



---

Stopping a North Korean Invasion: Why Defending South Korea is Easier Than the Pentagon Thinks

Author(s): Michael O'Hanlon

Source: *International Security*, Vol. 22, No. 4 (Spring, 1998), pp. 135-170

Published by: [The MIT Press](#)

Stable URL: <http://www.jstor.org/stable/2539242>

Accessed: 30/04/2013 17:23

---

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



The MIT Press is collaborating with JSTOR to digitize, preserve and extend access to *International Security*.

<http://www.jstor.org>

# Stopping a North Korean Invasion

Michael O'Hanlon

## Why Defending South Korea Is Easier than the Pentagon Thinks

Could another massive North Korean attack on South Korea intended to quickly reunify the peninsula under Pyongyang's rule really succeed? Although the capabilities of the Democratic People's Republic of Korea (DPRK) for such an attack are atrophying as its economy declines, the Defense Intelligence Agency still considers a Korean war scenario to be the primary near-term military concern of the United States.<sup>1</sup>

The Pentagon also appears to think that North Korea just might achieve an initial breakthrough, perhaps taking nearby Seoul and even much of the rest of the peninsula before ultimately being defeated by U.S. reinforcements and whatever could be salvaged at that point from the military of the Republic of Korea (ROK).<sup>2</sup> It considers conflict in Korea to be one of two chief prototypes of "major theater war" that, according to the Pentagon's 1993 Bottom-Up Review (BUR) and 1997 Quadrennial Defense Review (QDR), would probably unfold according to a standard script. Battle would begin with U.S. and allied forces executing a defensive action or "halt phase," during which they are nevertheless presumed to lose some land. Next, a major U.S. buildup would ensue, during which enemy forces would be attacked to the extent possible, principally by airpower. Finally, joint allied forces would undertake a counter-

---

*Michael O'Hanlon is a fellow in foreign policy studies at the Brookings Institution and is Adjunct Professor of International and Public Affairs at Columbia University. His most recent book is *How to Be a Cheap Hawk: The 1999 and 2000 Defense Budgets* (Washington, D.C.: Brookings Institution, forthcoming 1998); he also contributed two chapters to a recent volume edited by Mike Mochizuki, *Toward a True Alliance: Restructuring U.S.-Japan Security Relations* (Washington, D.C.: Brookings Institution, 1997).*

---

The author thanks Nick Beldecos, Stephen Biddle, Kurt Chicowski, Robert Crumplar, Tom Davis, Richard Dunn, Joshua Epstein, Julien Hartley, Eric Heginbotham, Payne Kilbourne, Christina Larosa, Frances Lussier, Mike Mochizuki, Eric Nyberg, and John Steinbruner for their invaluable assistance.

---

1. Statement of Lieutenant General Patrick M. Hughes, Director, U.S. Defense Intelligence Agency, before the Senate Select Committee on Intelligence, "Global Threats and Challenges to the United States and Its Interests Abroad," February 5, 1997, p. 11.

2. Reportedly, Pentagon models estimate about 50,000 U.S. and 500,000 South Korean military casualties during the first three months of war. See Don Oberdorfer, "A Minute to Midnight," *Newsweek*, October 20, 1997, p. 18.

---

offensive to retake lost territory, possibly also counterinvading the adversary's country.

Regardless of whether the conflict is assumed to be in Southwest Asia, Korea, or elsewhere, the necessary U.S. forces are estimated to include roughly six ground-combat divisions including Marine and Army units, ten wings of Air Force aircraft, and four to five Navy aircraft carrier battle groups.<sup>3</sup> The Pentagon considers it prudent to assume that two major theater wars might start within several weeks of each other and overlap substantially in their duration. The requisite forces for two such wars effectively determine the size of the U.S. military today and most of its associated cost. (Total U.S. national security spending is roughly \$267 billion in 1998, down about \$100 billion in inflation-adjusted terms from the 1980s' average, but only \$50 billion less than the overall Cold War average.<sup>4</sup>)

A strong body of evidence and a wide array of analytical methods argue, however, that the Department of Defense's official image of war does not apply well to the Korean peninsula. On the down side, North Korea would probably not provide the allies with one to two weeks of warning before an attack, roughly the amount reportedly assumed in the BUR's model of regional war; in fact, an attack preceded by only several hours or at most a day of clear warning seems the more likely scenario.<sup>5</sup> But other factors are strongly in the allies' favor. In stark contrast to the situation in Korea in 1950, or to that in Kuwait in 1990, a strong forward-defense posture is already in place, and little warning would be required for troops to don gas masks and take up their prepared positions. Large allied forces are highly ready, well armed with potent weaponry, served by sophisticated all-weather day-night reconnaissance assets, and aided by terrain that is naturally favorable to a defender as well as being thoroughly prepared with explosives and obstacles.

A traditional armored assault by North Korean forces would amount to putting metal into a metalgrinder, and be fairly straightforward for the allies to stop. A DPRK assault emphasizing artillery and infantry soldiers on foot

---

3. Secretary of Defense Les Aspin, *Report on the Bottom-Up Review* (Washington, D.C.: U.S. Department of Defense, October 1993), pp. 13–22; and Secretary of Defense William S. Cohen, *Report of the Quadrennial Defense Review* (Washington, D.C.: U.S. Department of Defense, May 1997), pp. 12–13, 24–26, 30.

4. Michael O'Hanlon, *How to Be a Cheap Hawk: The 1999 and 2000 Defense Budgets* (Washington, D.C.: Brookings Institution, 1998).

5. The QDR reportedly varied this assumption about warning time in its sensitivity studies, but the standardized vision of regional war assumes some five to seventeen days of warning. See "Final Draft of Mobility Requirements Study Update to Go to Services," *Inside the Pentagon*, Vol. 10, No. 44 (November 3, 1994), p. 3; and Cohen, *Report of the Quadrennial Defense Review*, p. 24.

would pose a somewhat more nettlesome military challenge. Specifically, using artillery that in many cases is protected by hardened shelters, special forces to act as artillery spotters and sabotage allied defenses where possible, large numbers of traditional infantry soldiers to assault South Korean defensive lines, and quite likely chemical weapons, North Korean forces would present a somewhat more complex threat than did Saddam Hussein's armor on the open plains of the Arabian desert. But benefiting from their dug-in positions and the prepared terrain, the allies could employ massive amounts of artillery and machine-gun fire against North Korean soldiers. Radars and night-vision equipment would make the allies' defenses effective even during darkness. North Korea's only real counter to this allied capability would be to first use its own artillery in an attempt to suppress South Korean defenses. But it would be trying to use indirect fire against hardened dug-in positions, without benefit of advanced radars to aid in targeting, in a situation in which allied defenses would start out with several times the firepower actually needed to stop the eventual infantry assault.

These facts by no means trivialize either the danger to South Korean citizens or the devastation to Seoul that would be caused if North Korea unleashed its long-range artillery, missiles, and commandos. Nor do they refute the Defense Intelligence Agency's claim that Korea may be the most dangerous tinderbox in the world today. Nor do they argue against targeted investments to redress specific weaknesses in allied defense capabilities, such as better protection against chemical weapons that the Pentagon's 1997 QDR advocated for U.S. forces and that the South Korean military probably needs as well. Nor do they argue for the withdrawal of U.S. forces from the peninsula. Those forces remain critical for deterrent purposes and for facilitating a major American deployment prior to an allied counteroffensive.

But the favorable nature of the Korean military balance does cast doubt on the Pentagon's claim that U.S. forces approaching Desert Storm magnitude might need to deploy quickly to the peninsula to save the ROK from annihilation. That in turn calls into question the requirement for a U.S. military with 1.36 million active-duty troops recently endorsed by the QDR. Even though a relatively large U.S. deployment might be needed if the allies decided to counterattack, occupy North Korea's territory, and overthrow its government, the time urgency of doing so would be much less than if South Korea stood on the brink of being overrun. Moreover, if North Korea did launch a major war, its forces would probably be so badly damaged in the initial unsuccessful assault that they might later prove incapable of posing a stalwart defense of

their own territory—especially given that allied forces would have been little weakened during the initial battles, probably suffering less than one-tenth the number of losses that DPRK units would incur. The chances that overlapping counteroffensives involving Desert Storm–scale American forces would be needed in Korea and Southwest Asia are too low for that scenario to determine the size and structure of today’s U.S. military.

