposed.45

Should North Korean infantry make it past the initial barrier lines, they will attempt to seize the succeeding mountain ridges overlooking choke points that look down on tank routes. Taking control of these ridges is essential to North Korean success. The ridge positions can be on extremely rough terrain. With 300 to 400 meters being the effective limit for hand-held weapons while in a bunker, the steep terrain may limit the defenders’ to a few shots before the attackers are hidden by the curve of the hill.46 The allies must rely on barriers, air attacks, and artillery from other positions to slow and reduce the numbers of these attackers.

While North Korean infantry are trying to overrun antitank positions, engineers will be trying to neutralize tank barriers: concrete ditches, tank traps, rock drops, and pre-chambered roads and bridges. Retreating South Korean infantry, however, will detonate the rock drops and pre-chambered roads and bridges, leaving the engineers with the far more difficult and time-consuming tasks of clearing heavy rubble.47
The Challenge of the Tank Assault

Allied officials agree that North Korea’s main battle tanks are the key to the invasion. They are easy to hide when not moving and they are easy to kill if they are caught on the move.46

North Korea has 3,000 main battle tanks, (the allies have 2,350) but it only has 700 main battle tanks of even remotely modern design. The allies field 1,040 vastly superior main battle tanks with state-of-the-art target-acquisition and significantly longer killing ranges, including 160 U.S. M1A1 Abrams, 800 Abrams-based Korean Type 88s (known in some “upgunned” versions as the K1A), and 80 Russian T-80Us.47

North Korea has 600 amphibious vehicles and 2,300 floating bridge sections. It also has snorkeling gear for the T-62, good to about 20 feet of water.48 However, trying to bring a large number of its best tanks across the three to five-mile wide Han and Imjin Rivers, so as to use the 25-mile plain route to Seoul, would be “a very complicated task for North Korean tanks,” says the former U.S. chief of engineer plans.49 Given the concentration of allied firepower at these crossings, allied planners expect most tanks to ford the Imjin and its tributaries near the Chorwon corridor, which features the last armor-passable mountains before the rugged eastern half of the Demilitarized Zone.

This would make the armored assault on Seoul a 50-mile operation. The corridor passes through 25 miles of repeated mountain choke points before reaching U.S. Camp Casey, base of the U.S. 2nd Infantry Division, with two brigades comprising two battalions of tanks, two battalions of mechanized infantry and two battalions of helicopter-borne air assault infantry. In addition the 2nd Division has impressive resources of artillery, engineers, attack helicopters and logistical units. Most analysts predict North Korea will not get this far. Almeida and O’Hanlon conclude that because in this terrain only fifteen of a force of 1,000 armored vehicles could cross a line at one time, even excluding air power, artillery, and mines, “front-line allied forces today could probably generate at least four times the necessary rate of firepower to stop North Korean armored forces.”

South Korea has 488 combat aircraft.50 There are 90 U.S. combat aircraft in Korea and 300 available in the region and this can be doubled to 600 within a week.51 The main U.S. airbases in Japan are too far from the Korean battle front for unfueled flight, so their aircraft will probably transfer to Korean bases.52 According to the Defense Intelligence Agency, the allies will quickly gain control of the air, and be able to hunt constantly for North Korean tanks and infantry.53
Should North Korean tanks come as far as Camp Casey, the tanks of the 1st brigade, like South Korean tanks in earlier lines of defense, will fight in defile, which is a "sequential battle conducted in restricted terrain characterized by rugged mountains, steep ridges, and narrow valleys." Before the battle, U.S. forces will have set up platforms for command, communications, and intelligence collection, and dug the first few fighting positions for each tank. The Abrams' cannon has a range of 2,500 meters, while the T-62's range is only 1,600 meters, but since terrain will place many main gun engagements at 800 to 1000 meters, ranging alone may not determine the victor. Instead, the Abrams will rely on superior computer fire control and targeting, such as the constantly improving Forward-Looking Infrared System, whose latest upgrade reportedly can "identify and kill targets about 45 percent faster" than the current, already greatly superior U.S. system.

Tanks of the South Korean 5th Brigade will fight in tandem with the U.S. 1st Brigade. They are in a high state of readiness and in a recent firing exercise suffered no vehicle breakdowns and no main gun failures. South Korea is building more K1A tanks, and is constantly upgrading and "upgunning" its current tanks. It has also started to deploy the top-of-the-line Multiple Integrated Laser Engagement System.

**The War of the Economy**

The economic disparity between North and South has settled the strategic issue in Korea. Here is how the International Institute for Strategic Studies describes the impact on the North's readiness following decade without Soviet subsidies—a decade in which two to three million people starved to death:

On the military front, North Korea’s economic difficulties began to affect its conventional capabilities. Shortages of fuel and spare parts cut into Pyongyang’s ability to field and reinforce mobile forces. Readiness declined significantly in the face of cutbacks on training exercises. Inadequate supplies of food and other resources raised problems of sustaining troops and maintaining morale. There have been reliable reports of soldiers robbing market traders at gun-point to get food. Even arms procurement was affected. The decline of some 10 percent in 1998 resulted from resources constraints, not central policy decisions, but it contributed to the army’s increasing problem of antiquated or obsolete weapons. The deterioration in North Korean conventional capabilities increasingly called into question Pyongyang’s strategy of rapidly overrunning South Korea and achieving unification on North Korean terms before US reinforcements arrive.
In contrast, the allies have improved their capabilities in the 1990s with "significant upgrades in armor, artillery, attack aviation, counterfire, and pre-positioned stocks" and "a vigorous program of exercises." At the start of the decade the Soviet Union was giving its older weapons to the North; by the end of the decade it was selling its finest weapons to the South.

Larry Niskich, the Congressional Research Service's specialist on Korea, thinks that the North's invasion capabilities have eroded significantly, due to lack of resupply of modern weapons and the effect of the economic crisis on morale and the physical state of troops, transport, and infrastructure. To Niskich, the erosion in conventional forces explains the North's recent focus on building, testing, and selling missiles and weapons of mass destruction.

A former South Korean field general now on the National Assembly's Defense Committee and the Combined Forces Commander share Niskich's conclusion that the North's conventional invasion readiness has declined. "In my opinion, we can defend against an invasion. In the 1990s, allied capabilities have increased as North Korea's invasion capabilities have decreased," U.S. General John Tilelli said that the economic crisis "must cause a denigration in their military readiness," and that "their conventional forces essentially stabilized at a stable level of readiness, lower than it was, while their missile technology, their asymmetrical technologies, have increased."

North Korea's military budget is estimated at $5 billion, roughly one-third of its entire government budget, and only one-third the size of South Korea's $15 billion military budget. North Korea has only two on-going procurement programs, the Taepo-dong 1 and Nodong medium-range ballistic missiles. It appears to be bargaining away the Taepodong program to the United States for economic and diplomatic benefits.

In contrast, South Korea has 20 major procurement programs underway that will build on its already overwhelming technological advantage. Purchases will include tanks, fighters, early warning aircraft, attack helicopters, frigates, submarines, armored personnel carriers, multiple launch rocket systems, and surface to air missiles."
**Figure 1: Current Arms Orders Of North And South Korea**

**North Korea** ($5 billion military budget, down from $6 billion in 1985)

- Taepo-dong 1 Medium range ballistic missile:  
  *Under development, one test firing.*
- Nodong Medium range ballistic missile:  
  *Deployment reported*

**South Korea** ($15 billion military budget, up from $9 billion in 1985)

**Aircraft**
- 4 U.S. B-767 Airborne Early Warning Aircraft
- 120 co-produced U.S. F-16C/D Fighter Aircraft
- 10 Italian Hawk 800 Unmanned Aerial Vehicles
- 100 Italian Searcher Unmanned Aerial Vehicles
- 30 U.S. T-38 Training Jet Aircraft
- 94 South Korean KTX-2 Training Jet Aircraft
- 12 German BO-105 Attack Helicopters
- 13 United Kingdom Lynx Attack Helicopters
- 6 U.S. CH-47 Transport Helicopters
- 8 Indonesian CN-235 Transport Aircraft

**Missiles and Rockets**
- 190 U.S. AMRAAM Air to Air Missiles
- 29 United States Multiple Launch Rocket Systems
- 1294 French Mistral Surface to Air Missiles
- South Korean Pegasus Surface to Air Missiles

**Ships**
- 3 South Korean KDX-2000 Frigates
- 9 German Type-209 Submarines
- 1 South Korean Chonghaejin Salvage Ship

**Vehicles**
- 33 Russian T-80U Main Battle Tanks
- South Korean K1A1 Main Battle Tanks
- Russian BTR-80 Armored Personnel Carriers
- 33 Russian Armored Infantry Fighting Vehicles

*Source: The Military Balance, 1996/97, The International Institute for Strategic Studies*
The Role of Ottawa-Banned Weapons in Allied Plans

What role do antipersonnel landmines play in deterrence and in the warfighting plans of the allies? The allies have two goals in combat: to defeat North Korea in the invasion and counter-invasion, and to do so with minimum allied casualties. The Pentagon rejects a ban in part because its war game predicts that without the mines the allies would still prevail, but would suffer "tens of thousands" additional casualties. The role of Ottawa-banned weapons must be assessed in terms of both goals.

