

The Dynamics of the North Korean Threat Is The Erosion of North Korean Military Capabilities Real or Imagined?

Bruce William Bennett
RAND Corporation

It is an all-too-familiar pattern for military forces. Lacking sufficient funds to finance across-the-board military modernization, the country appears to pursue only selective modernization and some force evolution. The majority of military equipment is therefore allowed to slip into an antiquated state. The same financial constraints limit force readiness, especially reducing the combat training essential for the force should it be suddenly thrust into wartime operations. This reduction is then exacerbated by a diversion of the force into peacetime assignments that bear little resemblance to its wartime missions. Commentators wonder whether these military forces have become hollow, with significantly reduced combat capabilities.

While many military forces today can be described in these terms, the focus of this paper is on the North Korean military. Has the lack of modernization and the degradation in North Korean readiness really eroded the North Korean threat? Or have selected North Korean military developments led to an enhanced threat? What can be expected in the future?

This paper will examine these questions in terms of three measures of North Korean military capabilities:

Absolute Military Capabilities. Absolute capability measures the quantity and quality of North Korean forces across the

various dimensions of military power. It considers the North Korean equipment fielded (its quality, quantity, and sustainability) and the readiness of the North Korean military personnel to use that equipment. It would show, for example, that North Korean armor has changed little over the last decade, and thus while the equipment is the same, it has aged and apparently become less reliable, and the training of armor personnel has declined. Measures of absolute capability are commonly used in the military community.

Relative Military Capabilities. Relative capability measures the ability of North Korea to achieve its conquest objective against the Combined Forces Command (CFC) of the United States and the Republic of Korea (ROK), assessing the implications of the strengths and vulnerabilities of both sides. It would include the issues considered in absolute capabilities, but does so for both sides, and also is concerned with strategy and operational concepts and the ability to execute this strategy. Relative capability is thus a far more useful measure than absolute capability.

The Ability to Cause Damage. North Korea's ability to cause damage is the extent to which North Korea can hurt the military forces of the CFC and society in the ROK.

To determine whether North Korean capabilities have eroded, we will compare North Korean capabilities today in each of these areas with those of approximately a decade ago, before the shift in North Korean development priorities and the end of the cold war.

It is difficult to assess these measures with certainty, because North Korea has been very effective in denying CFC information on many weapon issues. Moreover, the specific scenario of a future war in Korea cannot be predicted. Still, it appears that many North Korean conventional military capabilities have been eroding in absolute terms, and have eroded even further relative to the capabilities of CFC. But during the same period, North Korea has fielded chemical and

biological weapons (CBW) and related delivery systems that could vastly increase the damage to CFC forces and to civilians in the ROK. These CBW constitute an asymmetric threat to CFC, one which targets CFC vulnerabilities using military capabilities that CFC would not use (because of U.S. and ROK participation in the Chemical Weapons Convention and in the Biological and Toxin Weapons Convention). While ROK and U.S. defense efforts have significantly reduced CFC vulnerability to most North Korean conventional threats, CFC has not yet put the same kind of effort into reducing its vulnerability to CBW. The rise in North Korean CBW capabilities leaves CFC defenses vulnerable to this asymmetric threat and out of balance. But CFC efforts to restore balance are ongoing, and will eventually erode even the more fearsome North Korean CBW capabilities.

North Korean Objectives and Strategy

For fifty years, North Korea has had a consistent objective: Reunification of the Korean peninsula on North Korean terms. In the 1950s, North Korea sought to accomplish this objective militarily, and in the 1960s it sought to accomplish this objective both economically and through special force actions it took against South Korea. When the special force actions failed, North Korea apparently returned to a military strategy of conquest in the late 1960s. By the 1980s, North Korea had lost the economic competition with South Korea, and eventually, with the end of the cold war, it lost its political leverage. Thus, only a military strategy remained for North Korea to accomplish its reunification objective.

During this same period, the North Korean regime has weakened, and the possibility of regime failure, frequently referred to as "collapse," has increased. The North Korean regime is thus forced to consider actions it might take to avert regime failure. One of the few options available to the North Korean regime, should the situation become sufficiently perilous, is a military attack on the ROK, with the hope that a fracturing North Korean leadership could be brought back to unified action by a focus on conquering the ROK. Most experts consider such a scenario the most likely condition that could lead to a North Korean attack on the ROK.

In the 1970s, North Korea placed major emphasis on developing military capabilities appropriate for the offensive operations needed to conquer the ROK. The expansion of the North Korean economy at that time and support from North Korea's allies facilitated this growth.¹ The fundamental components of the North Korean military strategy were penetrating and collapsing forward CFC defenses, rapidly advancing through South Korea to secure the country and deny an easy U.S. reentry, and convincing the United States to disengage itself from the conflict.

The Evolution of North Korean Military Capabilities

Until 1997, most experts focused on North Korean conventional capabilities as the basis of the North Korean threat. This section examines how the North Korean conventional capabilities evolved over time relative to CFC defensive capabilities. While a North Korean conventional attack on the ROK faces CFC with some risks and could cause significant damage, CFC should be able to defeat such an attack well short of its objectives of capturing the entire peninsula, and quite likely before the main thrusts even reached Seoul. Recognizing the developing U.S. conventional superiority, North Korea apparently determined in the early 1980s that it needed to turn its attention to developing a facilitating force that would strike CFC vulnerabilities, undermining CFC strengths to the point where North Korea could hope to achieve its objectives. This section also describes the development of this facilitating force.

Historical Evolution of the North Korean Conventional Threat

In 1950, at the start of the Korean War, North Korean forces were able to break through the ROK and U.S. defenses in part by using a small force of T-34 tanks. ROK and U.S. forces were thinly deployed, with outdated equipment and poor readiness.

In the aftermath of the Korean War, ROK forces were gradually developed to provide a sizable, capable defense. Both North Korean and ROK forces depended upon older combat equipment made available by their superpower supporters. For example, North Korean T-54 and T-62 tanks were in many ways comparable to the ROK M-47

and M-48 tanks, while North Korean Fishbed and older aircraft were counterparts of the ROK F-86 and F-5 aircraft. The density of CFC forces in the forward area, coupled with the comparability of much of the ground force equipment, suggested that the CFC defenses would be difficult for the North Koreans to penetrate. However, by the late 1970s, if North Korea had been able to penetrate the forward defenses, its armored forces could have provided the numbers and capabilities necessary to advance rapidly from Seoul to Pusan. The development of this kind and level of military strength reflects North Korea's post-war assessment that the most significant factor in its defeat had been its failure to move rapidly past Seoul and on to Pusan at the beginning of the Korean War. In the early 1980s, North Korea further modified its force structure, organizing much of its armor into mechanized/motorized corps that would specifically have the mission of quickly advancing past Seoul.

In the 1980s and 1990s, North Korea did little to modernize its armor forces,² and did not even fully mechanize its heavy corps. Many military analysts considered the resulting outdated North Korean forces as being no match for CFC, especially as the United States and then the ROK modernized their heavy ground forces and combat aircraft. It was less widely recognized that North Korea had changed its force improvement priorities, seeking to resolve its primary remaining combat difficulty, rapid penetration in the forward area. Instead of building armored personnel carriers (APCs) to fill out its "mechanized" corps, North Korea built self-propelled artillery that could potentially give it the firepower to penetrate the CFC forward defenses. Moreover, lacking the finances to modernize its air forces, North Korea built large numbers of long-range artillery to carry out its deeper battlefield interdiction efforts and Scud missiles to support strikes in the theater rear.