Not all would necessarily conclude that an alternative strategy must entail smaller forces.<sup>6</sup> But on balance the results of this analysis do offer a way out of the Pentagon’s coming budget crunch by suggesting that some U.S. force structure can be reduced so as to ensure that remaining units stay well equipped and highly ready for a wide range of missions.

Regardless of how this analysis might affect strategy and budget debates in the United States, it should further deter leaders in Pyongyang. Any hope they may now have of completing a rapid military thrust before the allies could fully respond is ill-founded. Unfortunately, when officials, in Seoul and Washington imply or state that the North currently enjoys military superiority on the peninsula, they may embolden DPRK officials, whose own capacity for independent analysis is suspect.<sup>7</sup> North Korean leaders probably already know that large-scale war would be an unwise gamble, but may not have entirely ruled it out as a desperation option. They should.

The North Korean military threat could, to be sure, quickly disappear and make the problem considered here irrelevant. But North Korea has already survived the better part of a decade without Soviet help and may be able to endure considerably longer. It is hard to believe that North Korean leaders, having recently watched South Korea consider putting to death two of its own former presidents on corruption charges, would wish to put themselves in the hands of a country that considers them guilty of far worse crimes. Rather, a continuation of the Korean standoff is likely for some years to come. At a minimum, defense planning should be conducted with that possibility in mind.<sup>8</sup>

---

6. See, for example, Paul K. Davis and Richard L. Kugler, “New Principles for Force Sizing,” in Zalmay M. Khalilzad and David A. Ochmanek, eds., *Strategy and Defense Planning for the 21st Century* (Santa Monica, Calif.: RAND Corporation, 1997), pp. 95–140.

7. See, for example, Ministry of National Defense, ROK, *Defense White Paper 1996–1997* (Seoul: Korea Institute for Defense Analyses, 1997), p. 213; Ministry of National Defense, ROK, *Defense White Paper 1995–1996* (Seoul: Korea Institute for Defense Analyses, 1996), p. 72; former Secretary of Defense Les Aspin, quoted in Lawrence J. Korb, “Our Overstuffed Armed Forces,” *Foreign Affairs*, Vol. 74, No. 6 (November/December 1995), p. 25.

8. For a concurring view, see Marcus Noland, “Why North Korea Will Muddle Through,” *Foreign Affairs*, Vol. 76, No. 4 (July/August 1997), pp. 105–118.

This article explains in detail why joint U.S.-ROK forces are, with very high confidence, capable of stopping a DPRK attack cold. Specifically, they should be able to stop the North Korean military at their outermost layer of defenses along the so-called Hollingsworth Line, a set of prepared positions running east-west below the demilitarized zone (DMZ). Even if things go badly, it is difficult to see how they could fail to plug any breach in their line well before Seoul could be taken.

The following section presents some background on the nature of military capabilities and geography on the peninsula—the raw materials that would enter into any war. The next section discusses qualitatively a set of factors that would work strongly in the allies' favor in any conflict. The fourth section shows why the allied defense posture is robust by employing two different types of simple dynamic quantitative assessments. In the fifth section the analysis turns to the matter of North Korean weapons of mass destruction, most notably chemical weapons, and explains why they would be unlikely to change the military situation appreciably. The concluding section explores implications for defense planning in Seoul and Washington.

### *Military Forces and Geography on the Korean Peninsula*

Although the BUR and QDR lump Korea with Southwest Asia conceptually, the peninsula is much more like a cross between the former intra-German border and Bosnia than like Kuwait, Saudi Arabia, or southern Iraq. That image applies to both the nature of the terrain and the nature of the fighting forces deployed in the vicinity. The Korean peninsula as a whole is roughly 250 kilometers wide at its waist and about 1,000 kilometers long. It is characterized by very hilly topography; much of what flat land exists is marsh or rice fields.

Korea's central region is also one of the most heavily militarized zones in human history. Significantly more than 1 million troops and 20,000 armored vehicles or artillery pieces, as well as more than 1 million land mines, abundant chemical weapons, and fortified defensive positions, are found between Pyongyang and Seoul (the distance from the four-kilometer-wide DMZ to Seoul is roughly 40 kilometers and from the DMZ to Pyongyang about 125 kilometers).<sup>9</sup> Forces in Korea are more densely concentrated than Warsaw Pact

---

9. For example, North Korea may have a total of as many as 250 metric tons of chemical munitions, in nonpersistent and persistent forms, deliverable by a wide range of systems ranging from

and NATO units were in Central Europe during the Cold War.<sup>10</sup> For North Korea, in fact, roughly 65 percent of its total units and up to 80 percent of its estimated aggregate firepower are within 100 kilometers of the DMZ, significantly greater fractions than in the 1980s.<sup>11</sup>

There exist only two main natural axes of potential attack in the (relatively) flat western part of the peninsula, near Seoul. Known as the Chorwon and Munsan corridors, they are each about 15 kilometers wide in some places, and branch out and interconnect in others.<sup>12</sup> Another three to four attack corridors could be imagined in the central and eastern parts of the country, given the existing road networks and terrain, although the Sea of Japan coastal route would be the most amenable to vehicles.<sup>13</sup>

More might be done to fortify the terrain near the DMZ. Roads and bridges have already been prechambered for rapid demolition, but open-country movements could also be impeded. For example, concrete-lined trenches nearly impassable to modern tanks could be built, as could artificial hills of 40 degrees or more inclination.<sup>14</sup> Such obstacles would of course also make a ground-force counterinvasion of North Korea by allied forces more difficult—but the most sensible type of counterinvasion might involve circumventing the DMZ via air assault and amphibious capabilities anyway.

The following summaries of the forces possessed by the two Koreas and the United States give a general perspective on the nature of the peninsular

---

artillery to aircraft to missiles. See Defense Intelligence Agency, *North Korea: The Foundations for Military Strength* (October 1991), p. 60.

10. See, for example, Fran Lussier, *U.S. Ground Forces and the Conventional Balance in Europe* (Washington, D.C.: U.S. Congressional Budget Office, June 1988), pp. 7–28, 91–99. About one-fourth of the total NATO and Warsaw Pact forces were either deployed in the Germany-Poland-Czechoslovakia area or immediately deployable to that zone using prepositioned stocks. That made for a total of roughly 2.5 million troops and 60,000 armored vehicles in a zone with a front three times the length of the Korean DMZ—similar numbers, per kilometer of front, to what prevails near the DMZ. But forces in the Germanys, Poland, and Czechoslovakia were based as far away as 200 to 300 kilometers from the intra-German border, whereas most of those in the Koreas are within roughly 100 kilometers of the front.

11. James C. Wendt, “U.S. Conventional Arms Control for Korea: A Proposed Approach,” RAND Note (Santa Monica, Calif.: RAND Corporation, 1993), p. 14; Don Oberdorfer, *The Two Koreas* (Reading, Mass.: Addison-Wesley, 1997), p. 313; and Defense Intelligence Agency, *North Korea: The Foundations for Military Strength, Update 1995* (Washington, D.C.: U.S. Defense Intelligence Agency, March 1996), p. 13.

12. Nick Beldecos and Eric Heginbotham, “The Conventional Military Balance in Korea,” *Breakthroughs* (Spring 1995), p. 3.

13. Yong-Sup Han, “Designing and Evaluating Conventional Arms Control Measures: The Case of the Korean Peninsula,” Ph.D. dissertation, RAND Corporation, 1993, pp. 31, 155.

14. Lussier, *U.S. Ground Forces and the Conventional Balance in Europe*, p. 39.

military balance. They also provide information that is employed in the analyses that follow.

#### NORTH KOREA

On paper, North Korea's forces resemble those of the generic "regional aggressor" of Bottom-Up Review fame—a country similar to 1990 Iraq in its military capability and its potential to threaten neighboring U.S. interests. That is probably the main reason why the BUR and QDR developed the somewhat sloppy habit of describing possible wars in Southwest and Northeast Asia in similar terms.