Which Allied Weapons Would Be Banned?

The purpose of the Ottawa Treaty is clear: to ban antipersonnel mines but not anti-vehicle mines. However, most mines that are designed to be triggered by the weight, magnetic signature of density, or other characteristics of a vehicle can also be set off by individuals. In addition, many anti-vehicle mines are purposely constructed with sensitive "anti-handling" devices that explode or cause an explosion if they are disturbed by a person. These antipersonnel features make it time-consuming and dangerous for enemy infantry to destroy or remove anti-vehicle mines that are impeding their vehicles. Armed forces fielding anti-vehicle mines that can only be triggered by a vehicle must adopt a doctrine of directly observing the mines, so as to deliver fire on the enemy infantry.

Just which allied weapons would the Ottawa Treaty ban? Unlike the Conventional Forces in Europe Treaty, the Ottawa Treaty does not list the specific weapons or even types of weapons that it covers. Unlike the Convention on Certain Conventional Weapons (CCW), it contains no provision for countries to note reservations that might clarify their interpretation of key definitions. Unlike the Chemical Weapons Convention, it does not establish a regulatory body to handle disputes. Nations must use the international standard for interpreting treaties, the Vienna Law of Treaties, which states:

A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose...(Interpretation may take into account) any subsequent practice in the application of the treaty which establishes the agreement of the parties
regarding its interpretation...(If this still) leaves the meaning ambiguous or obscure... recourse may be had to supplementary means of interpretation, including the preparatory work of the treaty and the circumstances of its conclusion.76

The treaty bans mines "designed to be exploded by the presence, proximity or contact of a person," but then provides a complex exception for anti-handling devices for anti-vehicle mines. An anti-handling device, it states, is "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."

The definitions were drafted by diplomats trying to preserve military options, rather than by anti-landmine campaigners trying to constrain military options. A number of governments made it clear in the 1997 Oslo negotiations that finalized the treaty that their reading of the treaty did not require them to give up the systems they use to protect their anti-vehicle mines, even though many of those systems include elements that can be triggered by the presence of a person. When the issue was raised in January and May 2000 in Geneva at meetings of the Standing Committee of Experts on the General Status and Operation of the Convention of the Ottawa Convention, many governments argued that their anti-vehicle mines were legal both because their fuzes and anti-handling devices fulfilled the letter of the treaty and because their "use" rules for deploying mines would fulfill the spirit of the treaty by precluding civilian casualties.77

In contrast, the International Campaign to Ban Landmines (ICBL) stated in Oslo and again in Geneva that the diplomatic record of discussions during negotiations in Oslo and a "diplomatic understanding" reached in those discussions meant that any anti-vehicle mine that could be detonated by the "unintentional" act of a person would violate the treaty. However, the record and the understanding are not written documents.77

The Ottawa definitions of an antipersonnel mine and an anti-handling device originated with the definitions in the amended Protocol II of the CCW. There are, however, two significant differences. First, the word "primarily" appears in the CCW text before the word "designed" in the definition of an antipersonnel mine. This was done in order to exempt anti-vehicle mines from the controls placed on antipersonnel mines. Numerous countries, including nearly all NATO countries, entered reservations when ratifying the amended Protocol II of the CCW to affirm that the word "primarily" exempted anti-vehicle mines. Second, the phrase "or otherwise intentionally disturb" was added in the Ottawa text to the CCW's definition of an anti-handling device.
The ICBL submitted a draft treaty to governments taking part in the Ottawa process which clearly banned all mines or devices that could be triggered by a person. However, when the first working ("Austrian") draft of the text that became the Ottawa Treaty was released in late 1996, it exempted all anti-vehicle mines by repeating the CCW's use of the word "primarily." The ICBL and the International Committee of the Red Cross (ICRC) stressed their opposition to this definition, which they had strongly criticized during CCW deliberations because the loophole might encourage signatories to lay large numbers of anti-vehicle mines. The negotiating countries then sought to craft a definition that would satisfy both the ICBL and ICRC and governments with anti-vehicle mines. Canada and other key negotiators agreed in mid-1997 to remove the word "primarily," but only as they added the exemption for anti-vehicle mines and anti-handling devices. The words "or otherwise intentionally disturb" were added to that exemption late in the negotiating process in Oslo after the ICBL, at the outset of the meeting, issued a statement criticizing the original anti-handling definition.

Some non-governmental groups have accepted the fact the treaty simply does not do what they wanted: ban all mines that can be triggered by the unintentional act of a person. The ICRC, although it argues that anti-vehicle mines whose fuzes make them act like antipersonnel mines are banned by the treaty under the definition of an antipersonnel mine, flatly states that the Ottawa Treaty exempts anti-vehicle mines with anti-handling devices. And deminers like Rae McGrath, who denounced the treaty's definitions when he spoke at the Nobel Peace Prize ceremony in December 1997, have called the treaty a "betrayal" for focusing on the intent of the design rather than on the actual effect of a munition.

A comprehensive review of the statements relevant to the issue of permissible anti-vehicle mines appears in the ICBL's 1999 Landmine Monitor. Landmine Monitor reports that Canada is modifying its arsenal to reduce the antipersonnel characteristics of anti-vehicle systems. However, in many countries, military forces are planning to retain fuzes or anti-handling devices that either turn anti-vehicle mines into large antipersonnel landmines—or are actually antipersonnel landmines themselves. Of particular concern are buried, long-lived anti-vehicle mines with fuzes or sensitive anti-handling devices. These weapons are more dangerous to civilians than U.S. and South Korean self-destructing mixed systems. Relevant facts are summarized here by country:

**France:** The scatterable Minotaur system includes what the manufacturer calls "counter-clearance" munitions. Each munition, according to its manufacturer: "has four trip wire booby-trap deployment systems on each side,
functions on ground by breakage or disturbance of booby-trap wires.” Many long-lived French mines have trip-wires, booby-traps, and other anti-handling features, and can easily be set off by a person who is not aware of the mine’s presence.

When France ratified the CCW, after it had signed the Ottawa Treaty, it specified in a reservation that it was interpreting the word “primarily” in the text to exempt anti-vehicle mines from controls. If France considered its anti-vehicle mines with antipersonnel features to be banned under the stricter Ottawa Treaty, it would have had no reason to enter this reservation under CCW.

**Sweden:** The anti-vehicle mines Fordsmina 13 and 13R can be triggered by a trip-wire that can be set from ground level to as high as two meters. According to *Landmine Monitor*, “Sweden is interpreting the Ottawa Convention as not to include Fordsmina 13 and 13R as they are designed to be detonated by the presence of a vehicle.” Sweden also has a large number of anti-vehicle mines that are “very sensitive to contact”—meaning that they could easily be triggered by a person.

**Germany:** The German Army uses the DM-39 “explosive charge” to protect its DM-21 anti-vehicle mines. The U.S. Department of Defense classifies this anti-handling device as an antipersonnel mine. Similarly, the MUSPA “submunition” is dropped on airfields and can be triggered by the sound of an aircraft engine, but since it also can be set off by a person, the Pentagon also classifies it as an antipersonnel mine. Germany also has a number of long-lived anti-vehicle mines with extremely sensitive anti-handling features. These systems are air or artillery-delivered containers that fire off tank-killing projectiles when sensors pick up the characteristics of an armored vehicle.