In the late 1980s and 1990s, the power of the ROK economy began to make significant differences on the battlefield. The ROK was able to field new tanks superior to anything in the North Korean inventory and large numbers of armored personnel carriers (APCs) to give its forces greater mobility and protection. The relatively static ROK defense of the 1980s and earlier decades was modernized into a

force of mechanized and motorized units behind the forward divisions to give CFC the mobility and firepower to promptly counter any North Korean tactical breakthrough. ROK artillery was also selectively modernized and expanded, providing a self-propelled component to support such operations and to enhance survival. Advanced munitions were acquired to give both U.S. and ROK artillery a relative tube-for-tube advantage over the quantitatively superior North Korean artillery. Moreover, counterfire radars were acquired and put in place in the forward area to give CFC artillery a qualitative advantage in counterfire battles.

The U.S. development of fighter-delivered precision anti-armor weapons was the single most important enhancement of CFC capabilities. The U.S. and later ROK modernization of combat aircraft through the 1980s and 1990s suggested that CFC would most likely gain air superiority within a day or so in the theater, especially given North Korea's failure to modernize its combat aircraft. Thereafter CFC would be able to deliver precision munitions against the North Korean heavy forces at such a rate that even if North Korea rapidly achieved breakthroughs, the North Korean heavy forces could be destroyed within a week or so, well before they could reach Pusan.

The bottom line is that CFC has come to dominate the conventional forces challenge and response cycles with North Korea. While North Korea has made some significant advances in developing its conventional forces, CFC advances have more than offset the North Korean advances in almost all areas, as suggested in TABLE 1. This assessment becomes even more striking in light of the declines in North Korean training and readiness, which conceivably reduce North Korean capabilities a further 25 to 50 percent relative to CFC forces. Moreover, CFC's continuing military developments give it the initiative in Korea, and will further reduce North Korea's relative conventional military capabilities in the coming years.

Developing the North Korean Facilitating Force

The patterns that lay behind the erosion of North Korea's ability to conquer the ROK were clearly visible in the early 1980s. The United States was experimenting with precision munitions and weapon

systems that would eventually decimate the ground forces in which North Korea had so heavily invested. Moreover, the United States was developing advanced aircraft that would be able to rapidly sweep North Korean air forces from the sky. And North Korean naval forces, which had always been more coastal and limited in capability, could not stand against evolving U.S. naval forces.

TABLE 1: Key Aspects of a Conventional North Korean Attack

<i>Battle Component</i>	<i>North Korean Initiative</i>	<i>CFC Response</i>
Penetrating forward defenses	Field a large artillery force; SOF directed	More artillery, counterfire radars, better munitions
Exploitation in depth	Heavy corps	Precision anti-armor, especially fighter- and helicopter-delivered
Rear-area battle	Large SOF forces, delivery by submarine, ships, AN-2s; Scuds	Rear area security, naval interdiction, air intercept, attack ops/Patriots

There is apparently no public record available of the North Korean decisionmaking in this period, and thus we must surmise the events from the predicament North Korea faced and from the eventual changes in their force acquisition and posturing. In the early 1980s, North Korea could focus its limited military modernization resources in only one of two possible directions: (1) enhancing its conventional forces (though not enough for full modernization), or (2) developing nuclear, biological, and chemical (NBC) weapons and related delivery systems to attack CFC vulnerabilities and thereby overcome CFC strengths. Without adequate resources for full modernization of its conventional capabilities, North Korea could not realistically have offset the developing CFC capabilities. In fact, this would have been a guaranteed path to the erosion of North Korean capabilities, even though in absolute capability terms North Korea's conventional forces

would have looked relatively stronger than they do today had it chosen conventional modernization. North Korea had examined ballistic missiles, chemical and biological weapons, and other advanced systems well before that time. But in the early 1980s, it apparently decided to focus modernization on NBC weapons and related delivery systems as likely the only available option to arrest overall capability erosion, giving North Korea potential means to attack CFC vulnerabilities and thereby overcome CFC strengths.

North Korean strategy apparently evolved to include three elements. First, the North Korean CBW and delivery systems were developed as a *facilitating force* that could potentially blow holes in the CFC ground forces and suppress the CFC air and naval forces. This facilitating force would be an equalizer, to overcome the anticipated erosion of North Korean conventional force capability to conquer the ROK. Second, North Korea would still need its infantry, artillery, and armor forces to capture the ROK; but these would only be able to survive and operate effectively if the facilitating force overcame the CFC strengths. Third, North Korean nuclear weapons and perhaps some biological weapons (BW) are likely held as a reserve to guarantee North Korean regime survival against either aggressive CFC air operations or as a counter to a CFC counteroffensive (which would seek to capture North Korea and depose the regime).

Absolute Military Capabilities

Many experts look at the North Korean T-34 and T-54 tanks, their MiG-19 aircraft, and their Romeo-class submarines, and conclude that North Korean military forces are hopelessly outdated. The advanced age of this military equipment is significant, in that it suggests both difficulty in operations and maintenance as well as the vulnerability of that equipment to advanced adversary equipment (the latter does not count in absolute capability but is a part of relative capability, discussed below). Other factors such as the quality of the weapons and personnel, organization, and training also matter.

Absolute military capabilities are generally measured in three components: (1) the offensive/ defensive capabilities of the weapon systems fielded, (2) the ability to sustain the weapon systems fielded,

and (3) the organization and readiness of the military personnel to employ the weapon systems. These evaluations must be performed across the multiple dimensions of military capability, addressing the degree of change (and possible erosion) in each. Strategies and concepts of operation do not matter in these essentially static assessments because the comparative capabilities of CFC forces are not considered. (They matter in measuring relative military capabilities, as discussed below.) Indeed, lacking a basis for comparison across the various dimensions of military capabilities makes it somewhat difficult to come to an aggregate assessment of absolute military capabilities.

Overall Force Issues

As CFC thinks about either offensive/defensive capabilities or sustainment, it is important to note that the United States has historically maintained a system of totally replacing aging weapon systems. Most other countries, including North Korea and the ROK, can usually afford to only partially modernize their forces, creating a significant diversity in most classes of equipment. Thus, while the United States has replaced its previous generations of tanks with all M-1 tanks, North Korea still maintains T-62s, T-54s, and even some T-34s in its force; the ROK maintains M-47 and M-48 tanks along with their modernized K-1 tank. North Korea uses new-weapon production to provide equipment to its first-priority units, meanwhile passing the older equipment down to units which previously lacked equipment, had even older equipment, or had had to use some form of substitute for the most appropriate kind of equipment (e.g., using a self-propelled recoilless rifle rather than a tank in reserve "armor" units). While these lower-priority units are thus vulnerable to U.S. forces, they are not as vulnerable to the forces of U.S. allies, and generally not as vulnerable as they would be without this old equipment. It appears that North Korea has eventually discarded extremely old and unusable equipment (like most of its old T-34 tanks). However, the failure to provide even a modest flow of new equipment in many areas raises questions about the ability of North Korea to maintain its force structure without consistently delaying the retirement of old equipment that will increasingly become an operational and maintenance problem.