More specifically, North Korea's forces exceed the upper range postulated for such a possible foe in terms of active-duty military personnel, artillery, and naval patrol craft.<sup>15</sup> They are at the high end of the assumed range for tanks, and they are at the low end of the range or slightly below it for fighting vehicles, combat aircraft, and surface-to-surface missiles.<sup>16</sup> North Korea also possesses roughly 10,000 surface-to-air missiles, 5,000 mobile air-defense guns, and 3,000 fixed air-defense guns. (As a point of reference, these air-defense capabilities are roughly comparable in number and vintage to those of 1990 Iraq—which, though unable to down large numbers of Coalition aircraft during Operation Desert Storm, did force most to fly at or above two miles altitude until the ground war.)

North Korean defense spending, according to both the International Institute for Strategic Studies (IISS) and the U.S. intelligence community, totals about \$6 billion a year. That spending level is not particularly large, but it does represent roughly 25 percent of the DPRK's gross domestic product (GDP)—the highest such ratio in the world.<sup>17</sup>

---

15. Specifically, North Korea's forces total about 1.05 million active-duty troops, 10,200 artillery tubes, and about 415 small naval vessels (as well as 25 attack submarines, 60 small submarines, 3 frigates, 25 mine countermeasures ships, and about 250 small amphibious vessels). The BUR threat is assumed to have 400,000–750,000 troops, 2,000–3,000 artillery pieces, and 100–200 naval vessels (of all types combined), respectively.

16. North Korea is believed to have 3,400 tanks, 2,750 light tanks and armored personnel carriers, 610 combat aircraft, and about 85 surface-to-surface missiles; the BUR assumes 2,000–4,000 tanks, 3,000–5,000 armored fighting vehicles, 500–1,000 combat aircraft, and 100–1,000 Scud-class ballistic missiles.

17. U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers 1995* (Washington, D.C.: U.S. Government Printing Office, 1996), pp. 42, 45; IISS, *The Military Balance 1996/97* (Oxford, U.K.: Oxford University Press, 1996), pp. 186–187; and Aspin, *Report on the Bottom-Up Review*, p. 13. South Korean estimates are within 10 percent of these IISS estimates, except in the case of combat aircraft, where the ROK believes that DPRK holdings total 850. Ministry of National Defense, ROK, *Defense White Paper 1995–1996*, p. 71.

The DPRK's order of battle comprises slightly less than 150 active-duty brigade equivalents. That number includes those associated with North Korea's 26 infantry divisions, as well as some 15 independent armored brigades and 24 truck-mobile infantry brigades. Another 25 brigades are made up of special-force commandos, totaling 100,000 troops, or about 10 percent of active-duty North Korean forces. The special forces would attempt to deploy by air, sea, land, and the famous sub-DMZ tunnels to spread mayhem throughout much of South Korea and disrupt U.S.-ROK combat operations.<sup>18</sup> In all, ground warfare units make up nearly 90 percent of total active-duty DPRK forces. Another 95 brigades exist within the reserve-force structure. The 610 or so North Korean combat aircraft are organized into 15 regiments. The various small naval vessels can be divided into five main groups: missile craft (numbering 42), torpedo craft (about 200), patrol craft (roughly 175, of which 155 are inshore vessels), submarines (about 25 old Soviet designs, as well as some 60 miniature subs for special forces), and mine countermeasures ships (25).

Given the obsolescence of most North Korean equipment, however, actual capabilities of most forces would be notably less than raw numbers suggest. About half of North Korea's major weapons are of roughly 1960s design; the other half are even older. The U.S. Army's Cold War system for comparing the capabilities of equipment suggests that ground-combat units equipped with modern Western weaponry are perhaps only 20 to 40 percent better than those of comparable size with obsolescent equipment like North Korea's.<sup>19</sup> But the Gulf War should have done much to discredit that methodology. A reputable defense contractor, the Analytical Science Corporation, developed a more up-to-date and realistic "TASCFORM" approach, utilized in the 1990s by the Office of Net Assessment at the Pentagon. It evaluates modern Western weaponry as generally two to four times better than older Soviet-vintage systems.<sup>20</sup>

---

18. These estimates attribute three brigades to a North Korean division. Here, there is a substantial discrepancy between IISS and South Korean Ministry of Defense estimates; the latter imply a total of about 250 active-duty North Korean brigades. See Ministry of National Defense, ROK, *Defense White Paper 1995-1996*, p. 71. The North Korean airborne and seaborne forces are believed to number about 20,000 troops. The tunnels, suited to the passage of people and perhaps some heavy equipment, are believed to number at least 20, of which 4 have been found. See *ibid.*, p. 54.

19. (It was known as the "WEI/WUV" system, for weapon effectiveness indices/weighted unit values.) See, for example, William P. Mako, *U.S. Ground Forces and the Defense of Central Europe* (Washington, D.C.: Brookings Institution, 1983), pp. 114-125; and War Gaming Directorate, U.S. Army Concepts Analysis Agency, "Weapon Effectiveness Indices/Weighted Unit Values III" (Bethesda, Md.: U.S. Army Concepts Analysis Agency, November 1978), pp. Q-49 through Q-62, Q-72 through Q-76, R-14 through R-16.

20. For published details on TASCFORM databases, see Michael O'Hanlon, *The Art of War in the Age of Peace: U.S. Military Posture for the Post-Cold War World* (Westport, Conn.: Praeger, 1992),

This means that North Korea's heavy forces, possessing enough raw combat equipment to fit out perhaps ten U.S. divisions, are estimated to have the overall capability of only about 2.5 modern U.S. armored divisions. Adding in the "scores" of equipment operated by light infantry, the North Koreans have the overall firepower of nearly five modern U.S. heavy-division equivalents in their force structure. That is less than the six modern division equivalents that Iraq possessed by the same TASCFORM scoring metric in 1990. This North Korean firepower is configured in a more potent way than the comparable amount of Iraqi armor and artillery, as discussed below, but remains limited in overall effectiveness. North Korean airpower, though about six U.S. wing equivalents in size, corresponds to only about two F-16 wing equivalents in estimated net capability.<sup>21</sup>

So much for hardware; what about North Korean doctrine and military readiness? Here the DPRK makes out even less well. Associated for half a century with highly inflexible Soviet military practices, it places great stock in top-level leadership and scripted war plans. Thus it is doubtful that North Korea has produced many good midlevel officers. Nor has it been able, particularly of late, to afford the types of large-scale combined-arms training that characterize the U.S. and South Korean militaries.<sup>22</sup>

On the other hand, North Korea's artillery threat to Seoul does not for the most part depend on sophisticated tactics or operations. It has had decades to prepare war plans for at least the first day or two of an attempted invasion of the South. Certain other capabilities could also be of acute concern to allied forces. For example, although the U.S. Office of Naval Intelligence characterizes the overall DPRK submarine force as being obsolescent and "only modestly proficient in basic operations in its own coastal waters," it points out that it could have some effectiveness in missions such as mining, attacks against ships, and insertion of ground forces.<sup>23</sup>

#### SOUTH KOREA

The ROK's 560,000-strong ground forces are just over half the size of the DPRK's—whether one thinks in terms of personnel, major equipment hold-

---

pp. 66–67; and Michael O'Hanlon, *Defense Planning for the Late 1990s: Beyond the Desert Storm Framework* (Washington, D.C.: Brookings Institution, 1995), p. 43.

21. See O'Hanlon, *The Art of War in the Age of Peace*, pp. 64–67; and O'Hanlon, *Defense Planning for the Late 1990s*, p. 43.

22. Statement of Lieutenant General Hughes, "Global Threats and Challenges to the United States and Its Interests Abroad," p. 11.