**Belgium:** According to *Landmine Monitor*, the fuze on the PRB III anti-vehicle mine “is the same type as used on the M35 antipersonnel mine,” and the fuze on the PRB IV “is in fact an antipersonnel mine.” The crux of the problem of the Ottawa Treaty is presented in this excerpt discussing the Belgian law banning landmines:

It seems obvious to non-governmental organizations that anti-handling devices should be considered as devices of the same nature (as antipersonnel mines) and therefore fall under the ban law mine. The Belgian Army does not agree with this interpretation and considers that from the moment an anti-handling device is in place on an antitank mine, it becomes an integral part of the antitank mine and that antitank mines are not prohibited by the law.
The Belgian Army, and its government and other European governments, simply do not agree with an interpretation of the Ottawa Treaty that bans anti-vehicle systems whose anti-handling features act like antipersonnel mines. Like France, Belgium reaffirmed this position by entering a reservation to the CCW, after it had signed the Ottawa Treaty, specifying that anti-vehicle mines with anti-handling features had been exempted from CCW controls.

**United Kingdom:** The British Army possesses a number of anti-vehicle mines that, according to *Landmine Monitor*, have “potential AP effects.” However, these mines are “not considered antipersonnel mines by the Ministry of Defense.” Notable among them is the AT2, which is delivered by a multiple launch rocket system and contains an “integral anti-handling device.” While the United Kingdom is replacing one of its long-lived anti-vehicle mines, the L27, with the German ARGES tank-killing munitions, it continues to deploy long-lived systems with sensitive anti-handling features. The United Kingdom entered a CCW reservation for anti-vehicle mines after signing the Ottawa Treaty.

In January 2000, a number of States Parties called on the SCE to establish a committee to explore the issue. However, in April, other States Parties denied the necessary consensus. As a result, the anti-vehicle issue remains unresolved.

Given this confused situation, it is difficult to say which weapons the allies would consider banned. This monograph treats mixed systems as banned, because their antipersonnel mines can be triggered by an unintentional act; and treats allied anti-vehicle mines as legal, on the assumption that they would be tested and, if necessary, modified to meet the treaty’s standards.

**Landmines and the Key Allied Tasks**

Antipersonnel landmines are integrated into both of the two closely related allied operations that will take place if North Korea invades South Korea: stopping the invasion, and mounting a counter-offensive to seize Pyongyang and reunify the country. These weapons are not deployed primarily to harm soldiers. Their purpose is rather to slow and channel soldiers and vehicles so that other weapons can be brought to bear on them.

Both allies possess long-lived as well as self-destructing antipersonnel mines. Complex differences in ownership and roles may well permit one ally to join the treaty without hampering the other’s continued ability to deploy its weapons. For example, U.S. participation in the treaty would have
no effect on South Korea’s million-mine barrier system, because it is maintained exclusively by South Korean troops. The landmines that the allies have emplaced or plan to use in Korea include:

**Emplaced mines:** One million long-lived South Korean mines, roughly three to one antipersonnel to anti-vehicle, are emplaced within the two-kilometer wide allied sector of the Demilitarized Zone and the tightly controlled, eight kilometer wide Military Control Zone that adjoins it. Nearly all the antipersonnel mines are either the U.S. M-16, a powerful bounding fragmentation mine with a lethal blast radius of 15 meters and a wounding blast radius of 30 meters, or the U.S. M-14, a smaller, plastic mine that is intended to wound rather than kill. The long-lived allied anti-vehicle mines are triggered by weight, a tiltrod or disturbance of an anti-handling device.

South Korea says that it regularly maintains the minefields in the Military Control Zone that contains most of the one million mines. The M-14s have been recently serviced to have a washer glued to the bottom, in order to comply with the CCW’s rules on metal content. In contrast, many of the minefields in the Demilitarized Zone, some of which were laid haphazardly during the Cuban Missile Crisis of 1962, are not well-maintained or well-marked. While some of these minefields are hidden behind hills and can safely be serviced, others are in view of North Korean troops. The South Korean minefields are rarely deployed in open terrain. In fact, allied doctrine actually wants invading North Korean infantry to pass through open terrain, where allied firepower can be brought to bear on them and where allied mobility would provide a significant combat advantage. The minefields are instead generally placed in rough forests that have been allowed to grow tangled and nearly impassable in the 47 years since the end of the Korean War. Their goal is to force the invading infantry into pre-set killing zones in rice fields and along dirt lanes and paved roads.

The “mine forests” are well-marked with barbed wire that skirts nearly every road that winds through the forests in the forward area. They are part of an integrated barrier defense that is based around mountains, rough wooded terrain, and rivers, and includes: tank ditches, pre-placed concrete tank traps, “rock drops” (massive concrete blocks suspended over roads, usually at choke points), and roads and bridges “pre-chambered” with explosives.

One million long-lived U.S. mines and perhaps twice as many South Korean long-lived mines, again three to one antipersonnel to anti-vehicle, are stockpiled in Korea, available for emplacing in both the forward com-
bat area and on the mountains overlooking the invasion routes in the western half of the peninsula.\textsuperscript{26} The eastern half of the peninsula is simply too rough, with the exception of one eastern coastal road, for a tank offensive. Allied forces will place artillery and antitank weapons on the series of succeeding ridges to attack enemy vehicles that must come up the narrow valleys and through the choke point at the end of each valley. The primary role of North Korean infantry, once they have breached the forward area, will be to try to dislodge these allied forces, or at least to degrade their firing abilities.

Many of the approaches to the allied positions on the ridges come through rough forests and rocks. The long-lived landmines would be emplaced on these hills as soon as allied intelligence determined that a North Korean invasion was imminent. The task of emplacing a million or more landmines is extremely labor-intensive and time-consuming, and would probably not be completed by the time the invasion began. “Once the battle starts, you can’t be digging holes,” the U.S. Army’s point person for landmine policy, said. South Korean troops would handle most of the emplacement, even of the one million U.S. mines, simply because there are too few U.S. troops to emplace a significant number of mines in a brief period.

Long-lived landmines in Korea are not really a “force multiplier” that reduces the need for allied troops, as claimed by the Pentagon. As a result of concerns about breaching, the allies already deploy forces to cover the mine forests and mined approaches to firing positions. Instead these landmines are a “task complicator” for North Korean commanders who must devote forces and time to breaching the mine forests, when time is of the essence. U.S. success in breaching Iraq’s dense minefields during the allied ground invasion in the Gulf War shows that unwatched minefields can be breached quickly.

The allies assume that North Korea will use many of the breaching methods the United States used in the Gulf War, such as rocket line charges, fuel-air explosives, rollers, grappling hooks, or clearance by lead troops. If targeted on the mine forests, the North Korean artillery barrage preceding the infantry advance will itself detonate or destroy enough mines to clear a less lethal path for their infantry.\textsuperscript{79}

\textbf{Scatterable mines:} The allies have over 80,000 scatterable, self-destructing antipersonnel mines in Korea that can be delivered by air, artillery, and infantry. The United States deploys over 50,000, nearly all in mixed system canisters in which a small number of antipersonnel mines protect a larger number of antitank mines, which are triggered by the magnetic signature of
an armored vehicle. These include 40,000 air-delivered Gator mines, 10,000 artillery-delivered Volcano mines, and some infantry-delivered Modular Pack Mine System (MOPMS), in which mines are contained in a 160-pound trunk. The United States also has approximately 10 million scatterable antipersonnel mines that could be brought to Korea in a crisis. These include roughly nine million ADAM antipersonnel mines that are delivered in canisters by artillery, some 300,000 Gator mines, over 100,000 Volcano mines, and 9,000 MOPMS mines. South Korea purchased 32,000 ADAM mines before Congress imposed a moratorium on antipersonnel mine exports in 1992. South Korea also has some U.S. GEMS mixed mines that are scattered from trailers using the “Flipper” scattering device, a method that the United States no longer uses.

Mixed system mines are used to slow and channel tanks and other vehicles. If enemy armor stops to enable engineers and infantry to clear a minefield or if it diverts to a new route, its mission will be disrupted and it can be subjected to air and ground attack from allied assets for a longer period. The antipersonnel mines in the canister slow enemy infantry who are trying to clear a lane for vehicles by placing explosive charges on the exposed anti-vehicle mines. The enemy infantry must first clear a lane for themselves to the anti-vehicle mines with various mechanical devices and explosives. The allies must also assume that North Korea has obtained at least crude “spoofers”—electronic devices that mimic the signature of a tank, which could be used to set off allied mixed system anti-vehicle mines.