Weapon system age affects sustainability but also eventually affects personnel readiness by increasing the maintenance burden. As any mechanical device ages, it experiences more failures, and those maintaining it suffer greater difficulties in finding the parts and other equipment for maintenance. Recent news reports have noted similar problems in U.S. forces - for example: "Marines are cannibalizing parts from the Vietnam-era CH-46 helicopter to keep other choppers flying, while mechanics work 14-hour days to maintain aging, saltwater-damaged vehicles."³ The age of most North Korean equipment will preclude the availability of new spare parts, requiring the North Koreans to "cannibalize" some armor and aircraft to have the parts to maintain others.⁴ Thus, whatever the number of older North Korean weapons, some smaller amount will in reality be available at any given time for combat (the remainder being used for spare parts).

In addition, the readiness of most North Korean forces appears to have declined in recent years. North Korea's economic difficulties have reduced the amount of training North Korea can afford, and North Korean troops seem to be increasingly diverted to supporting the economy rather than focusing on preparation for warfare. North Korean troops have also suffered at least some reduction in food over the last decade, weakening them physically. The aging of North Korean equipment has apparently led North Korean authorities to reduce training with their equipment to avoid wear and damage to that equipment. Still, the anticipated fervor of North Korean troops may offset training and other readiness limitations to some extent, though their spirit has likely not grown significantly over the last decade.

Assessing North Korean Forces

TABLE 2 shows the change in absolute capabilities of the North Korean ground forces over the past decade or so, dividing ground forces into four key components: armor, infantry, artillery, and special operations forces (SOF).

Armor. The general perception of North Korean ground force capability erosion results primarily from evaluations of the North Korean armor forces. Still, even these forces have experienced some modest qualitative improvements, primarily enhancements to existing

armor vehicles rather than replacement by newer systems. But the age and related poor sustainability of North Korean armor appears to have clearly caused absolute North Korean capabilities to decline. With this decline and the North Korean economic difficulties, armor training has also decreased. These factors have led to an overall reduction in North Korean armor capabilities.

Infantry. North Korean infantry has changed less, having gained the introduction of a few new weapons (such as improved air defense missiles like SA-16s), but food shortages and the loss of some training has left the absolute capabilities of North Korean infantry with little change.

TABLE 2: North Korean Ground Force Absolute Capabilities
1988 to 1998

Issue	Armor	Infantry	Artillery	SOF
Weapon systems				
Quality, no CBW	+	+	++	+
Quality, CBW	+	+	+++	
Age	--	0	+	+
Quantity	0	0	+	0
Sustainability		0	0?	0
Personnel readiness				
People quality	0	-	0	-
Organization	0	0	+	0
Training	-	-	-	0
Overall capability, no CBW	-	0	+	+
Overall capability, CBW	-	0	++	++

Code: "+" is better in 1998, "-" is worse, "0" is about the same, multiple "+" or "-" indicate much better or much worse.

Artillery and SOF. Interestingly, North Korea has done a fair

amount to increase the quality of its artillery and SOF, and also to increase the quantity of its artillery over the last decade. In particular, the North Korean fielding of long-range artillery that ranges 60 to 70 kilometers is of concern because this artillery allows North Korea to attack targets throughout the depth of the forward defense and in Seoul. North Korean SOF have received new air defense weapons (e.g., the SA-16) and other advanced small arms that add to their power. North Korea has significantly enhanced the power of its artillery and SOF by fielding CBW for their use, and North Korea may have also fielded fuel air explosives (FAE), very powerful conventional munitions.⁵ The North Korean artillery capabilities are fundamentally a function of sustainability, especially needing adequate munitions. While it appears that North Korea has produced a considerable quantity of artillery munitions and stored these in underground facilities (UGFs) with its artillery, storage in UGFs tends to degrade munitions relatively quickly, raising questions about the true sustainment of North Korean artillery.

Nevertheless, while most experts view North Korean ground force capabilities as having significantly eroded, in absolute terms this is only clearly true of the North Korean armor. North Korean artillery and SOF appear to have received enhanced capabilities over the last decade and very much advanced capabilities if CBW is included in the evaluation.

TABLE 3 evaluates the changes in North Korean absolute military capabilities over the past decade for forces other than ground forces.

Aircraft. North Korea has fielded few new aircraft in the last decade, though the few advanced aircraft it has obtained (like Russian Fulcrums) could add significantly to its overall air force capabilities. Meanwhile, the age of most of the North Korean Air Force is getting to be a serious problem. Many North Korean aircraft have apparently decayed to the point of being less than reliable; they may break down in a short period of time if pressed to a high operational tempo in war. The training of North Korean Air Force is also a serious problem: Fuel limitations and aircraft age have apparently limited average pilot flying hours to thirty hours per year, only about 15 percent of U.S. pilot flying time.⁶

TABLE 3: Other North Korean Force Absolute Capabilities
1988 to 1998

<i>Issue</i>	<i>Air Forces</i>	<i>Surface Ships</i>	<i>Submarines</i>	<i>Ballistic Missiles</i>
Weapon systems				
Quality, no CBW	. +	+	+	+
Quality, CBW	++	+	++	+++
Age	--	-	-	0
Quantity	-	0	+	+++
Sustainability	--		-	0
Personnel readiness				
People quality	0	0	0	0
Organization	0	0	0	0
Training	-	-	-	0
Overall capability, no CBW	--	-	0	+
Overall capability, CBW	0	-	+	+++

Code: "+" is better in 1998, "-" is worse, "0" is about the same, multiple "+" or "-" indicate much better or much worse.

On the other hand, the North Korean Air Force can also deliver CBW; in particular, the AN-2 aircraft that North Korea plans to use to insert North Korean SOF could also use agricultural sprayers to contaminate targets like airfields and ports with CW. Overall, North Korean Air Force capabilities have eroded significantly unless CBW delivery is considered; CBW use may allow the North Korean Air Force to retain the destructive capabilities of a decade ago.

Surface ships and submarines. The North Korean Navy has added several kinds of ships over the last decade, though most of the navy has not changed over that period. New North Korean hydrofoils and mini-submarines give North Korea enhanced capabilities to insert special forces. However, the aging of the rest of the North Korean

Navy leaves it with minor overall improvement at most over the last decade. Because few ships in the North Korean Navy would deliver CBW directly, CBW would not affect the North Korean naval capabilities much.

Ballistic missiles. The North Korean Scud missiles were initially available somewhat more than a decade ago, but only in limited numbers. North Korea now appears to have enough Scud missiles to cause CFC minor problems if conventional munitions are used, or major problems if CBW are used. In addition, the North Korean NoDong and TaepoDong missiles have further enhanced North Korean capabilities, allowing North Korea to strike targets throughout **Japan**, a major enhancement in absolute North Korean capabilities. **Some** would argue that the relative inaccuracy of these longer-range missiles would reduce their impact on **Japan**. Because of this inaccuracy, North Korea may target these missiles primarily for coercion on **Japanese** urban areas, against which areas CBW warheads should yield sufficient casualties to cause a significant impact. Moreover, if North Korea fields submunitions for its ballistic missiles, the impact of even the high-explosive warheads would be enhanced.⁷

In conclusion, then, North Korean absolute military capabilities have eroded in some areas and grown in others over the last decade.⁸ When CBW are included in North Korean capabilities, it would appear in the aggregate that North Korean absolute capabilities are stronger today than a decade ago.