23. Office of Naval Intelligence, *Worldwide Submarine Proliferation in the Coming Decade* (Washington, D.C.: U.S. Department of Defense, May 1995), p. 14.

ings, or force structure. Its air and naval forces are comparable in number to North Korea's. Its defense expenditures, though just over 3 percent of GDP, are nearly three times as great as the DPRK's (South Korea spent \$15.5 billion in 1996).<sup>24</sup> South Korea's major combat equipment, as evaluated by the TASCFORM scoring system, is roughly equal in aggregate to North Korea's. Specifically, the ROK's ground-combat weapon capabilities are estimated to be roughly three-fourths as great as the DPRK's. Factoring in attack helicopters, its aggregate air capabilities are slightly greater than the North's, totaling about 2.5 F-16 wing equivalents by the TASCFORM system.<sup>25</sup>

South Korea would appear to have outright superiority, as measured by these types of static indices, once one factors in the effects of superior training, equipment maintenance, logistics, and support equipment like reconnaissance and communications gear (to say nothing of the advantage of fighting from prepared positions). Quantifying the importance of these effects is difficult, but those who have attempted to do so have found impressive results. Trevor Dupuy's assessment of the military outcomes of the Arab-Israeli wars, for example, suggests that excellence in these dimensions of military capability may double combat effectiveness.<sup>26</sup>

South Korea's official position is that the North enjoys military superiority on the peninsula.<sup>27</sup> The Pentagon is often inclined to agree—assuming in the BUR, for example, that North Korean soldiers are better fighters than South Korea's, despite the former group's dearth of training and support.<sup>28</sup> But such views are not well supported by the evidence.

---

24. Total South Korean military personnel number 660,000, of which 560,000 are Army troops. The ROK military has 2,050 tanks, 2,500 armored personnel carriers, 4,500 artillery pieces, and about 140 attack helicopters. (Compared to North Korean levels, South Korea has 60 percent as many tanks, 90 percent as many fighting vehicles of all types combined, 45 percent as much artillery, and a large advantage in attack helicopters.) It has roughly half as many ground-combat brigades or brigade equivalents as North Korea. See IISS, *The Military Balance 1996/97*, pp. 186–189; for the most recent defense spending figures, see IISS, *The Military Balance 1997/98* (Oxford, U.K.: Oxford University Press, 1997), pp. 18, 184.

25. O'Hanlon, *Defense Planning for the Late 1990s*, p. 43; and IISS, *The Military Balance 1996/97*, pp. 188–189.

26. Trevor N. Dupuy, *Attrition: Forecasting Battle Casualties and Equipment Losses in Modern War* (Fairfax, Va.: HERO Books, 1990), pp. 105–110, 148; see also Barry R. Posen, "Measuring the European Conventional Balance: Coping with Complexity in Threat Assessment," *International Security*, Vol. 9, No. 3 (Winter 1984/85), in Steven E. Miller, ed., *Conventional Forces and American Defense Policy: An International Security Reader* (Princeton, N.J.: Princeton University Press, 1986), p. 113.

27. Ministry of National Defense, ROK, *Defense White Paper 1995–1996*, p. 50.

28. Korb, "Our Overstuffed Armed Forces," p. 25.

THE UNITED STATES

As envisioned under the Bottom-Up Review and reaffirmed by the Quadrennial Defense Review, the United States plans ultimately to deploy almost half of its combat forces to a possible war in Korea. Associated troop numbers would probably exceed 400,000—a slightly smaller, but comparably capable, force to the 550,000 U.S. military personnel deployed for Operation Desert Storm.<sup>29</sup>

The United States bases about 300 fixed-wing combat aircraft in the immediate vicinity of Korea. (That tally counts forces in Japan, including about 75 fixed-wing aircraft on the carrier *Independence* that are generally nearby.) It could easily double its available combat planes in the region within a week, and double them again in another couple of weeks. U.S. Army and Marine Corps forces in Northeast Asia also have roughly 100 attack helicopters associated with them.<sup>30</sup> Airfields available for U.S. combat aircraft would number at least half a dozen at the outset of hostilities, and could quickly be expanded to a dozen or more locations in Japan and the ROK.<sup>31</sup>

The United States stations two brigades of the Army's Second Infantry Division in South Korea. They are distributed roughly halfway between Seoul and the DMZ, and are based in a total of seventeen camps astride the two main

---

29. Specifically, under the BUR the United States planned to deploy roughly 4–5 Army divisions plus the very extensive support equipment for about 2 large Army corps, 4–5 Marine brigades (making for a grand total of roughly 6 ground-combat divisions between the Army and the Marines), 4–5 aircraft carrier battle groups and associated wings of aircraft, 10 Air Force fighter wings (a Navy or Air Force tactical combat wing typically includes 72 operational aircraft), 100 Air Force bombers, and probably also missile defenses, special forces, and reserve forces. It would not have deployed Army National Guard combat units in significant numbers; plans for attack submarines, frigates, and a few other major assets were unclear. Aspin, *Report on the Bottom-Up Review*, p. 19.

The QDR is less precise about force requirements, but essentially reasserts the BUR's results. Specifically, the QDR states, "The results of this analysis demonstrated that a force of the size and structure close to the current force was necessary to meet the requirement set out in the strategy of being able to win two, nearly simultaneous, major theater wars in concert with regional allies. While slightly smaller forces were capable of prevailing without a significant increase in risk in the base case of the analysis, a larger force was judged necessary to conduct these operations with acceptable risk when either enemy chemical weapons were used or shorter warning times were played." See Cohen, *Report of the Quadrennial Defense Review*, p. 24. On Operations Plan 5027, see Oberdorfer, *The Two Koreas*, p. 325.

30. Fran Lussier, *An Analysis of U.S. Army Helicopter Programs* (Washington, D.C.: U.S. Congressional Budget Office, 1995), pp. 71–75; and IISS, *The Military Balance 1996/97*, pp. 23–26.

31. Michael O'Hanlon, "Restructuring U.S. Forces and Bases in Japan," in Mike M. Mochizuki, ed., *Toward a True Alliance: Restructuring U.S.-Japan Security Relations* (Washington, D.C.: Brookings Institution, 1997), p. 157; data from Jon Regan, Analytical Sciences Corporation, Rosslyn, Virginia (personal communication); and Ministry of National Defense, ROK, *Defense White Paper 1995–1996*, p. 117.

potential attack corridors in the western half of the country.<sup>32</sup> U.S. ground forces in Korea might be roughly tripled in size within ten days. Notably, Marine Corps prepositioning ships at Guam and Army prepositioning equipment in Korea, each representing about a brigade of capability, could quickly be filled out with troops airlifted from the United States to Korea. Light ground forces, notably the Twenty-fifth Infantry Division from Hawaii, could deploy within the first ten days as well. A brigade's worth of Army equipment and a second brigade of Marine equipment prepositioned on ships in the Indian Ocean could arrive shortly thereafter, although depending on conditions in the Persian Gulf, they might also be reserved for possible use in that region.<sup>33</sup>

Such U.S. capabilities would be helpful, but they would remain a modest share of overall ground power on the peninsula. And it is also possible that ships carrying the prepositioned equipment would have to delay their arrival by several days to permit antisubmarine and antimine operations enough time to assure their safety. Fortunately, as is shown below, these U.S. Army and Marine Corps reinforcements would not be needed to stop a DPRK assault; South Korean units teamed with U.S. airpower and the U.S. Army's Second Infantry Division could do the job.

After several weeks, a variety of ships could arrive from the United States. SL-7 fast sealift ships carrying a U.S.-based heavy Army division could reach Korea after some twenty to thirty days. More light ground forces and Marines could arrive in that time frame as well, as could aircraft carriers and other ships from the Mediterranean, Persian Gulf, or west coast of the United States. As the military acquires better sealift capability in the form of 11 large medium-speed roll-on roll-off vessels for transport and another 8 for prepositioning, it will be able to deploy an additional armored division plus some support capabilities within the first month of a major crisis.<sup>34</sup> The deployment would be mostly rounded out in the second month with the arrival of other U.S. heavy forces by sealift. Within seventy-five days, according to official plans, the entire transport operation would be completed. At present, however, given that

---

32. U.S. Forces Korea, "U.S. Forces Korea in the Republic of Korea, 1997" (Washington, D.C.: Department of Defense, June 1997), pp. 35–42.

33. IISS, *The Military Balance 1996/97*, p. 29; Secretary of Defense William J. Perry, *Annual Report to the President and the Congress* (Washington, D.C.: Department of Defense, March 1996), p. 148; and O'Hanlon, *Defense Planning for the Late 1990s*, p. 59.