North Korean armored units are held in rear areas before being directed to a cleared invasion route, and are hidden as often as possible in bunkers and buildings. During a conflict these staging areas would be hit with air-delivered scatterable mines. As the armored units move south, they would be attacked with antitank weapons when in the open and with air and artillery-delivered mixed systems when taking cover. Mixed systems would also be used to seal off armored counter-attacks in North Korea during the allied counter-invasion. Once an allied column had chosen a route through a mountainous area, the feeder roads to that route would be blocked with mixed systems, to slow North Korean armor and antitank vehicles trying to reach the route. Some South Korean officials believe that to save time and personnel for other tasks, the allies will not actually emplace new mines, but will instead use scatterable mines to protect their ridge fighting positions.

Figure 2 reviews ten tasks that are key elements of an allied victory. For these ten tasks, antipersonnel landmines play a unique role in one, an important role in two, a minor role in five, and are irrelevant in two.
**Figure 2: Matrix of Key Allied Tasks and the Role of Antipersonnel Landmines**

<table>
<thead>
<tr>
<th>Task:</th>
<th>Irrelevant</th>
<th>Minor</th>
<th>Important</th>
<th>Unique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppress initial artillery barrage:</td>
<td>No role</td>
<td>Protect anti-vehicle mines that slow movement of aircraft on Northern airfields, but unobserved field quickly cleared</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish air and sea control:</td>
<td></td>
<td>Part of robust, complex, observed barrier against mass assault</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow and channel initial infantry assault:</td>
<td></td>
<td>No mass assault</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protect bases from special operations forces:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Destroy North's infrastructure and command and control:</td>
<td>No role</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Force tank invasion to mountain corridors:</td>
<td></td>
<td>Geography and antitank positions achieve this.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hold ridge fighting positions:</td>
<td></td>
<td>Slow enemy movement in &quot;blind spots&quot; while waiting for air strikes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow enemy tanks in invasion to permit a kill with other weapons:</td>
<td>Adding a few minutes to clearance of anti-vehicle mines not crucial in deep battle; rock drops and tank traps already at choke points in close battle.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal off allied counter-invasion routes:</td>
<td></td>
<td></td>
<td></td>
<td>Unique ability to add a few minutes to clearance of anti-vehicle mines can permit capture of key junctions</td>
</tr>
<tr>
<td>Degrade antitank positions in counter-invasion:</td>
<td></td>
<td>Other antipersonnel weapons provide better effect; unobserved barriers will barely slow reinforcements.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- In stopping the initial North Korean artillery barrage that will precede the invasion, allied landmines play no role whatsoever. In contrast to claims made by the Pentagon during the debate over landmine policy in 1997, allied counter-battery artillery fire and air strikes will use munitions other than mixed systems.

- In establishing air and sea control, there is a minor role for landmines. Some of the munitions dropped on North Korean airfields would be mixed systems, whose purpose is to slow the movement of aircraft from bunkers. Since these minefields would be unobserved and more than 50 miles away from allied ground troops at this early stage of the war, they could be cleared quickly by airfield engineers.

- Landmines obviously play an important role in slowing and channeling the initial North Korean infantry assault. However, they are only one element in the robust, complex, observed barrier system designed to force troops out of forests and into open areas and onto lanes and roads.

- Landmines play a minor role in protecting rear-area bases from attacks by infiltrated special operations forces. North Korea will be unable to infiltrate enough troops for mass assaults on these bases, so trip-flares, barbed wire, and patrolling will accomplish much of what landmines can in slowing the approach of special operations forces.

- Destroying the North's infrastructure and command and control abilities is another task in which there is no role for landmines. Allied aircraft will use every available slot for munitions other than mixed systems.

- While landmines will probably be used as part of allied efforts to force the tank invasion away from the Munsan Plain in the west and into the mountain corridors of the center of the peninsula, they will play only a minor role in its success. North Korea cannot afford to devote the forces needed, or the time they would take, to bridge the Han and Imjin Rivers under allied air and artillery fire. North Korean tanks trying to loop west into the Munsan Plain after fording narrower rivers in the center of the country would have to run through extended open areas against constant use of accurate antitank weapons.

- Landmines will play an important role in defending ridge fighting positions. They will slow enemy movement through "blind spots" on steep hills, giving allied aircraft more time to make strikes.

- The allies have devoted considerable attention to making barrier systems that will slow and channel enemy armor to permit their destruction.
with other weapons. The Chorwon corridor has repeated choke points studded with rock drops, tank traps, tank ditches, and pre-chambered roads and bridges. Firing mixed systems on top of this collection of barriers will certainly add time to the many tasks of the North Korean engineers and infantry trying to clear a way for their tanks. However, if they are unobserved, they can be quickly breached, compared to the time it will take to detonate and clear a rock drop.

- Landmines in mixed systems appear to have a unique ability to seal off allied counter-invasion routes from enemy armor. The allies' real-time reconnaissance abilities should give their tank commanders moving into North Korea a good picture of the location of enemy armor. As the allies pick routes through the North Korean mountains toward Pyongyang, mixed munitions will be used to slow enemy tanks that are trying to move toward key junctions from feeder roads.

- Allied armor will be successful more quickly in the drive for Pyongyang if other allied forces can degrade North Korean antitank positions in the counter-invasion. Mixed systems minefields would have a marginal impact on this task.
Alternative Weapons and Tactics for Key Allied Tasks

The cost of the weapons and tactics proposed here as combat and casualty-effective alternatives to antipersonnel mines in Korea is estimated at $2 billion if both the United States and South Korea join the Ottawa Treaty, and $1.5 billion if only the United States joins. Alternatives to scatterable landmines would require $1 billion to procure three Joint-STARS ground-targeting aircraft and their Ground Station Modules and $500 million to procure remotely delivered “off-route” anti-vehicle weapons and “hovering” munitions. Alternatives to long-lived mines would require $500 million to procure cluster bombs, Claymore mines, electronically driven and coordinated machine guns, sensors, and trip-flares. The program could be funded in part by terminating the Pentagon’s ineffective search for alternatives to antipersonnel mines, which is projected to cost $1.05 billion by 2005.

South Korea's stated policy is to join the Ottawa Treaty if the United States develops effective alternatives to antipersonnel landmines. However, if South Korea chose not to join with the United States, the new U.S. weapons and tactics would simply be added to the allied doctrine and arsenal. South Korea could continue to use its one million long-lived barrier mines, its up to two million stockpiled long-lived mines, and its 32,000 ADAM artillery-delivered mines and GEMS Flipper-scattered mines. With the approval of Congress, the United States could also transfer its stockpiles of both long-lived mines and mixed systems to South Korea before joining the treaty.

A Pentagon official has claimed that having one ally on the treaty and one off could create tactical problems during combat, but he was unable to specify situations in which this would occur. U.S. personnel do not maintain the current South Korean minefields, and there are no plans for them to emplace mines from South Korea's stockpile or to load or fire the South Korean ADAM and GEMS mines. It should also be stressed that even if both allies join the Ottawa Treaty, the currently emplaced antipersonnel mines in the million-mine barrier system do not have to be removed for ten years.

There are some non-military reasons why South Korea may choose not to join the Ottawa Treaty, even if the United States does and even if the United States provides alternatives. South Korean planners wish to control the movement of civilian refugees from North Korea during a political or military crisis. A South Korean general says: “The minefields will also deter, if chaos descends on the North, a massive flight of refugees that would be destabilizing, and help preserve the separateness of the two states.”

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The South Korean Ministry of Defense and Office of the President have studied the reunification of Germany intensively, and have decided that a situation like the chaotic fall of the Berlin Wall would be too risky for Korea; it could trigger unpredictable northern acts. The South Korean government believes that reunification is inevitable, but it wants to control the movement of northern citizens during the process. South Korea may also be leery of the Ottawa Treaty because of the expense of clearing the current minefields. A leading public proponent of clearing long-lived mines, and replacing them in military doctrine with self-destructing mines, has estimated the cost of clearance at $10 billion.

The Tasks and the Tools

The weapons and tactics that can serve as alternatives to antipersonnel landmines in meeting the particular challenges of war with North Korea fall into three categories:

- those that create "lethal ground" for infantry where there are currently or would be emplaced minefields;

- "breaching complicators" that protect scattered anti-vehicle mines from tampering, with the minimal cost of removing antipersonnel mines from mixed canisters; and

- those that kill vehicles, and especially tanks, directly, rather than just slow them down as minefields do.