Relative Military Capabilities

Relative military capabilities are generally-measured in three components: (1) the relative offensive/defensive capabilities of the weapon systems fielded, (2) the offensive strategy and operational concepts developed by the attacker and how well they will likely work against the defensive strategy and operational concepts of the defender, and (3) the relative ability of the attacker to execute its operational concepts. These evaluations must be performed across the multiple dimensions of military capability. But in contrast to absolute military capability, which measures the raw strength of the force elements, these assessments reflect the ability of each force element to achieve

the outcomes needed for North Korea to accomplish its objective of conquering the ROK. Strategies and concepts of operation do matter. The aggregate assessment of relative military capabilities is the likelihood that North Korea could achieve its objective.

Even given that North Korean absolute military capabilities have actually grown over the last decade, most military analysts believe that CFC military capabilities have grown far faster. Thus, most would argue that North Korean relative military capability has eroded seriously over the last decade, leaving North Korea unable to achieve the conquest of the ROK. Considering only conventional force comparisons, it does seem clear that North Korean relative military capabilities have eroded seriously. But the change in relative capabilities is less clear when the North Korean CBW and related delivery systems are added to the evaluation, because they could significantly offset the qualitative advances that CFC has made with conventional forces over the last several decades.

This section first examines overall force issues in making a relative military capabilities assessment. It next assesses the relative capability of North Korean forces if they are limited to conventional force operations and suggests the degree to which North Korean relative conventional capabilities have eroded. It then analyzes the North Korean force capabilities including CBW and shows that, when CBW are added, North Korean relative capabilities do not appear to have eroded.

Overall Force Issues

Countries with outdated military equipment can still win military conflicts if their opponent's equipment and other capabilities are inferior or in other ways vulnerable. For example, in World War II, it was not the relative age, quantity, or quality of military equipment that proved to be the deciding factor early in the conflict. Rather, the German maneuver through the Ardennes, given the French and British vulnerability in that sector, was the primary determinant of the battle for France. In a sense, French and British capabilities had eroded because of the character of their threat assessment and operational concepts, and not because of the character of their equipment.

Thus, when evaluating whether relative North Korean capabilities have eroded, the key questions involve how a future war might be fought and how North Korean equipment and concepts of operation would likely impact campaign outcomes. As argued above, North Korean strategy is not symmetric with CFC strategy. Therefore, an assessment cannot focus simply on comparisons of North Korean tanks to CFC tanks, as was common in the cold war.⁹ Rather, because the United States and its allies typically enjoy substantial conventional superiority, analysts must be prepared to assess the asymmetric strategies that could be used by North Korea to attack CFC vulnerabilities, seeking to undermine CFC strengths. For example, it is not the outcome of a simple tank-on-tank battle, or even the ability of CFC aircraft to interdict North Korean tanks, that may be the key determinant of whether North Korean relative capabilities have eroded. Instead, North Korean capabilities may still be robust if they can significantly attrite CFC ground forces and suppress CFC air forces using CBW.

But North Korea needs more than Scud missiles or SOF teams to achieve a successful combat outcome. If North Korean tanks are so old that they cannot be maintained or sustained in combat, the North Korean forces will ultimately be defeated on the battlefield even if North Korea fields relatively robust CBW and other capabilities. Moreover, to the extent that a North Korean attack on the ROK comes as a desperation move by the North Korean regime to avert regime failure, the North Korean military leadership may not be cohesive in carrying out the attack. Consequently, the attack could either become very ragged in execution, or quite possibly the precipitating event for a military coup or civil war in North Korea.

Assessing North Korean Forces in a Conventional Scenario

Throughout the early and mid-1990s, most experts in the United States and the ROK still felt that North Korea posed a primarily conventional force threat to CFC. It was anticipated that, at some point, North Korea could begin a massive mobilization, and when its forces were ready, launch an artillery-supported infantry assault against the CFC defenses. That assault would seek to create holes in the several

CFC defensive lines (layers) in front of Seoul. Once an operational-level breakthrough developed, North Korea would commit its heavy forces to exploit the breakthrough and move rapidly to Pusan.

In response, CFC would see the North Korean mobilization and quickly begin its own mobilization. Once North Korea attacked, CFC's artillery would seek to suppress North Korean artillery and infantry operations, while CFC infantry would absorb the attacks through multiple lines of defense. CFC armor brigades would be prepared to cut off and deal with any early penetration. As CFC shaped the battlefield, it would seek an opportunity for a counterattack that would cut off and surround the main North Korean attackers, leading to their early defeat.¹⁰ CFC would then build up its forces to perform a counteroffensive that would push the North Korean forces back through North Korea.

No one can be quite certain of the outcome of such a conflict. Not only are combat operations highly uncertain, but there is also much that is unknown or imperfectly known about North Korean plans and capabilities. Many organizations have sought to evaluate a North Korean invasion of the ROK using a single, best-estimate assessment with computer models largely developed to reflect combat on the European Central Front during the cold war. It is impossible to tell whether the results of such evaluations reflect relatively likely outcomes or extreme cases outside the uncertainty bounds, though the latter is more likely because the models used do not reflect the unique character of conflict in Korea.¹¹

Instead, this author has performed extensive sensitivity analyses of potential conventional Korean conflicts in order to determine the patterns of outcomes that could occur across the range of uncertainties.¹² Several basic patterns do emerge from such analyses along with related assessments of the North Korean force trends, assuming North Korea uses only conventional forces:

- North Korean forces can penetrate some defensive lines in main attack sectors, but are unlikely to reach the Han River that flows through Seoul. Over the last decade, the North Korean performance with a conventional attack has apparently declined

somewhat, reflecting an erosion in North Korean conventional military capability. But the decline in performance is not as great as some might expect, for while North Korean aircraft and armor have been aging and losing potency, it has produced an artillery force with significant potential.

- North Korean armor reflects old designs against which CFC forces have developed very capable counters. Tanks such as the T-54 or T-62 can be handled easily by any combination of CFC armor systems, CFC anti-armor systems, and CFC interdiction capability. Indeed, the most modernized aspect of the North Korean armor force is the T-72 tank, the same kind of tank fielded by Iraq and decimated by U.S. forces in the Persian Gulf war eight years ago.

- The artillery battle is key to the conflict outcome. CFC needs to gain the advantage in the artillery duels quickly, and it should be able to do so by focusing ground force counterbattery assets and air sorties against the North Korean artillery. CFC counterfire capabilities have grown significantly over the last decade. Counterfire would require some time to stop the North Korean artillery. During that time, the North Korean artillery could cause considerable damage both to CFC forces and to the civilian infrastructure and population in and around Seoul. Over the last decade or so, the growth in the quantity and quality of North Korean artillery systems has competed with the growth in CFC counterfire capabilities. It is likely that artillery is less susceptible to training and logistics limitations than other parts of the North Korean ground forces, assuming that the ammunition for the North Korean artillery is stored in their forward underground facilities.

- Even if North Korea were able to penetrate the defenses in front of Seoul (which is quite unlikely), CFC air forces should be able to decimate the North Korean heavy forces before they reached Pusan (probably before they reached Taejon). North Korea's relative conventional capabilities have declined in this

area during the last decade, as North Korean armor has aged and CFC has fielded extremely potent weapons to kill North Korean armor.