34. Rachel Schmidt, *Moving U.S. Forces: Options for Strategic Mobility* (Washington, D.C.: U.S. Congressional Budget Office, 1997), pp. 29, 35.

enhancements to sealift are still in the works, that goal might be missed by a month or more.<sup>35</sup>

In all, using the TASCFORM metric referred to earlier, these U.S. forces would correspond to at least 5 modern heavy ground-division equivalents and more than 15 modern fighter wings. The former capability would exceed those of either the DPRK or the ROK; the latter would exceed the sum of all Korean air forces by a factor of three.<sup>36</sup>

### *Military Analysis of a Second North Korean Attack*

Were North Korea again to attack South Korea with the intent of capturing Seoul and reunifying the peninsula by force, its prospects for success would be very poor—even worse than commonly believed. Not only would the eventual outcome of the war be in little doubt, a point most agree on, but the chances of an initial North Korean breakthrough and approach to Seoul are also very low.

North Korea could, to be sure, seriously harm the South Korean people and economy. Notably, it could pose threats through long-range artillery attack against Seoul, surface-to-surface missile strikes, and commando raids. Consider the artillery, for example. Reportedly, at least 250 of North Korea's roughly 10,000 artillery tubes are within range of Seoul in their current positions.<sup>37</sup> Most artillery can fire several rounds a minute. Also, the initial speeds of fired shells are generally around half a kilometer per second.<sup>38</sup> That means that even if an ROK counterartillery radar some 10 kilometers away picked up a North Korean round and established a track on it within seconds, a counter-strike would not be able to silence the offending DPRK tube for at least a minute (and probably more like two minutes). On average, such a tube could therefore probably fire two to five rounds, and quite possibly a dozen or more, before being neutralized or forced to retreat fully into its shelter. Some tubes may even be able to fire from protected positions, permitting them to keep up

---

35. See Aspin, *Report on the Bottom-Up Review*, p. 20; Schmidt, *Moving U.S. Forces*, pp. 33–44, 79–95; Fran Lussier, *An Analysis of the Army's Force Structure* (Washington, D.C.: U.S. Congressional Budget Office, April 1997), p. 9; and O'Hanlon, *Defense Planning for the Late 1990s*, pp. 55–65.

36. O'Hanlon, *Defense Planning for the Late 1990s*, p. 43; and O'Hanlon, *The Art of War in the Age of Peace*, pp. 66–67.

37. Ministry of National Defense, ROK, *Defense White Paper 1996–1997*, p. 65.

38. See, for example, Christopher F. Foss, *Jane's Armour and Artillery 1989–1990*, 10th ed. (Alexandria, Va.: Jane's Information Group, 1989), pp. 636–645.

the barrage until they suffer either a near-direct hit by an artillery round or an attack from a laser-guided bomb.<sup>39</sup> That means that at least 1,000 but probably several thousand rounds could detonate in Seoul no matter how hard the allies tried to prevent or stop the attack. An average round could cause tens of casualties and considerable physical destruction. The end result could be many tens of thousands of civilians dead and many tens of billions of dollars in damage.<sup>40</sup> Attacks against Seoul would be much worse yet if they involved chemical or biological weapons, though they would also raise the prospect of allied retaliation with nuclear weapons.

Such inevitable carnage in the nation's capital explains why the South Korean government cannot consider war an acceptable outcome. But the ability of the allies to prevail militarily can hardly be doubted, and the probability that they would lose substantial amounts of territory even temporarily is very low.

To understand why the North Korean battle plan is so unpromising, consider the following nine points. First, although attackers do not necessarily require a three-to-one local combat power advantage over defenders before prevailing in combat,<sup>41</sup> they rarely can achieve rapid breakthroughs when attacking prepared defenses of strength comparable to their own. When armies tried to drive directly through prepared defensive positions in World War II, for example—what North Korea would have to do in a future war on the peninsula—they rarely advanced more than 4 or 5 kilometers a day.<sup>42</sup> Indeed, advance rates were usually less than that. They were as low as about 1 kilometer a day in campaigns against very well prepared defenses, such as the allies' attack against Germany around the Siegfried Line.<sup>43</sup> With such slow initial progress, North Korean forces could not succeed. Over time, they would become increasingly vulnerable to U.S. tactical aircraft reinforcements and lose whatever protection that attacking in bad weather may have given them vis-à-vis advanced munitions dependent on laser-homing or infrared guidance. They would also probably run out of supplies after a few days, because allied artillery and air attacks as well as road obstacles would prevent sig-

---

39. Ministry of National Defense, ROK, *Defense White Paper 1996–1997*, p. 56.

40. See Oberdorfer, *The Two Koreas*, pp. 313–324.

41. Joshua M. Epstein, "Dynamic Analysis and the Conventional Balance in Europe," *International Security*, Vol. 12, No. 4 (Spring 1988), p. 156.

42. Robert L. Helmbold, "A Compilation of Data on Rates of Advance in Land Combat Operations," Research Paper CAA-RP-90-04 (Bethesda, Md.: U.S. Army Concepts Analysis Agency, February 1990), pp. A-278 through A-294, A-318 through A-322.

43. Posen, "Measuring the European Conventional Balance," in Miller, *Conventional Forces and American Defense Policy*, p. 114.

nificant movement of trucks and other resupply vehicles down key invasion corridors.<sup>44</sup> By way of perspective, successful breakthrough operations by the North Koreans in 1950 benefited from a number of major conditions that would not apply again. Among them are that combined South Korean and U.S. forces were nearly a factor of ten smaller than they are today, and essentially absent from key attack corridors; they did not possess effective antitank weapons at first; and their units were in very poor condition.<sup>45</sup>

Second, not only are ROK defenses prepared, and comparable in firepower to North Korea's military, but they are also dense. Across just 250 kilometers of front, much of it unusable for armored vehicles, is deployed most of the South Korean army. The resulting force-to-space ratio of about one division per 10 kilometers is excellent. Modern ground forces are generally designed to cover at least twice that much front.<sup>46</sup>

Third are the rivers, marshes, demolitions, and other impediments to movement in the DMZ region.<sup>47</sup> DPRK movement by road would be nearly impossible, because it would channelize attackers into a killing zone and also require use of prechambered bridges that would certainly be destroyed early in any war. Even assuming an attack in the winter that allowed forces to traverse frozen rice fields, either the Han or Imjin rivers would need to be crossed in any attack in the western half of the country near Seoul—and those rivers might not be frozen hard enough to support tanks.<sup>48</sup> The combined effects of

44. Lussier, *U.S. Ground Forces and the Conventional Balance in Europe*, p. 86. The North Koreans would probably need to send at least 1,000 truckloads of supplies southward daily to support an armored force of the assumed size. See Joshua M. Epstein, *Strategy and Force Planning: The Case of the Persian Gulf* (Washington, D.C.: Brookings Institution, 1987), pp. 112–113.

45. Eliot A. Cohen and John Gooch, *Military Misfortunes: The Anatomy of Failure in War* (New York: Free Press, 1990), pp. 165–195; Beth Bloomfield, *Force Planning and Budgetary Implications of U.S. Withdrawal from Korea* (Washington, D.C.: U.S. Congressional Budget Office, May 1978), pp. 36–37; and Rod Paschall, *Korea: Witness to War* (New York: Berkley Publishing Group, 1995), pp. 21, 167.

46. Stephen D. Biddle, David Gray, Stuart Kaufman, Dennis DeRiggi, and D. Sean Barnett, *Defense at Low Force Levels: The Effect of Force to Space Ratios on Conventional Combat Dynamics*, IDA Paper P-2380 (Alexandria, Va.: Institute for Defense Analyses, 1991), pp. 7–41; Mako, *U.S. Ground Forces and the Defense of Central Europe*, pp. 36–37; John Patrick Elwood, “Conventional Wisdom: Force-to-Space Considerations and Conventional Arms Control in Europe,” senior thesis, Princeton University, 1989, p. 28, based on data in Robert McQuie, *Historical Characteristics of Combat for Wargames (Benchmarks)*, CAA-RP-87-2 (Bethesda, Md.: U.S. Army, Concepts Analysis Agency, July 1988); and Joshua M. Epstein, *Conventional Force Reductions: A Dynamic Assessment* (Washington, D.C.: Brookings Institution, 1990), p. 58.