Lethal Ground:

Alternatives in this category must fulfill the important role antipersonnel mines play in protecting bases from special operations forces, slowing and channeling the initial infantry assault, and holding ridge fighting positions. This is the easiest of the three categories in which to field alternatives, because allied forces control the area to be protected, and can pre-place the alternatives.

Under Pentagon contracts, Textron Systems and Alliant Techsystems developed three separate prototypes to compete for a single production contract to field a non-self-destructing alternative (NSD-A) system by 2003. All the prototypes used what the Pentagon calls the "man-in-the-loop" model. In this model, latest-generation sensor and surveillance intelligence alerts a soldier to the presence of enemy forces and permits a human decision to activate lethal or non-lethal weapons by radio control.
Based on successful field tests, the Pentagon has asked the two manufacturers to collaborate on a single "man-in-the-loop" weapon. The system will use "extended range tripline sensors" and a forward observer to identify enemy troops in the weapon's range. The Mission Needs Statement provided to the contractors by the Pentagon tracks the general purpose of the Ottawa Treaty in requiring "means for discrimination/selective use" and a system that can "provide interrupt between sense and effect." However, it does not make compliance with the treaty a requirement, nor does it describe or interpret its actual language. This raises the possibility of the development of an alternative that might actually violate the Ottawa Treaty. Indeed, the planned weapon does contain a feature that violates the Ottawa Treaty, the Battle Override Switch (BOS). The BOS permits a commander to use radio controls to turn the weapon into an active antipersonnel mine.

The Pentagon envisions spending $57.7 million on the development of this alternative to long-lived mines in Korea, and another $753 million on production. However, instead of developing this new weapon, the Pentagon could better use currently available weapons that mimic the function of long-lived mines, while maintaining its ongoing program of research, development, and production of "hovering" anti-vehicle weapons and air-delivery systems for "off-route" anti-vehicle weapons.

**Pre-placed explosives:** An alternative to long-lived antipersonnel mines is simply to emplace explosive devices, such as an immediate-fuzed or time-fuzed "popcorn" cluster bomb or a string of command-detonated Claymore mines, throughout the areas that would otherwise have been covered by antipersonnel mines. The time-fuzed cluster bomb releases bomblets that explode at random intervals for roughly 30 minutes. Anti-vehicle mines could remain, provided that they met the Ottawa Treaty's standards.

The explosive devices would be rigged to provide nearby allied forces with the ability to trigger them by radio signal, once they had determined that enemy infantry were in the area. The detonation of the 800 pound CBU-97 air-delivered cluster bomb propels bomblets over an area of 500 feet by 1,200 feet. The area might be significantly less for a ground detonation among trees, but allied forces could maximize it by seeking the least sheltered pre-placement in a given area.

**Electrically driven Gatling guns:** A more complex, but equally effective, method of turning a previously mined or planned mine area into lethal ground for enemy infantry would be to build bunkered machine gun sites on a few high points behind each area, and place in them a variant of the electrically driven and coordinated "Puff the Magic Dragon" Gatling gun.
system that has been used in the AC-130 Spectre or “Spooky” gunship. This system was developed in the Vietnam War for three (and at times four) coordinated 7.62 mm revolving barrel mini-guns. Each of these weapons can deliver up to 6,000 rounds a minute and the coordinated trio can blanket a football-field sized area with a bullet every square yard in three seconds. A single trigger button fires all three guns in the necessary patterns. In the AC-130, a computer was used to factor in air speed and angle in guiding the guns, but on the ground, with pre-set fields of fire, only the mechanical driver will be needed to rotate the guns to the proper settings and return them.

Even more powerful weapons have recently been added to the AC-130 that also could be adapted to ground use. For example, the AC-130 now uses the Western Design 25mm Ammunition Storage and Handling System (ASHS), a “Linear Linkless Feed System” that feeds the GAU-12/U five barrel Gatling cannon at a rate of 1800 shots per minute off the Delco Trainable Gun Mount System. The AC-130 also carries the 20mm Vulcan cannon that delivers up to 6,000 rounds per minute, which could be adapted to a mechanical driver.

Breaching complicators:

Antipersonnel landmines are included in a mixed system canister to delay enemy engineers or infantry who are trying to reach the visible anti-vehicle mines and disable them. If the allies decide to continue using scattered anti-vehicle mines after removing antipersonnel mines from the canisters, they must find ways to compensate for the decrease in protection.

The key missions which alternatives must fill as breaching complicators include two deep battlefield tasks in which antipersonnel landmines play a minor role (slowing the movement of aircraft on northern airfields and degrading antitank positions in the allied counter-invasion), one deep battlefield task in which they play a unique role (sealing off allied counter-invasion routes), one close battlefield task in which they play a minor role (forcing the tank invasion to mountain corridors), and one task performed in both the deep and close battlefields where they play a minor role (slowing enemy tanks in the invasion to permit a kill with other weapons).

In none of these tasks will the alternatives be as effective as the mixed system antipersonnel mine, which was designed specifically for protecting the anti-vehicle mine. However, in all of them, the alternatives can achieve much the same purpose. In addition, successful implementation of the third category of alternatives, direct tank-killing weapons and tactics, will make this category of breaching complicators virtually irrelevant.
**UAV or aircraft sweep:** Allied planners could schedule a sweep of an anti-vehicle minefield by an unmanned aerial vehicle or armed aircraft within twenty minutes of its delivery by air or artillery—about as much time as is needed for forces to emerge and start clearing the field. The armed aircraft could attack enemy breachers with cluster bombs and tanks with antitank missiles, while the UAV's data could lead a commander to send in armed aircraft or use artillery on the area. If enemy forces have not yet emerged, then some benefit of delay would already have been gained by the delivery of the anti-vehicle mine canisters.

**More anti-vehicle mines:** The Pentagon could replace antipersonnel mines in scatterable canisters with additional anti-vehicle mines, or fire additional “pure” canisters into an area. Both options would increase the clearance time for enemy infantry.

**Sensors:** The Pentagon could either order the placement of sensors in anti-vehicle canisters as antipersonnel mines are removed, or plan separate air or artillery delivery of sensor packages to anti-vehicle minefields. The sensors would inform allied commanders when enemy troops were trying to clear the mine field or when enemy vehicles were present, so that allied forces could deliver air, sea, or artillery attacks on the area. While this allied counter-clearance response will not be as fast as that provided by in-place antipersonnel mines it would be quite rapid and far more lethal to the breachers.

**Time-fuzed munitions:** The Pentagon could also choose to deliver “popcorn” time-fuzed cluster munitions to the minefield either in the anti-vehicle mine canisters or by air or artillery. The randomly exploding bomblets would discourage enemy personnel from working to clear the minefield.

**Vehicle-killing:**

The purpose of mixed system minefields is to slow or divert vehicles until other weapons can be brought to bear to kill them. The most promising alternatives to the use of antipersonnel mines in mixed canisters to protect anti-vehicle mines fall in the category of weapons that simply kill vehicles directly. These alternatives would dramatically improve allied combat abilities, and thereby reduce allied casualties, in each of the five tasks in which mixed systems play a role. They could kill, rather than just slow, aircraft on northern airfields, and kill, rather than just slow, tanks trying to break out of mountain corridors, tanks moving toward or down invasion routes, and infantry and tanks moving to block allied counter-invasion routes.

**Off-route weapons:** Target-activated weapons that fire themselves from the ground at vehicles are called “off-route” munitions. Like scatterable
anti-vehicle mines, they are “fire and forget” weapons that once deployed find and attack targets on their own. These munitions are not as vulnerable to enemy tampering as anti-vehicle mines, simply because they are harder for enemy infantry to see and clear. They are available today for emplace-ment by hand, but are being developed for delivery by missile and artillery. These weapons can kill vehicles from the side or the top, and so are militar-ily superior to scatterable anti-vehicle mines, which only detonate when a vehicle passes over them.