- Deployed U.S. ground forces, working with surviving ROK ground forces, could contain and defeat the residual North Korean attackers.
- North Korea would have to reduce CFC sorties by 50 percent or more to make it possible for their heavy forces to reach Pusan.¹³ This magnitude of sortie reduction is almost impossible if North Korea uses only conventional means against CFC air forces. North Korean air force capabilities have eroded: The North Korean air forces are truly antiquated and its pilots poorly trained; North Korea will likely lose dozens of aircraft for every CFC aircraft it downs air-to-air. Because of its vulnerability in the air, the North Korean Air Force cannot be expected to do many offensive missions against CFC forces. CFC aircraft are still vulnerable on their airfields to attacks by North Korean special forces. The equipment of the North Korean special forces appears to have enhanced rather than eroded special forces capabilities over the last decade (adding weapons like SA-16s and systems like GPS); CFC counter-SOF capabilities appear to have grown only slightly over this period.
- The North Korean surface navy has eroded to the point where it can be swept from the seas relatively promptly. North Korean major submarines (e.g., Romeos) are also antiquated, though many of its midget submarines appear able to penetrate ROK coastal waters without being detected. Still, their contribution to overall campaign outcomes in a conventional conflict can be expected to be small.
- Weapon systems like the Scud, NoDong, and TaepoDong missiles have been fielded over the last decade but would make little difference to relative military capabilities if used with conventional, unitary warheads because of the small damage area of such warheads coupled with their great inaccuracy.

However, if used with conventional submunitions, these missiles could cause a fair amount of damage to personnel targets and unsheltered aircraft at ROK airfields, especially if the North Korean missiles were made relatively accurate. (There is some debate on Scud accuracy.) In any case, the fielding of these missiles reflects an expansion and not an erosion of North Korean capabilities.

TABLE 4 provides a rough evaluation of the changes in North Korean relative ground force capabilities over the past decade in a conventional scenario. As mentioned above, this table reflects the ability of each ground force element to achieve the outcomes it must for North Korea to accomplish its objective of conquering the ROK.¹⁴ This evaluation suggests that, in a relative sense, North Korean armor capability has greatly eroded over the last decade, with North Korean infantry capabilities eroding somewhat less. North Korean artillery capabilities appear to have actually increased in a relative sense over the last decade, while SOF capabilities have remained about the same.

TABLE 5 evaluates the changes in North Korean relative military capabilities over the past decade in a conventional conflict, for forces other than ground forces. Relative air force, most surface naval capabilities, and general-purpose submarine capabilities have fallen significantly, reflecting in particular the dramatic reduction in relative force quality and sustainability. For example, North Korean combat aircraft are largely MiG-21 Fishbeds and older designs which can be rapidly destroyed in the air by CFC air forces, many of which are now several generations more advanced. But the North Korean agent naval infiltration capabilities have increased in terms of surface hovercraft, mini-submarines, and agent infiltration craft.

North Korean ballistic missiles have achieved significant advances in relative capability. Ironically, the North Korean Scud missiles reflect a design from the 1950s and 1960s, yet CFC has not yet fielded a defensive capability adequate to fully defeat the Scuds. While CFC does deploy Patriot missiles capable of intercepting Scuds, it has only enough Patriots to cover a few targets in the ROK,¹⁵ and even at the defended targets at least some Scuds can be expected to leak

through the Patriots' attempted intercepts. The United States is

TABLE 4: North Korean Ground Force Relative Capabilities without CBW, 1988 to 1998

Issue	Armor	Infantry	Artillery	SOF
Weapon systems				
Quality	--	-	+	+
Quantity	-	0	+	0
Operational concepts	-	0	0	0
Execution				
Training	-	.	.	.
C4I	-	.	.	.
Sustainment	-	0	?	0
Overall capability	--	-	+	0

Code: + is better in 1998, "-" is worse, "0" is about the same, multiple "+" or "-" indicate much better or much worse.

working on more advanced Patriot missiles and on the THAAD and other forms of defense against ballistic missiles, but it will be several years before more capable defenses will be fielded. Meanwhile, the North Korean NoDong and most recently the TaepoDong missiles significantly enhance North Korean missile capabilities, allowing North Korea to extend coercion to all of Japan and perhaps as far away as Guam and Alaska. Moreover, these newer missiles pose a more demanding reentry challenge that could defeat even the more advanced PAC-3 missiles the United States has yet to field. Still, the apparent inaccuracy of these longer-range missiles limits their potential operational impact when used with high explosives, making it more likely that they would be used primarily for strategic coercion (e.g., against large area targets like cities).

TABLE 5: Other North Korean Force Relative Capabilities without CBW, 1988 to 1998

<i>Issue</i>	<i>Air Forces</i>	<i>Most Naval Agent Infiltration</i>	<i>Ballistic</i>	<i>Missiles</i>
Weapon systems				
Quality	--		0	+
Quantity	0	0	++	++
Operational concepts		-	-	0
	++			
Execution				
Training			+	0
C4I			0	
Sustainment	--	--	0	0
Overall capability	--	--	+	++

Code: "+" is better in 1998, "-" is worse, "0" is about the same, multiple "+" or "-" indicate much better or much worse.

Assessing North Korean Forces in a CBW Scenario

North Korean CBW capabilities could have a synergistic effect with the other North Korean military capabilities in an invasion of the ROK. Most of the major North Korean deficits identified for a conventional attack would be redressed at least in part by effective CBW use.¹⁶ The resulting synergisms make comparisons like those in tables 4 and 5 difficult to draw for CBW scenarios. The following analyses present each of the likely North Korean operational objectives first, and then the likely CFC counter in the second paragraph following each bullet. The first paragraphs after each bullet are intended to offer a chain of North Korean logic, without regard to the CFC counters posed in the second paragraphs. Note the gulf between the characterizations of such a conflict, the North Korean logic arguing

that this kind of war would be a vast departure from Korean conflict as traditionally conceived by CFC, and the CFC logic suggesting that CBW and other asymmetric threats would not make a significant difference from the traditional concepts (in part because of enhanced CFC capabilities):

- Even though North Korea would likely attack the ROK as an act of desperation by the regime in power, the regime would maintain total control over its military forces. Its forces know their missions and would execute them without reservation. Because a North Korean attack would likely be an act of desperation, some senior North Korean officers might refuse to execute attack orders, or might execute them reluctantly and without strong effort. Any loss of cohesion in the North Korean attack would start to unravel the chances for success because so many elements of the attack have to work properly and together for North Korea to succeed. The officers might also look for signs of defeat and be prepared to turn on the regime as soon as such signs appeared. The actions of senior officers could even lead to a civil war in North Korea, with the North Korean emphasis shifting from an attack on the ROK to resolving internal conflict.¹⁷

- North Korean artillery would likely start any invasion by attempting to destroy ROK ground forces in the forward area using chemical weapons (CW).¹⁸ North Korean artillery would likely use CW according to the same concepts developed by the Germans in World War I. This strategy would involve using nonpersistent CW like Sarin in sectors where its troops would plan to advance, because the nonpersistent chemicals disperse within an hour or so, while simultaneously using persistent CW like mustard gas in sectors where it does not plan to advance in order to impair the mobility of those defending troops. The impact of these attacks, especially with nonpersistent CW, would be far greater if North Korea achieved surprise and was able to hit ROK ground forces before they could put on individual protective equipment (IPE) like masks and suits. CFC artillery would also be a major North Korean artillery target, hoping to suppress CFC firepower in the forward area using CW. North Korean special forces would likely assist in suppressing key targets (like CFC

artillery), providing both fire direction to the North Korean artillery and a second layer of attack should the North Korean artillery fail to suppress assigned targets.¹⁹

CFC must prevent North Korea from achieving surprise in such an attack using excellent intelligence collection and interpretation. Without surprise, the impact of CW attacks on ground forces would be greatly reduced. CFC also needs to deploy sufficient IPE to protect all of its forces, and train its forces to use this equipment promptly and effectively on warning. CFC must focus its efforts on the counterfire battle to destroy North Korean artillery. CFC has initiatives ongoing in all of these areas.