47. Under some circumstances, U.S. mines in Korea would be less helpful than frequently advertised by their proponents. They are estimated to number roughly 1 million (see Dana Priest, “56 in Senate to Press for Law Banning Use of Land Mines by U.S.,” *Washington Post*, June 12, 1997, p. 12). But many would not be “installed” in the frozen ground in time to oppose a short-warning attack.

48. Defense Intelligence Agency, *North Korea*, pp. 58–59.

terrain, demolitions, and artillery in slowing armored vehicles would greatly increase their vulnerability to direct fire from TOW antitank weapons, tanks, and other antitank guns. In quantitative terms, the vulnerability of armor can increase by two to twenty times when it is slowed down appreciably.<sup>49</sup> North Korea might attempt to obstruct the views of U.S. and ROK forces by heavy use of smoke-generating artillery rounds and grenades in the vicinity of an attempted breakthrough.<sup>50</sup> But allied forces would still enjoy the advantage of being able to fire from protected positions, even if they lost some of the range of their advanced sensors and optics, and would still generally get the first shot.

Fourth, although defenders would be immediately vulnerable to artillery attack at the rate of many thousands of rounds per minute, so would attackers—and the latter would be exposed. The exposed area, and thus the vulnerability, of a soldier on foot or in a jeep or truck would be at least ten times as great as that of a soldier in a foxhole—a much worse handicap for the North Koreans than their roughly two-to-one advantages in artillery and soldiers would provide.<sup>51</sup> Similar considerations apply to gunfire during close-in battle.

Fifth, allied military equipment is much more capable than that of the DPRK. South Korean Type 88 or K-1 tanks, for example, have detection and targeting sensors similar to the U.S. M1 Abrams. They would be firing at even more primitive mixes of Soviet-style tanks than Coalition forces confronted in the Gulf in 1991. North Korea owns T-62 tanks, which entered production in the early 1960s, and earlier vintages. These tanks and similar systems are, to put it gently, not very good. They had a mediocre track record twenty-five years ago in the Arab-Israeli wars, and would do even worse against modern anti-tank weapons and modern tanks.<sup>52</sup>

---

49. Epstein, *Conventional Force Reductions*, p. 70; and Engineer Studies Group, Department of the Army, *Measuring Obstacle Effectiveness: A Fresh Perspective*, vol. 1 (Fort Belvoir, Va.: March 1975), p. 20.

50. See, for example, U.S. Army, *Ranger Handbook* (Fort Benning, Ga.: U.S. Army Infantry School, 1992), pp. 6-1 through 6-12.

51. On the effectiveness of artillery against exposed versus dug-in forces, see James F. Dunnigan, *How to Make War*, 3d ed. (New York: William Morrow, 1993), p. 125. Comparisons with the Iran-Iraq War are also telling here; in that conflict, most artillery-caused casualties were exposed soldiers attempting to effect an advance, and most successful infiltrations of minefields were the result of careful probing attacks rather than massed assaults. Both of these results involving armies of roughly comparable technology and training to North Korea's bode poorly for the latter's ability to carry out a successful massive surprise attack. See Anthony H. Cordesman and Abraham R. Wagner, *Lessons of Modern War, Volume 2: The Iran-Iraq War* (Boulder, Colo.: Westview Press, 1990), pp. 433, 445, 447.

52. Stephen Biddle, "Victory Misunderstood: What the Gulf War Tells Us about the Future of Conflict," *International Security*, Vol. 21, No. 2 (Fall 1996), pp. 167–172; and David C. Isby, *Weapons and Tactics of the Soviet Army* (London: Jane's Publishing, 1981), pp. 130–150.

Sixth, allied reconnaissance is much better than that of North Korea. The all-weather day-night character of modern reconnaissance also makes it much more effective than it was during the Korean War, when both North Korean and Chinese armies were able to evade detection for long periods in preparing major attacks, or than in World War I, when British and German forces were occasionally able to conduct successful offensive operations by achieving tactical surprise and honing in on weak points in enemy lines.<sup>53</sup> In addition to starting with a solid defensive line, therefore, South Korean and U.S. soldiers have the ability to anticipate and counterconcentrate against any concerted DPRK breakthrough effort in one place. Not only could they detect any large-scale massing of armored vehicles through various platforms like overhead reconnaissance satellites, and lower-tech but effective RC-7B planes, joint surveillance target attack radar system (JSTARS) radar-imaging aircraft, but they could also generally monitor the movement of approaching human beings through devices such as ground radars and infrared detection systems.<sup>54</sup>

Seventh, assuming passable weather conditions, direct fire from aircraft would also put North Korean armor and troops at serious risk. U.S. and ROK aircraft would quickly establish air superiority and devote at least 500 planes and helicopters to the ground attack beginning early in the battle. Using Maverick, Hellfire, and TOW missiles and laser-guided bombs, the allied forces could expect to destroy roughly one armored vehicle in every four shots if Gulf War data are a guide. If they flew at the Desert Storm overall rate of about one sortie per aircraft per day, they would stand a good chance of destroying 500 North Korean armored vehicles in a day's fighting (out of a total of roughly 10,000 to start with). As time went on, North Korean targets would become more dispersed, fewer in number, and more difficult to locate and attack—but U.S. air reinforcements would arrive rapidly and allow more firepower to be devoted to the mission. (It might be possible that the sortie rate could, as in Desert Storm, be maintained at two flights per day in the early going, but in light of the threat of a chemical attack, it is safer to assume a sortie rate of one flight per day.<sup>55</sup>) Because North Korea lacks sophisticated runway-destroying

---

53. See, for example, James L. Stokesbury, *A Short History of the Korean War* (New York: William Morrow, 1988), pp. 102, 120; and Jonathan Shimshoni, "Technology, Military Advantage, and World War I: A Case for Military Entrepreneurship," *International Security*, Vol. 15, No. 3 (Winter 1990/91), pp. 205–207.

54. See, for example, Jane's Information Group, *Jane's Weapon Systems 1988–1989* (Alexandria, Va.: Jane's Information Group, 1988), pp. 284–285, 399–406; and David A. Fulghum, "Army Spy Aircraft Watch North Korea," *Aviation Week and Space Technology*, November 24, 1997, pp. 58–59.

55. Department of Defense, *Conduct of the Persian Gulf War* (Washington, D.C.: Department of Defense, April 1992), pp. T-18 through T-19, T-60 through T-67, T-142 through T-146, T-182 through

submunitions and accurate missiles, it probably could not prevent this outcome by attacking the allied aircrafts' runways from afar.<sup>56</sup>

If the weather were poor, infrared and laser-homing missiles might not be effective. Indeed, they might not work at all. But some aircraft guns would remain capable. Also, an attacker probably could not count on conditions of very heavy fog and clouds enduring more than a day or two.<sup>57</sup> Even in the event of bad weather, JSTARS aircraft with radar capabilities to detect moving armor might be able to help helicopters, jets, and bombers get near enough to DPRK forces that they could cause considerable damage. Some aircraft could use their guns—albeit at greater risk of being shot down—even in heavy fog. They could also drop dumb bombs and area-effect weapons from higher altitudes against soft vehicles and troops.

Eighth, despite their huge number, North Korean commando forces would have limited effectiveness against South Korean defensive lines. Deploying by a special means like airplane, submarine, or tunnel does not necessarily make a commando more effective than a regular soldier. To be successful, airborne assault generally requires air superiority and suppression of the enemy's artillery and air-defense systems—and North Korea would not be able to achieve any of those advantages against dug-in allied defenses.<sup>58</sup> Tunnel assault could be more effective. Troops arriving via underground passageways would be unable, however, to penetrate deeply into ROK defenses given the limited length of the tunnels.<sup>59</sup> Also, they would become highly vulnerable to counter-

---

T-186; Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington, D.C.: U.S. Government Printing Office, 1993), pp. 13, 42, 103–115, 197–200; and Thomas C. Hone, Mark D. Mandeles, and Sanford S. Terry, "Part II: Command and Control," in Eliot A. Cohen, project director, *Gulf War Air Power Survey: Volume 1* (Washington, D.C.: U.S. Government Printing Office, 1993), p. 213.