Germany is developing the COBRA and ARGES systems, which are air or artillery-delivered containers that fire tank-killing projectiles when sensors pick up the characteristics of an armored vehicle. The COBRA wide area munition system kills from the top. When it recognizes a tank through seis-mic and acoustic sensors, it shoots itself 150 meters in the air, and hangs suspended by a parachute while it finds the tank and then fires a number of sensor-fuzed munitions over a 300 meter radius. ARGES kills from the side. When it recognizes a tank through a variety of sensors, it fires an anti-armor projectile at its side.65

As noted in General Robert Gard’s monograph in this series, the United States already fields the Hornet Wide Area Munition as a hand-em-placed weapon.66 The Hornet’s sensors can be set to search for the characteristics of tanks or of other heavy vehicles. When a target is identi-fied, the Hornet automatically fires its projectile above the target, and the projectile then fires an explosively formed penetrator at the top of the target. The Hornet has a lethal radius of 100 meters. In the air-deliverable version currently being developed by Textron, after landing the Hornet will automatically upright itself by stretching out its metal base strips and begin its search for appropriate targets. The air-deliverable Hornet was originally to be developed before the hand-emplaced version, but the end of the Soviet threat caused the Pentagon to reverse the order of production.67

**Hovering weapons:** Target-activated weapons that fire themselves from the air at vehicles are called hovering munitions. They currently do not pro-vide coverage of an area for as long as off-route munitions. Until the Unmanned Aerial Vehicles of the U.S. High Altitude Endurance system are fielded, hovering munitions’ aerial platforms are parachutes and gliders that gradually descend until the munitions are fired or self-destroy. The High Altitude Endurance platform, like the current Global Hawk, “will even-tually carry a 2,000 pound sensor package to 65,000 feet and loiter for more than 24 hours” to detect moving vehicles and personnel. Another Unmanned Aerial Vehicle will hover at 25,000 feet for 24 hours at a time to dispense precision, gravity-driven glide bombs.68
When this system is fielded, mixed systems will be virtually irrelevant in the Korean defense problem, because all-weather direct tank-killing will be available 24 hours a day. In a mobile battle where an area must be cleared of enemy vehicles for only a brief period as allied tanks move nearby, parachute and glider-carried hovering munitions that are closer to production than the High Altitude Endurance system can achieve this goal just as well as off-route munitions. In addition, hovering munitions cannot be cleared, and provide wider coverage than off-route munitions.

General Gard's monograph also identifies the three most promising hovering munitions being developed in the near term by the United States: the artillery-delivered Sense and Destroy Armor Munition (SADARM), the stand-off missile or aircraft-delivered Sensor-Fuzed Weapon (SFW), and the stand-off missile-delivered Brilliant Anti-Armor Technology (BAT) munition.99

A SADARM 155 mm artillery shell contains two parachute-stabilized, top-attack submunitions with armor-piercing, explosively formed penetrators that can destroy lightly armored vehicles, such as self-propelled howitzers. A single shell can reach targets over an area the size of four football fields. A SADARM multiple launch rocket contains four such submunitions. According to the manufacturer, Aerojet, SADARM was found to be 15 times more effective against mixed vehicle and infantry targets than conventional improved munitions.99

SFW aircraft-delivered, unpowered canisters weigh 1,000 pounds and contain ten packs of four SKEET submunitions that are designed to kill tanks. Like the SADARM submunitions, the Textron SFW submunitions are parachute-stabilized, explosively formed penetrators. The submunitions are fired up from the pack at a preset altitude, and then use their infrared sensors to detect appropriate vehicle heat sources.99 The services having been pushing to place SADARM and SFW in the field as soon as possible and some SFW munitions have already entered the inventory.99 Both the Navy and Air Force are also procuring a powered missile called the Joint Stand-Off Weapon, which can carry six packs of four submunitions and be delivered from 40 miles distance.99

BAT submunitions are aerodynamically stabilized, unpowered gliders that are released in the close or deep battle by the Army Tactical Missile System (ATACMS) missile, which is launched from the M270 Multiple Launch Rocket System. For long-range fire, 13 BAT submunitions are carried in the missile, and for shorter-range fire, six are carried. BAT is also being developed for use in powered cruise missiles. The BAT carries acoustic and infra-red sensors, and can remain above the deep battlefield searching for
targets for much longer than the SADARM and SFW hovering weapons. Full-rate production is scheduled for the last quarter of fiscal year 2000, at a cost of $1.46 million per missile.

**Joint-STARS:** Scatterable anti-vehicle mines can also be made virtually irrelevant in the Korean defense problem by increased procurement of Joint Surveillance Target Attack Radar System (Joint-STARS) Boeing E-8C aircraft, which provide all-weather, real-time tracking of enemy vehicles, and Army Ground Station Modules or Common Ground Stations, which receive the information and disseminate it to air and ground units. During its up to 11-hour flight (20 hours with aerial refueling), Joint-STARS can detect and target vehicles at more than 150 miles. In a Korean war, three Joint-STARS (assuming one being serviced) would immediately provide around-the-clock observation to view the entire near and deep battle from safe spots over South Korea.

In 1997, Joint-STARS aircraft were used in the allied amphibious warfare combined exercise Foal Eagle. A Common Ground Station used in the exercise provided "a remarkably accurate tactical picture of what was happening in the exercise area." Navy P-3 Orion aircraft used Joint-STARS data to hone in even further on tactical combat areas and provide real-time displays to the command center.

The phased array radar uses the Wide Area Surveillance and Moving Target Indicator system, which can locate moving targets, differentiate between wheeled and tracked vehicles, and zoom in on a rapidly evolving combat zone to provide real-time information for allied units. The radar also uses the Synthetic Aperture Radar/Fixed Target Indicator, which transmits maps with "precise locations of critical non-moving targets such as bridges, harbors, airports, buildings, or stopped vehicles."

Each Joint-STARS aircraft costs $225 million, and the associated Ground Station Modules (now being updated with improved processing equipment as Common Ground Stations) drive the unit cost to over $300 million. Only six aircraft are currently in service, and none are based in Korea. The planned buy, once as high as 22, is now at 13, with the hope that NATO allies will buy an additional six. The Army wants far more Joint-STARS, and hopes eventually to make Ground Station Modules "the most numerous military intelligence end-item in the Army, located from maneuver brigade up through echelons above corps."

Joint-STARS takes a huge step forward in tank-killing by providing real-time coordinates of stopped and moving vehicles directly to artillery, air, and armor commanders. It is an operational reality that is kept out of Korea only by cost. An older E-8A and a new E-8C flew 95 consecutive
sorties totaling over 1,000 hours over Bosnia in 1995 and 1996, with 98 percent "mission effectiveness." In the Gulf War, two E-8A pre-production models tracked Iraqi tanks and SCUD missiles while flying 49 sorties lasting 500 hours. The Federation of American Scientists provides this description of their effectiveness:

Joint STARS provided surveillance support of the battlefield during the battle for the town of Khafji. Joint STARS detected a follow-on force of 80 Iraqi vehicles heading toward Khafji. This follow-on force was engaged and stopped by tactical airpower and the Marine ground commanders knew that additional Iraqi forces would not enter the battle.

Joint STARS was even more effective in the recent conflict with Yugoslavia, providing coordinates for many of the allied tank kills in Kosovo, as well as for the devastating air attack during the one major ground battle, just before the end of the war, in which Yugoslav ground forces came out into the open to fight the Kosovo Liberation Army.

The Half-Hearted Search for Alternatives to Mixed Systems

For five years the Pentagon has studiously blocked the search for alternatives, particularly for alternatives to mixed systems. President Clinton’s National Security Council staff has refused to intervene, saying that they “have to trust” the Pentagon. As a result, the Pentagon bureaucracy has been free to reward opposition to President Clinton’s order to find effective alternatives, and to punish those who took to heart his call for an “urgent” search. Principal deputy assistant secretary of defense for special operations Tim Connolly was fired in large part for publicly stating that a ban on landmines would benefit U.S. troops without degrading their capabilities, and landmine policy director Colonel Robert Cowles left his position in large part due to frustration at the limited staffing, effort, and progress being made in the search for alternatives.

The departure of these personnel has sent a clear message in the Pentagon: taking the president’s order seriously is hazardous to your career. The bureaucratic rewards and punishments can only be reversed by a president setting a specific date at which the United States will no longer field weapons that do not comply with the Ottawa Treaty.

The search would certainly be speeded by two additional bureaucratic developments. First, the president could obtain supplemental funding from Congress to accelerate the production of currently available alternatives to
mixed systems. This would encourage the services to compete for a share of the new funds rather than collude in an ineffective search for new weapons. Second, the president could order the National Security Advisor, the Secretary of Defense, and the Chairman of the Joint Chiefs of Staff to monitor the fielding of alternatives, and transfer personnel not making an effective contribution to this effort.