- North Korean forces would not need to mass after a surprise CW barrage the way they would need to mass against the ROK positions in a conventional attack. Rather, North Korean forces using armed reconnaissance techniques would seek for parts of the defense that had been thoroughly suppressed by the CW barrage, and then penetrate through those sectors to move rapidly to the south and to roll up the defenses laterally. The reduced requirement for massing would also protect North Korean troops from CFC air attacks and artillery barrages.

If the North Korean artillery barrage was not successful in suppressing and attriting the CFC ground forces, then North Korean infantry would have to mass and would face substantial attrition from CFC infantry, artillery, and air power.

- If the artillery barrage is sufficiently effective, the North Korean infantry would seek to rapidly establish penetration corridors down to and across the Han River. The North Korean armor would exploit these corridors, rapidly crossing the Han and moving towards Pusan. At least one military defector has argued that North Korea would seek to cross the Han River in about a day or so, and to reach Pusan in a week.²⁰ This seems overly optimistic, but even a crossing of the Han River in a few days could only be accomplished if North Korean infantry and armor forces faced minimal opposition, and were able to suppress much of that using CW fired by the North Korean self-propelled artillery that would accompany the forces moving south. CFC defenses need to prevent the development of such penetration

corridors.

- North Korea would attack CFC airfields with Scud-delivered CW and conventional munitions, SOF carrying BW and conventional munitions,²¹ and Cruise missiles and aircraft (especially AN-2s) carrying CW to contaminate CFC airfields, thereby disrupting operations and causing substantial casualties. North Korea would likely seek to suppress 80 percent or more of CFC sorties from ROK airfields, hoping to eliminate major threats to its ground forces. North Korea would then actively use its air force against targets like Seoul to draw the residual CFC sorties into air-to-air engagements rather than allowing them to oppose the North Korean ground forces.

Scud-delivered CW may not contaminate airfields as much as would be necessary for success because of the inaccuracy of the Scuds and other factors. Moreover, CFC initiatives to mitigate such contamination are ongoing. CFC is fielding detectors that would give warning of North Korean BW attacks, and is vaccinating U.S. personnel against North Korean use of anthrax. North Korean Cruise missiles and aircraft should be detected and shot down before they could deliver CW to airfields.

- North Korea's longer-range missiles would be used to coerce Japan, in an effort to convince the Japanese government not to allow U.S. operations from Japanese soil. North Korea might even demonstrate its ballistic missile capabilities by striking Kadena air base in Okinawa with CW, seeking to deny CFC the C4I aircraft critical to CFC advantages in the air. North Korean SOF and agents would also operate actively against U.S. air forces flying from Kadena and likely other airfields in Japan, and some SOF and agents would attempt to interdict air operations from Guam.

North Korean missiles fired at Japan (including Okinawa) or Guam would be so inaccurate as to have very little operational impact. U.S. and Japanese forces need to be prepared to defend U.S. facilities in Japan from North Korean SOF and agent attacks. Such North Korean attacks could push Japan into open support of CFC, giving the United States good access to needed resources in Japan.²²

- Facing minimal opposition, the North Korean armor would be able to move south without much worry about its vulnerability. North Korean infantry units would sweep back the CFC ground force anti-armor capabilities, and the reduced CFC air sorties would make attrition manageable. Largely unopposed, North Korean armor should also experience manageable combat and maintenance attrition. These forces should be able to reach Pusan in a couple of weeks.

North Korean armor will not face minimal opposition, and will suffer significant combat and maintenance attrition.

- Because armor attrition would be manageable and CFC opposition would be light, North Korea would require minimal munition and part supply flows. Its major sustainment requirements would be fuel, oil, and food, which could be captured in the ROK.

North Korea would require both munition and part supply flows to sustain its operations, increasing its supply requirements beyond what it could reliably deliver.

- North Korean SOF would carry out some precursor BW attacks, especially against CFC command and control. These attacks would disrupt CFC operations and perhaps impair them. CFC would take time to reconstitute command and control, and the replacement personnel would be less familiar with their new responsibilities and have less experience working together, possibly leading to disagreements between ROK and U.S. personnel. CFC vaccination and other passive defense efforts should help prevent such BW attacks from being successful.

- ROK naval forces would be struck in port by Scud- and SOF-carried CBW, causing significant attrition. North Korean naval forces would then seek to rapidly overwhelm the ROK naval survivors before U.S. naval forces could be deployed. This would be easiest to do when the U.S. carrier normally located in Japan is deployed out of the region, as happened when the U.S.S. *Independence* was sent to the Persian Gulf in early 1998.

CFC should be able to avoid being surprised by the North

Korean attack. If so, ROK naval forces would be at sea and not subject to Scud attack. ROK naval forces unattrited by CW should be more than sufficient to deal with most threats posed by the North Korean navy.

- CBW attacks on CFC airfields and ports would substantially diminish the flow of U.S. forces onto the peninsula.

Substantial protection is being put in place at key CFC ports and airfields to prevent disruptions.

- The number of Americans killed or seriously injured would be large. The United States has shown a propensity in military engagements to be unwilling to sustain large numbers of casualties. Ideally, the magnitude of casualties would be sufficient to break American will and cause the United States to disengage. As a fallback, the North Korean forces would rapidly capture the peninsula and force the United States to execute a reentry in order to defeat the North Koreans. North Korean forces would position artillery and other weapons near possible beaches and other entry areas, prepared to cause substantial CW and perhaps BW casualties to the U.S. forces who might attempt to reenter Korea, and thereby deter U.S. action.

Alert and prepared U.S. forces will not suffer nearly as many casualties, and an effective noncombatant evacuation operation (NEO) will protect U.S. civilians. CFC forces would successfully defend the peninsula such that a U.S. reentry would not be required.

In all of these North Korean operations and CFC counters, there is a fair degree of uncertainty, because it is difficult to know how effective the North Korean threats will be, whether the CFC defenses will be adequately prepared, and what war outcomes will be. The reality likely lies somewhere in between the two perspectives, potentially causing the war to be quite different from what either side expects. North Korea depends on succeeding in almost all of its operational objectives; failure in even a single area could prevent North Korean conquest of the ROK. But from a CFC perspective, preventing North Korea from reaching Pusan is not a clear victory, especially if the North Korean forces penetrate beyond Seoul and leave massive

destruction in their wake. CFC must do everything it can to enhance its capabilities in each area mentioned above that is needed to counter the North Korean threats, seeking to defeat the North Korean attack as rapidly and as far forward as possible.