56. Christopher Bowie, Fred Frostic, Kevin Lewis, John Lund, David Ochmanek, and Philip Propper, *The New Calculus: Analyzing Airpower's Changing Role in Joint Theater Campaigns* (Santa Monica, Calif.: RAND Corporation, 1993), p. 29.

57. For example, in the Gulf War—admittedly in a part of the world with a generally more favorable climate—only about 5 percent of all planned flights had to be changed because of the weather. That number may have represented closer to 10 percent of all ground-attack sorties. On one day, day four of the war, about 40 percent of all flights had to be changed. See Hone, Mandeles, and Terry, "Part II: Command and Control," in Cohen, *Gulf War Air Power Survey, Volume 1*, pp. 216–218. Given that the Korean peninsula witnesses about 100 days of precipitation a year, to the Arabian peninsula's 10, this effect could be several times more frequent in the former setting, but would still be unlikely to seriously hamper ground-attack missions for more than a couple of days. See National Geographic, *Atlas of the World*, 6th ed. (Washington, D.C.: National Geographic Society, 1992), p. 132.

58. Headquarters, Department of the Army, *FM 100-5: Operations* (Washington, D.C.: Department of Defense, June 1993), p. 8-4.

59. Beldecos and Heginbotham, "The Conventional Military Balance in Korea," p. 5.

attack against the tunnel entrances by artillery or aircraft-delivered munitions—counterattacks that could probably be initiated within a few minutes of the beginning of the assault.<sup>60</sup>

Small infiltrations of North Korean special forces over land and by submarine are probably feasible. But these approaches would limit troop numbers to hundreds or at most a few thousand in any surprise raid—a potent capability only against relatively undefended targets. Moreover, troops infiltrating in this way would not be very mobile, and would generally require a number of hours or days to reach key targets—enormously complicating the task of achieving surprise.<sup>61</sup> These special forces might be able to cause some serious headaches in Seoul, for South Korean civilians elsewhere, and perhaps in some cases for deployment of reinforcements (by blowing up key bridges and the like). But their ability to deploy in force into key South Korean defenses, or other major military assets like airfields, is quite limited.

Finally, North Korean forces continue to fall into increasingly worse shape. A recent significant reduction in field training and major question marks over the availability of fuel, spare parts, and other supplies are the coups de grâce that would almost certainly doom any attack to devastating failure.<sup>62</sup>

### *Modeling an Attempted North Korean Breakthrough Operation*

These qualitative arguments against the plausibility of a North Korean breakthrough, though powerful, are not quite conclusive. Most notably, they fail to integrate different factors and weapons into a single analytic framework or to examine the dynamics of actual battle. Structured quantitative and dynamic

---

60. Indeed, U.S. airpower—tactical fighters as well as, eventually, long-range bombers—could close down a modest number of hardened sites, such as caves sheltering artillery, with high confidence. That could certainly be done for tunnel openings, which would be easily located once large numbers of troops started pouring out of them. See Tony Capaccio, “If War Comes with North Korea, ‘Buffaloes’ Would Crush Caves,” *Defense Week*, April 15, 1996, p. 7.

61. For example, North Korea has some 60 small submarines for special forces, each carrying about a half dozen divers or commandos; even if its two dozen attack submarines were also used to carry troops, and all managed to deploy troops into South Korea successfully, only about 1,000 soldiers would undertake the mission. And it is doubtful that all could set out simultaneously without tipping off allied intelligence that an attack was under way. See IISS, *The Military Balance 1996/97*, p. 187; and Captain Richard Sharpe, ed., *Jane’s Fighting Ships 1995–1996*, 98th ed. (Surrey, U.K.: Jane’s Information Group, 1995), p. 395.

62. Institute for National Strategic Studies, *Strategic Assessment 1997* (Washington, D.C.: U.S. National Defense University, 1996), p. 237; Richard Halloran, “North Korea’s Slide Ends Military Edge,” *Washington Times*, December 13, 1996, p. 18; and statement of Lieutenant General Hughes, “Global Threats and Challenges to the United States and Its Interests Abroad,” p. 6.

simulations of military scenarios can help round out the picture and provide independent assessments of the state of the balance.

How to do this? The discipline of military science does not tell us how to reduce warfare to mathematical equations; there is no widely accepted methodology for doing so. Detailed Pentagon dynamic models of war, in addition to being classified, are often so complex and opaque that they obscure key assumptions built into them. Sometimes they rely on data characterizing various weapons and other defense systems that are not well known, particularly if the technologies have not been realistically tested. There are also reports from sources as reputable as the chairman of the Joint Chiefs of Staff, the congressionally mandated National Defense Panel, and key former Pentagon civilian officials that existing models have major weaknesses—such as a systematic underestimation of the role of airpower.<sup>63</sup> This conclusion is reinforced by the fact that the Pentagon was apparently less accurate in its predictions of U.S. Gulf War casualties than were most independent analysts using much simpler methodologies.<sup>64</sup>

#### KUGLER-POSEN AND EPSTEIN MODELS

Two specific types of simpler dynamic simulations, the Kugler-Posen “attrition-FEBA expansion model” and the Epstein “adaptive dynamic model,” appeared in the international relations literature in the 1980s. Both were applied to the NATO–Warsaw Pact conventional balance in Europe to suggest that the prevailing Cold War pessimism about the Western alliance’s forward-defense posture was overstated, and that in an actual battle NATO stood a very good chance of maintaining a cohesive defensive line while losing little territory. The key inputs to those models were force-to-space ratios, representing the density

---

63. Zalmay M. Khalilzad and David A. Ochmanek, “Rethinking U.S. Defence Planning,” *Survival*, Vol. 39, No. 1 (Spring 1997), pp. 43–64; National Defense Panel, “Assessment of the May 1997 Quadrennial Defense Review” (Arlington, Va.: National Defense Panel, May 15, 1997), p. 8; General John Shalikashvili, “Comments by the Chairman of the Joint Chiefs of Staff,” in Cohen, *Report of the Quadrennial Defense Review*, p. 66; and Eliot A. Cohen, “Toward Better Net Assessment: Rethinking the European Conventional Balance,” *International Security*, Vol. 13, No. 1 (Summer 1988), pp. 50–89.

64. Analysts such as Joshua Epstein, Barry Posen, and Trevor Dupuy predicted that total U.S. casualties would number no more than 10,000 to 15,000—and thus that 2,000 to 3,000 might be killed (assuming one death for every four to five casualties). Press reports suggest that the Pentagon’s estimates were two to three times higher; actual U.S. killed totaled about 400, including those killed in training and deployment during Operation Desert Shield. See Congressional Budget Office, “Costs of Operation Desert Shield” (Washington, D.C.: U.S. Congressional Budget Office, January 1991), p. 15; and Department of Defense, *Defense Almanac 96* (Alexandria, Va.: American Forces Information Service, 1996), p. 44.

of ground units that defenders and attackers could place along a front line of battle (in the case of the Kugler-Posen model); relative ground-force levels between the two sides, adjusted for equipment quality; relative technological levels between the two sides, as well as relative military competence (used to estimate an attrition exchange ratio in both models); the lethality and vulnerability of airpower vis-à-vis assets on the ground; and estimates of attacking forces' rates of advance and attrition based on various historical precedents.

By all of these measures, combined ROK-U.S. forces based in South Korea (and Japan) make out at least as well as NATO forces did in the European context. That means that the models, which rely on only these several key inputs, would also strongly suggest that any North Korean attack could be stopped by the allies with little loss of South Korean territory.<sup>65</sup> Indeed, a thorough analysis by Nick Beldecos and Eric Heginbotham using these two models showed just that, predicting stalemate north of Seoul even under conservative assumptions about allied capabilities and performance.<sup>66</sup>

#### MICROMODELS

It would also be reassuring to reach these conclusions through yet another method that gives a more localized and tactical sense for what could happen on the battlefield. The following analysis attempts to shed some light on the likely fate of North Korean armored vehicles and infantry soldiers as they moved southward into allied defenses. It does so by presupposing an undetected North Korean buildup in one attack sector of roughly 15 kilometers width in the western part of the peninsula, followed by a DPRK thrust south-

---

65. See Posen, "Measuring the European Conventional Balance," and John J. Mearsheimer, "Why the Soviets Can't Win Quickly in Central Europe," *International Security*, Vol. 7, No. 1 (Summer 1982), in Miller, *Conventional Forces and American Defense Policy*, pp. 79–157; Epstein, *Conventional Force Reductions*, pp. 85–106; and Joshua M. Epstein, *Nonlinear Dynamics, Mathematical Biology, and Social Science*, Sante Fe Institute Studies in the Sciences of Complexity (Reading, Mass.: Addison-Wesley, 1997), pp. 19–40.