Discussing the search for alternatives to mixed systems today with the Pentagon personnel ostensibly responsible for its success is a frustrating experience. In discussions, Pentagon personnel expend their creativity and energy on finding reasons why alternative concepts cannot work as well as mixed systems, rather than on exploring concepts to identify how they might work nearly as well.

This studied hopelessness contrasts sharply with the usual attitude of the U.S. armed forces and their Pentagon planners. Army officers joke that the “Can do!” optimism that is drummed into their heads as essential for combat missions sometimes harms their funding, because instead of protesting when the Army’s proposed budget is cut, their instinct is to say “Can do!” and start figuring out ways to get the job done. In contrast, in the case of alternatives to landmines, Pentagon planners have become “Can’t do” pessimists.

A U.S. Embassy official in Korea sums up the Pentagon’s massive resistance to President Clinton’s orders: “When you have a threat and deterrence, it is risky to change forces. North Korea is dangerous. I wouldn’t want to give up a single system.” The official is right: there is always another scenario for which a weapon might be useful, and military officials are not in the business of giving up weapons that might be useful. As was the case for two other indiscriminate weapons of mass destruction, battlefield nuclear weapons and chemical weapons, the civilian commander-in-chief must order our armed forces to use other means to achieve our military goals.

In October 1994, when President Clinton first established the U.S. policy of seeking to ban antipersonnel landmines, his administration established both a short-term and a long-term approach to self-destructing mines. The State Department would immediately try to negotiate a global agreement to ban long-lived mines, but permit what were first called “safe,” then “smart,” and finally, accurately, “self-destructing/self-deactivating” mines, while the Pentagon would search for alternatives that would permit the eventual banning of these mines. Both approaches failed to make progress in the next two years, although the State Department’s energetic efforts on its “U.S.-U.K. control regime” were not matched in the Pentagon, where no orders were issued and no entity was established to find alternatives.
In May 1996, faced with the possibility of legislation that would force a moratorium on the use of antipersonnel mines, President Clinton directly ordered the Pentagon to start an “urgent” and “immediate” search for alternatives to all antipersonnel mines, including self-destructing mines. Rather than begin research, however, for one year the Pentagon had the Defense Science Board and an inter-office Pentagon working group collaborate on a concept paper that stated the obvious:

- that no single system could mimic the functions of various antipersonnel landmines;
- that for long-lived mines, alternatives would need sensors and a “man-in-the-loop” to trigger a lethal response;
- that for mixed systems, “the operational requirements for area denial of dismounted threats and protection of AT minefields are not well quantified”; and that therefore
- “additional force structure” was the only “effective near-term alternative.”

This May 1997 report proposed another series of studies, geared toward mixed systems, “to more precisely define the operational requirement for APL and to assess the means to accomplish without APL those missions that today are achieved with APL”—that is, to do what the report itself had ostensibly been intended to do. The October 1996 interim draft of the report was sufficient for Deputy Secretary of Defense John Hamre to order the beginning of research on alternatives to long-lived mines, called Track 1. Track 2, the “maneuver denial” research focusing on alternatives to mixed systems, was established by Hamre as a long-term project with no immediate guideposts.

Incredibly, the Pentagon’s first proposal under Track 1 appeared to contradict the President’s order to find alternatives: it was to repackage ADAM antipersonnel mines in the same canisters as RAAM anti-vehicle mines—a continuation, not a replacement of antipersonnel mines. Similarly, in 2000 the Pentagon decided to include in the radio-controlled munition that will be its primary alternative to long-lived antipersonnel landmines a feature that violates the Ottawa Treaty. This “Battle Override Switch” allows a commander to turn a field of Ottawa-compliant radio-controlled munition into a full-fledged active minefield.

Pentagon personnel involved in landmine policy spent nearly all their time and energy in 1997 on trying to negotiate exemptions for Korea and mixed systems in the Ottawa process. The proposed studies of mixed systems
languished. The studies became moot in September 1997, when the Pentagon again won President Clinton’s acquiescence on a change in policy that appeared to contradict his order for a search for alternatives. This change redefined the antipersonnel mines in mixed systems as “submunitions” that were exempt from the need for alternatives. Top Pentagon officials told congressional staff in the spring of 1998 that rather than spend money on alternatives to mixed systems, the Pentagon planned to lobby for a change in the Ottawa Treaty to permit mixed systems.

While the landmine debate had changed dramatically since 1994, the Pentagon’s position had changed only slightly: instead of demanding the ability to use all self-destructing mines, it was demanding the ability to use them in mixed systems. This demand was rejected in every international negotiation since 1994: the U.S.-U.K. control regime, the CCW, and the Ottawa Treaty. The Pentagon’s position was illogical if its goal was to achieve U.S. participation in a ban on antipersonnel landmines, but quite reasonable if its goal was to block U.S. participation.

In May 1998, in return for Senator Patrick Leahy’s agreement not to oppose a waiver for the one-year use moratorium that would have started in February 1999, President Clinton reversed the Pentagon’s change in definitions and ordered an “aggressive” search for Ottawa-compliant alternatives to mixed systems. However, in August 1999, 15 months after this order, the personnel responsible for the search reported that the “concept development” that has to precede actual research was still underway: “We can’t discuss progress in alternatives to mixed systems, since we are still in the idea-generating phase,” a representative of the Pentagon office of Acquisitions and Technology said. Since then, the Pentagon has signed contracts only for further study of new concepts, rather than for studies on the use of existing weapons as alternatives.

It is not clear that the alternatives being sought would, or are intended to, comply with the Ottawa Treaty. In August of 1999 a top deputy in the alternatives office of the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict stated that the Pentagon was not searching for “Ottawa-compliant” alternatives in Korea, but simply for “alternatives.” He pointed out that neither the President’s landmine policy order (PDD-64), nor the internal Pentagon orders from Deputy Secretary John Hamre, include a reference to the Ottawa Treaty.

A Pentagon official later clarified that because Senator Jesse Helms and other opponents of the treaty in Congress might try to block funding for a search that explicitly mentioned it, the Pentagon carefully avoids mentioning the treaty in its official documents. Instead, the Pentagon counts on the
"common sense" of its planners and military contractors to use the Ottawa Treaty as a guide while working on alternatives.19

The bottom line is that after six years and numerous direct presidential orders, the Pentagon has made no progress on research, let alone development, of Ottawa-compliant alternatives to mixed systems. Given the current confusion about definitions and the lack of explicit commitment to treaty-compliance in Pentagon research, there is no reason to expect any progress in the next five years, even though the Pentagon has budgeted $241 million for research and development. Military contractors may be picking up on the Pentagon’s intention of not making progress. According to one reporter, in August 1999 a program director at the Army’s the Pickatinny Arsenal expressed surprise and frustration with the sparse interest of contractors in initial research on mixed systems.20

Interviews in August 1999 with Pentagon personnel responsible for the search for alternatives generated a moving target of constantly changing reasons why concepts could not work. The personnel were a landmine policy officer in the Office of the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict (SOLIC), a long-time landmine policy officer in the Department of the Army, a landmines policy officer on the Joint Staff of the Joint Chiefs of Staff, a representative of the Office of Acquisitions and Technology, and a munitions expert at the Pickatinny Arsenal.

**Claymore mines:** A member of the Pentagon briefing team adamantly and repeatedly refused to discuss ways to configure firing mechanisms for a group or a string of Claymore mines, even though these are the Ottawa compliant weapons currently in the U.S. inventory that most closely resemble long-lived landmines: “Claymores are out of bounds for this discussion... There will be no discussion of Claymores here...Claymores are not an alternative to landmines. If they could do the job, we’d have used them.” In fact, the weapon the Pentagon is finally about to purchase to replace its long-lived antipersonnel landmines is a radio-detonated munition that functions much like a command-detonated Claymore.

**The United States, but not South Korea, joining Ottawa:** Another member of the briefing team said that while there is no U.S. government position explicitly stating that the United States could not join the Ottawa Treaty unless its ally did, “we are in a coalition battle, and command and control is joint and would be complicated” by such an action. However, he could not provide examples of situations in which combat goals or which planned South Korean current or planned use of landmines would be compromised.
**Hornet Wide Area Munition:** Two members of the briefing team claimed that air or artillery delivery of the Hornet “off-route” tank-killing munition was “not in the development pipeline.” However, the Pentagon’s own reports indicate that it is, and pressure for a landmine alternative could speed its funding and testing. One briefer also stated that Hornet is vulnerable to breaching, but of course the same can be said for the more visible mixed system anti-vehicle mines.