Thus, the overall relative capability assessment is that, while CFC can likely prevent North Korea from reaching its objective of capturing the peninsula, CFC faces many risks. There is little question that the ROK today faces a greater risk of damage and defeat from a North Korean CBW threat than it did from the essentially conventional North Korean threat of a decade ago. Consequently, if North Korea is determined to use CBW, its overall relative military capabilities actually have increased rather than eroded.

North Korean Ability to Cause Damage

Even a CFC defeat of a North Korean attack would not prevent a substantial level of damage to CFC forces and civilians in Korea. Analysis of possible military operations in Korea suggests that CBW use would at least increase CFC casualties, and might increase them substantially (to perhaps double or more). In his 1994 testimony to Congress, General Gary Luck, the U.S. commander in Korea at the time, said that casualties in a future conventional Korean war could equal the casualties of the first Korean war, with 36,000 U.S. and 400,000 ROK soldiers dead.²³ The development of North Korean long-range artillery and Scud missiles puts all ROK cities at risk to North Korean attack, likely increasing the civilian damage that would occur.

Consider the North Korean long-range 240 mm MRLs. With each rocket carrying about 8 kilograms of Sarin,²⁴ the launch of a 12-tube MRL would involve almost 100 kilograms of Sarin, and the launch of a 22-tube MRL would involve about 175 kilograms of Sarin. If North Korea has 100 such MRLs, all armed with CW within range of Seoul, a single launch could fire upwards of about 15 tons of Sarin against Seoul. A ton of Sarin can affect between about 0.13 and 13 square kilometers with an incapacitating dose of Sarin, though the range is narrowed to 3.8 to 13 square kilometers on a clear, calm night (optimal for CW use).²⁵ If such an optimal night were used, and the rockets were spread for maximum destruction, an incapacitating

dosage could cover between about 35 and 120 square kilometers in Seoul, even if only 60 percent of the rockets arrived. More likely, North Korea would focus on particular areas, reducing the area of damage by perhaps a factor of two to three. Because some people would be indoors or otherwise protected to some degree, the damage could be reduced by another factor of three to five. Thus, the effective area covered with an incapacitating dose might be 2 to 20 square kilometers. Since the population density of Seoul is roughly 23,000 people per square kilometer,²⁶ the casualties from even a single successful MRL launch could be at least in the tens of thousands.²⁷ North Korean Scuds fired at air bases and ports in or near Pusan, Taegu, Suwon, Kwangju, and other cities would cause further civilian casualties. In the end, casualties in a CBW conflict with North Korea could easily be many times what General Luck estimated.

Even more damage would be done to North Korea, with CFC apparently planning a counteroffensive that would capture and damage much of North Korea.²⁸ Execution of such a counteroffensive could trigger a North Korean regime survival response with nuclear weapons, causing large amounts of damage. North Korean military leaders responsible for NBC weapon use would clearly be war criminals because of the massive civilian damage they would cause, requiring prosecution and punishment.²⁹ CFC attack operations would destroy North Korean CBW production and storage facilities, likely spreading contamination in North Korea and causing further casualties. The subsequent effort to reunify a badly damaged country would be substantial, likely taking many years for the unified Korea to fully recover. Thus, while North Korean military capabilities have eroded in some areas, North Korea's ability to cause damage to the ROK has actually grown with its potential use of NBC weapons.

Conclusion: Have North Korean Military Capabilities Eroded?

United States and South Korean military commanders are completing a new war plan intended not only to repel a North Korean invasion if hostilities erupt but to invade North Korea to demolish its armed forces, capture the capital at Pyongyang, and destroy the North Korean regime.

This paper has examined three measures to determine whether or not North Korean military capabilities have eroded over the past decade. These bases and the author's judgment on erosion in each case are:

Absolute Military Capabilities. North Korea has not modernized its military equipment in many conventional force components. North Korea's aging equipment has undoubtedly gotten less sustainable as it has aged, and North Korean personnel have experienced less training with that equipment. Thus, in these areas, North Korean military capabilities have clearly eroded. But with CBW and related delivery systems, a considerable amount of modernization has occurred, giving North Korea some important capabilities that did not exist at all ten or fifteen years ago. Thus, the assessment of absolute North Korean military capabilities is a "mixed bag," with many categories eroding while CBW-related military capabilities have advanced.

Relative Military Capabilities. This is a more important measure of military capability because it includes a wider range of critical issues. North Korean relative conventional capabilities have substantially eroded because their absolute capabilities have been relatively stagnant while CFC conventional military capabilities have significantly advanced. But once the CBW-related capabilities are included, North Korea seems more capable of achieving conquest of the ROK than it was ten years ago. This suggests that relative North Korean military capabilities have at least been static if they have not increased, despite the substantial increases in overall CFC military capabilities. To the extent that North Korean CBW gives it advantages, the very character of such a war would be quite different from that traditionally expected.

Ability to Cause Damage. Using CBW, North Korean military forces are capable today of causing far more damage to the ROK

than they could have caused ten years ago. This assessment reflects the development of North Korean artillery and CBW able to damage Seoul and to attack CFC ground defenses, and North Korean Scuds and SOF able to attack targets with CBW in the CFC rear area.

Therefore, North Korean military capabilities, when viewed in total, have not been eroding but have rather been increasing as the result of a significant shift in the focus of North Korean efforts. While leaving much of its conventional military forces with eroded but still significant capabilities, North Korea has shifted its force structure to include a facilitating force of North Korean CBW and delivery systems. These pose risks that will trouble CFC for a number of years until enhancements in CFC defenses are complete.

Notes

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1. The North Korean and South Korean economies were of roughly comparable size in the early 1970s, but the South Korean economy grew well beyond the North Korean economy thereafter.

2. North Korea did acquire a small number of T-72 tanks from the Soviet Union and may have hoped that Russian force structure changes would eventually lead to the surplus of T-72s that North Korea would be able to acquire at bargain prices. This situation has not yet developed, though it should be carefully watched and action taken with Russia to preempt such a development.

3. Rowan Scarborough, "Marine, Army Generals Tell Senate Money Direly Needed," *Washington Times*, September 25, 1998, p. 4.

4. North Korea does have some production lines that produce spare parts for their old equipment, giving some equipment a degree of youth despite its years. Thus while most North Korean aircraft are very old, North Korea does produce new engines for those aircraft that give them some "youth."

more times as much energy in an explosion as does an equal weight of high explosives. FAE roughly doubles the range at which lower overpressures occur (compared to TNT). Against people, the principal FAE lethal mechanisms are suffocation (because the oxygen in the air is consumed by the explosion) and thermal radiation, which cause attrition beyond the overpressure lethal range and penetrate many hardened facilities against which blast would not have much effect.

6. International Institute of Strategic Studies, *The Military Balance 1997-1999* (London: Institute of Strategic Studies, 1997), p. 184 for North Korean training; pp. 21-23 for U.S. training. When a North Korean MiG-19 pilot defected with his aircraft on May 23, 1996, the pilot said that he had flown only nine hours in the previous year, and four hundred hours in the previous decade (thus low levels of training have been a problem for over a decade). See Jim Lea, "Defector. NK Gets Russian Spy Data," *Pacific Stars and Stripes*, June 26, 1996, p. 6; Willis Witter, "Pilot Says N. Korea Is Planning Attack," *Washington Times*, May 29, 1996, p. 11. Nevertheless, the pilot said that constant training on Chinese-made simulators had North Korean pilots convinced that they could outmaneuver ROK F-5 and F-4 aircraft, but not F-16s. See Lea, "Defector." Other information at the time noted that the MiG-19 tires were badly decayed and that in other ways the aircraft was in a state of poor maintenance.

7. This possibility is suggested in Defense Intelligence Agency, *The Foundations of Military Strength - Update 1995*, PC-1510-101-96, March 1996, p. 23. A figure on this page shows the potential damage to an airfield from Scud warheads that are unitary TNT, cluster bombs (submunitions), or chemical.

8. "U.S. Army General John Tilelli, commander of the US Forces-Korea, said Thursday that recent developments in the DPRK have raised concern about the DPRK's military capabilities. Tilelli stated . . . , 'From a military standpoint, there have been changes. Their conventional forces essentially stabilized at a stable level of readiness, lower than it was, while their missile technology, their asymmetric technologies have increased.' He said that despite severe economic problems, military forces in the DPRK have been given 'more than their fair share' of food and fuel resources and as a result their war-fighting preparedness has decreased only slightly." Quoted in *Northeast Asia Peace and Security Network Daily Report*, citing Bill Gertz, "U.S. Commander Voices 'Concern' over N. Korea," *Washington Times*, January 29, 1999, p. 4.

9. During the cold war, military analysis and policy were dominated by high-end, relatively symmetric threats (strategic nuclear and NATO Central Front). Most analysts were trained to think in symmetric terms, typically producing "balance assessments" comparing the numbers of tanks or nuclear warheads on each side. Such simplistic comparisons were intuitively attractive, and thus persisted throughout the cold war and even in analysis since then, despite early arguments that counterforce or maneuver capabilities could allow even a smaller force to defeat a larger force under the appropriate conditions. One of the earliest open arguments during the cold war against simple symmetric comparisons was Albert Wohlstetter, "The Delicate Balance of Terror," *Foreign Affairs*, January 1959.

10. ROK forces commonly refer to such a counterattack as a "counterblow."

11. Indeed, one can argue that unless computer models are designed specifically to

capture the Korean environment and force structures, the operational concepts the Korean forces would use in conflict, and the "rules of war" in a Korean environment, the outcomes of an assessment could misrepresent entirely the course of conflict in a future Korean war. This concern is consistent with the Defense Department's strong interest in validating its computer models, where it defines validation as "the process of determining the degree to which a model is an accurate representation of the real world from the perspective of the intended uses of the model." See Department of Defense, *DoD Modeling and Simulation (M&S) Management*, Directive No. 5000.59, January 4, 1994. While analysts may not know the "real world" of a future Korean conflict, it is incumbent on them to represent that real world as closely as possible.

12. The author's group at RAND has examined more than 50,000 cases of potential North Korean attacks, looking at a range of values for uncertain quantitative and qualitative factors.

13. Most of our analysis suggests that North Korea would have to reduce CFC sorties by 80 percent or more for their ground forces to reach Pusan.

14. For example, to conquer the ROK, the North Korean artillery needs to create holes in the CFC ground forces in the main advance sectors, while causing enough damage to CFC ground forces across the peninsula that they would lack coherence to counter the North Korean infantry assaults or armor exploitations.

15. Patriot batteries are deployed at Kunsan, Osan, and Suwon air bases, as reported in Rich Roesler, "Patriot Crews Target Incoming Missiles," *Pacific Stars and Stripes*, August 14, 1997, p. 4.

16. While the North Korean CBW reflect designs which are decades old (e.g., mustard or VX gases, or plague or anthrax), CFC so far lacks an adequate defense against them. This is not to say that CFC is without any form of defense - far from it. Rather, CFC's defense against North Korean CBW is but a partial defense, which in some cases will be very effective and in other cases not so effective. Because CBW weapons are far more powerful than conventional North Korean weapons, the partial CFC defense could still suffer losses.

17. The development of conflict within North Korea after North Korea attacked the ROK would be a challenge for CFC to recognize and exploit. However, given the likely circumstances of a North Korean attack, CFC needs to focus its intelligence on such a possibility and plan for both stimulating such a conflict (to slow or stop the North Korean attack) and dealing with it.

18. While North Korean artillery could use BW, North Korea would likely avoid such use so that shifts in the wind would not contaminate its own troops with BW. Because the health status of North Koreans is much poorer than the health status of ROK or U.S. people, the North Korean forces would more likely be affected by BW and suffer worse results from exposure.

19. Against such targets, North Korean SOF would have to use conventional munitions or CW, since BW would generally act too slowly to impair the CFC capabilities by the time required.

20. Witter, "Pilot Says N. Korea Is Planning Attack."

21. While North Korean SOF could use CW, they cannot carry sufficient CW to affect

more than a very small target area (less than a hectare, or one-hundredth of a square kilometer). Instead, North Korean SOF using BW could carry sufficient BW to contaminate several square kilometers. If this was done without warning, a North Korean SOF team could cause serious damage to the personnel at a port or airfield.

22. The Japanese reactions to the North Korean TaepoDong missile test in August 1998 should give the North Koreans fair warning of how sensitive the Japanese are about threats to Japan. North Korean missiles fired directly at Japan, even at Okinawa, can be expected to draw only more intense reactions from the Japanese.

23. Kirk Spitzer, "Isles Key in S. Korea Defense," *Honolulu Advertiser*, March 3, 1994, p. 1.

24. "Chemical Weapons: New Information Analyzed," *Jane's Defence Weekly*, February 27, 1998, p. 370.

25. Steve Fetter, "Ballistic Missiles and Weapons of Mass Destruction: What Is the Threat? What Should Be Done?" *International Security*, Summer 1991, p. 21.

26. The 1997 Seoul population was roughly 20.3 million, in 342 square miles (885 square kilometers), according to the 1997 *Information Please Almanac*, p. 132.

27. This number would be reduced if not all rockets contained CW, or if weather conditions were less than optimal for CW use.

28. "United States and South Korean military commanders are completing a new war plan intended not only to repel a North Korean invasion if hostilities erupt but to invade North Korea to demolish its armed forces, capture the capital at Pyongyang, and destroy the North Korean regime." Richard Halloran, "New Warplan Calls for Invasion of North Korea," posted on the Internet, November 14, 1998. This concept was in reality not so new, as suggested by a 1994 report: "South Korean state television said yesterday that Seoul and Washington have a plan to topple the North Korean government if the Stalinist state attacks the South. The Korean Broadcasting System said that rather than simply driving back the North's troops, the plan provides for a counteroffensive to seize Pyongyang and try to topple the government of Kim Il-sung." In "KBS Reports Plan to Topple Kim Il-Sung," *Washington Times*, March 25, 1994, p. 16. "The aim would be initially to contain North Korean forces north of Seoul, and then eventually launch a counterattack to defeat them there and overrun the rest of North Korea." Jim Mann, "Scenarios for a 2nd Korean War Grim for U.S., South," *Los Angeles Times*, February 22, 1994, p. 1.

29. At the discretion of CFC, this prosecution could involve much of the officer corps of North Korea, including both senior military leaders and officers at each level of command responsible for directing NBC weapon use.