**Sensor-based artillery attacks on vehicles:** A member of the briefing team said that, “we looked into this in the past and found that the response mechanism was the problem: it’s a timing problem. To tell artillery to aim and fire, after the man in the loop makes a decision, takes time, including the air travel of shell, and it is too late to prevent the breach that is happening right then.” This conclusion contradicts the Pentagon’s oft-repeated claim that it takes the enemy 40 minutes to breach a close-battle mixed system field and only ten minutes to breach it when antipersonnel mines are not included in the canister. It is inconceivable that from the time a sensor tells the man in the loop that it has recognized a tank engine that it could take over ten minutes for a Multiple Launch Rocket to be aimed at and strike the coordinates. The Army claims a one-minute firing time for all 12 rockets, and with a typical artillery travel rate of 2 seconds per kilometer, the rockets would then take just over a minute to reach their 32 kilometer range.\[2\]

**Sensor and intelligence-based deep battle attacks on vehicles:**
According to another member of the briefing team, drones and satellites can feed information quickly, but the information doesn’t move quickly enough down the chain of command to the battlefield commander: “The data pipes for real-time intelligence aren’t there, and that would take billions of dollars of C3I improvements.” However, the Army is dedicating tremendous resources to speeding information to the battlefield, with the Joint-STARS Ground Module Stations being just one of many systems that serve that purpose. This briefer also said that the delivery of intelligence is often unreliable because of poor weather, limited coverage by satellites when other demands for information move the satellite around, and the lack of available Joint-STARS aircraft. These could be used as reasons to promote funding for additional Joint-STARS, rather than as reasons to keep using landmines.

**Time-fuzed cluster bomblets:** A member of the briefing team said that, “we looked at that. I can’t remember the exact figures, but there were drawbacks. It sounds like a very good idea, but in reality you needed a lot of bombs to have much effect, and the field degrades itself quickly, so all you have to do is wait 30 minutes.” However, the half-hour in which the field degrades is precisely the time the Pentagon claims is added to breaching by the inclusion of antipersonnel mines in an anti-vehicle mine
canister. Another member of the briefing team said that "sympathetic detonation" was also a problem, meaning that the explosions of the cluster bomblets would cause the anti-vehicle mines to explode. However, the Pentagon claims that scatterable anti-vehicle mines are hardened against sympathetic detonation, both to keep their own antipersonnel mines from detonating them and to reduce the effectiveness of enemy breaching tactics.

Sensor-Fuzed Weapon: One briefer claimed that, "Joint Standoff Weapon delivery of the Sensor-Fuzed Weapon is also a long way off." Another representative said that SFW has not been deployed for field use in any configuration. However, according to the Air Force, JSOW is a mature system, with 303 ordered for delivery by 2001. 1,200 SFWs are already deployed by the Air Force for direct delivery from aircraft.

Brilliant Anti-Armor Technology: This briefer also stated that, "BAT is out even farther than JSOW. They won't be available until 2006." In fact, full-scale production of BAT is set for 2000 and production of the ATACMS that will carry BAT is already underway. However, even if full operational capability were not achieved until 2006 date, that is the very time frame established by the Hamre memorandum, so the landmine policy office might logically be pushing this system as an alternative.

When it comes to tactical battle facts, as with weapons, the Pentagon personnel also presented a moving target of arguments against alternatives. One briefer said that North Korea could launch a "no-warning" attack. When told of the Army's own five-day estimate of warning for an armored invasion, he agreed with that estimate for "perceiving" elements of an invasion, but said that it was still essentially "no warning" because no reinforcements could arrive in five days. If this briefer's characterization of Allied readiness and intelligence capabilities is correct, then the United States and South Korea are woefully unprepared for a war in Korea. Such an assessment is, of course, preposterous.

The Pentagon personnel unveiled a new set of war game estimates showing particular allied sectors overrun 90 percent of the time without landmines as opposed to five percent of the time with landmines, but were unable to describe such basic assumptions about the sector model as weather, artillery ratios, air control, the impact of simple alternatives like Claymores, and whether the million South Korean mines were still present. At that point, one briefer remarked: "When people use these sorts of number, I know they're not engaged in a serious discussion. It all depends on other conditions on the battlefield. The real question is: what are you trying to achieve, and how do landmines help?"
A member of the Pentagon briefing team claimed that a “Gator dump” by
U.S. aircraft would mean that Allied forces would not have to watch a
North Korean bridge for 48 hours. When told that this conflicted with an-
other Pentagon claim that a mixed system minefield takes 40 minutes to
clear, he responded that “it all depends on what you drop,” but would not
identify the Gator configuration that could block a bridge for 48 hours.

This briefer also criticized Senator Leahy harshly for refusing to accept
Pentagon invitations to go to the Picatinny Arsenal for a live-fire demon-
stration and briefing that the Pentagon believed made a strong case for
retaining landmines. However, when the author then asked to visit the
arsenal to have the briefing the Pentagon wanted to give Senator Leahy,
the briefer told him, “don’t bother to go...it’s just a lot of things that go
boom,” and instead arranged a video tape briefing. The author did request
a briefing directly from Picatinny, but was informed by the Public Affairs
office there that it was no longer performing live-fire landmine briefings.

The final moving target for this report turned out to be the Pentagon’s re-
fulal to permit interviews for the author with U.S. field personnel in Korea.
For five years Pentagon personnel had encouraged the author to go to
Korea and get the soldier’s and airman’s point of view on the role of land-
mines. However, when provided with two weeks’ notice of the author’s
week-long research trip in 1999, the Pentagon determined that U.S. Forces
Korea was too busy with a command-post exercise to provide an official for
any day during the week to arrange the necessary interviews at Camp
Casey and the Osan and Kunsan Air Bases. As the author was driving past
Camp Casey to visit invasion corridors with Korean veterans, he came upon
dozens of military personnel who might have been able to escort him to
U.S. bases for interviews with U.S. personnel who actually deploy mixed
systems in battle. They were playing golf.
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that North Korea had sold Pakistan missile technology, perhaps in return for help with the development of nuclear weapons, and had shipped missiles parts and plans to Iran and Libya.

65 Interview, Seoul, August 1999.


70 Article 31: General rule of interpretation; Article 32: Supplementary means of interpretation.

71 For example, the Australian delegate told the meeting that: ‘If an anti-handling device is attached and it is independently triggered by tampering, it is legal. Both construction and deployment help us determine on a case by case basis (if it could be exploded unintentionally).’

72 See the website of the International Campaign to Ban Landmines; interview with designated campaign representative, Washington, June 1999.


75 Unless otherwise noted, all information and quotes come from the relevant country section of International Campaign to Ban Landmines, Landmine Monitor Report 1999, Human Rights Watch, New York, 1999.


80 Landmine Monitor, p. 333.

81 Landmine Monitor, p. 330.
Landmine Monitor, p. 476; South Korean Army landmine policy expert, interview, Seoul, August 1999.

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About the Author

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During Caleb Rossiter's 20-year career as a national security analyst in Washington, DC, he has been an analyst in the Foreign Affairs and National Defense Division of the Congressional Research Service, the deputy director of the congressional Arms Control and Foreign Policy Caucus, and the director of Demilitarization for Democracy, a non-governmental research center promoting civilian control of armed forces. In 1999 Dr. Rossiter was named a senior fellow at the Center for International Policy, and he joined Vietnam Veterans of America Foundation as a consultant on military alternatives to landmines and on international treaties reducing the impact of war on civilians.

Dr. Rossiter's work in the area of national security includes: authoring a 1995 study that first recommended the "man-in-the-loop" alternative to landmines, which is now the basis for the alternative weapon being developed by the Pentagon; proposing and assisting in the drafting in 1990 of legislation establishing the Expanded International Military Education and Training program, which replaces U.S. combat training of foreign armed forces with civilian-military seminars in military justice and oversight of budgets; and authoring in the 1980s studies of violations of the laws of war by the High Commands of the El Salvadoran Armed Forces and the Nicaraguan "contra" rebels. He has also written studies of executive branch decision-making on human rights, arms exports, aid to African armed forces, and landmines.