Specifically, as noted above, force-to-space ratios favor the ROK-U.S. alliance at least as much as they favored NATO's forward-defense posture in Central Europe, without even factoring in the effect of terrain. According to the TASCFORM method, South Korean ground forces are nearly the equal of North Korea's (and undoubtedly better when training is factored in), whereas in Europe the Pact would have had an initial advantage of about 1.5 to 1 that might have improved to 2 to 1 over time according to the best estimates of that day. In Korea combined ROK-U.S. ground-attack planes would be more than half as numerous on day one of a war as NATO aircraft were in Europe, but have only about one-third as many targets to shoot at. And their vulnerability to attack, even if several times greater per sortie than Coalition aircraft in the Gulf War, would be much less than the losses that Pact air defenses were expected to exact.

66. See Beldecos and Heginbotham, "The Conventional Military Balance in Korea," p. 6.

ward across the frontage of that sector. The calculation shows that allied forces could confidently stop a traditional armored thrust into their defensive positions. It also demonstrates that defenses could handle an attack emphasizing the DPRK's artillery and infantry assets.

**NORTH KOREAN BUILDUP.** To what extent could North Korea build up forces in a major attack corridor without detection by allied intelligence prior to launching its breakthrough attempt? (Once the buildup was detected, allied commanders would probably begin to counterconcentrate against it, so the maximum advantage for North Korea would accrue from a reinforcement operation that could be done secretly.)<sup>67</sup>

Western overhead reconnaissance assets generally allow fairly accurate estimates of an adversary's strength to be made. In the Gulf War, for example, Coalition intelligence estimates of Iraqi equipment and manpower at certain points in the war were inaccurate by up to 25 percent or so, but not more than that.<sup>68</sup> Still, it is best to err on the side of conservatism for the purposes of any such calculation, and assume that North Korea might be able to clandestinely establish a force concentration up to 50 percent greater than normal along part of the DMZ. Rather than base only 20 percent of its total firepower along a given axis, for example, it might instead have 30 percent there. A secret North Korean buildup of that magnitude would make for a total force in the attack sector of perhaps 1,000 tanks, 1,000 armored personnel carriers, a total of 3,000 pieces of large-bore artillery, and 500 recoilless rifles. Some 300,000 soldiers might man this equipment and also constitute infantry units with a total of 2,000 mortars, air-defense systems, antitank weapons, and automatic rifles.

Assuming no prior warning of this concentration of North Korean power, allied forces would presumably continue to deploy roughly 20 percent of their own ground equipment in the same corridor, distributed among three defensive lines and mechanized backup forces. The front line of defenses in the sector at issue would then include roughly 100 tanks, of which 50 might be the modern Type 88 or K-1, 150 armored personnel carriers, 400 artillery pieces, 500 mortars, about 10 antitank guns, recoilless rifles, air defenses, antitank

---

67. Some might argue that U.S. and Korean forces would ignore a buildup even once they detected it, given the tendency of countries to find themselves surprised in battle despite observing a number of warning signs in the period leading up to hostilities. But that argument does not seem convincing in the Korean context, given the absence of a peace accord, the most militarized terrain in the world, and a number of serious war scares in recent years. For the general tendency of states to be surprised, see Richard K. Betts, *Surprise Attack* (Washington, D.C.: Brookings Institution, 1982), pp. 3–24.

68. Keane and Cohen, *Gulf War Air Power Survey Summary Report*, pp. 127–128.

weapons such as TOW-2As, and roughly 50,000 troops.<sup>69</sup> Again as much manpower and equipment would back up these frontline forces in the second and third defensive belts combined. Mechanized ROK units and the U.S. Second Infantry Division could move up the corridor once the intensity of the breakthrough attempt was recognized, and airpower could be concentrated there too, but these forces are not assumed to take part in the initial engagement modeled below.

TRYING TO RUN THE GAUNTLET WITH ARMORED FORCES. The typical forward North Korean unit would need to traverse roughly 5 to 20 kilometers of terrain to reach the first line of allied defenses. The following calculation, though simplified, attempts to show the type of challenge it would be up against in doing so. Specifically, it imagines spreading the above North Korean force across the full width of the corridor in question and driving it into allied defenses at relatively high speed. This approach is conservative (i.e., pessimistic) from the perspective of an allied planner, because it minimizes the number of shots that the average North Korean unit would be subjected to compared with other types of tactical maneuvers.

Most movement by DPRK tanks and other armored vehicles would need to take place off roads (possible only in midwinter conditions in most areas). That is because highway bridges would be destroyed, artillery barrages would be targeted heavily on roads, explosive charges would be detonated to provoke rock slides in places where roads are bordered by cliffs, and carpet bombing would be conducted from aircraft onto roads. Under such off-road circumstances, North Korean vehicles would not be able to move very fast. Given that the fastest advances in history against poor defenses have only been about 20 kilometers per day, they would be unlikely to average more than five kilometers per hour as they neared allied positions.<sup>70</sup>

That is a dangerously slow pace for armored vehicles in hostile territory, operating without any real air cover and against dug-in defenders. Against targets moving at 10 kilometers per hour at 2,000 meters distance, for example, U.S. M60A3 tank rounds would expect kill probabilities of at least 0.2 per shot. That would increase to 0.5 per round if the incoming vehicles slowed, for

---

69. Approximately 40 percent of South Korea's infantry forces are in the first line of defenses; in addition, three armor-heavy mechanized infantry divisions would be available to counterconcentrate against the North Korean attack, though their equipment is not figured into these frontline numbers. See Beldecos and Heginbotham, "The Conventional Military Balance in Korea," p. 4.

70. See *ibid.*, p. 1; and Jeffrey Record, "Armored Advance Rates: A Historical Inquiry," *Military Review*, Vol. 53, No. 9 (September 1973), pp. 63–66.

example, to 2 kilometers per hour in places (or if they slowed somewhat less but were at closer range).<sup>71</sup> In the Gulf War, U.S. tanks (primarily M1A1s) may have averaged kill probabilities as high as 0.8 per round, according to U.S. Army data.<sup>72</sup> South Korean Type 88 tanks are of similar or better calibre than M60A3s and perhaps as good as M1A1s. The other principal South Korean tank, the M48, is not as good, although in its modern "A5" configuration it possesses the same gun as the M60A3.<sup>73</sup> All of those tanks can perform well in poor weather conditions, even if their optical ranges are reduced. Modern TOW missiles are also quite effective; even older varieties would do well against the DPRK armored force.<sup>74</sup>

Individual North Korean division-size formations would generally need to be spread out over a depth of at least 5 kilometers and a comparable width.<sup>75</sup> The North Korean force considered here would be the equivalent of at least three armored divisions (and an additional equivalent number of infantry divisions). So even if this force spread itself across the full 15-kilometer attack corridor, it would remain at least 5 kilometers deep. Looked at another way, it would be "an hour" deep—at the assumed pace of 5 kilometers per hour, it would take sixty minutes to cross over a given line from start to finish. That means that an average of 1.5 percent of the DPRK breakthrough force including about 15 tanks and 75 other armored vehicles, would come within firing range of the allied defenses every minute.

Assume that each allied tank round or antitank weapon had a kill probability of just 0.25 against DPRK tanks, a very conservative estimate given the record of modern systems in the Gulf War. Rounds against other types of armor would be at least as effective.<sup>76</sup> If allied forces could fire three shots at any

---

71. Epstein, *Conventional Force Reductions*, p. 69.

72. Robert H. Scales, Jr., *Certain Victory: The U.S. Army in the Gulf War* (McLean, Va.: Brassey's, 1994), p. 81.

73. Colonel Timothy M. Laur and Steven L. Llanso, *Encyclopedia of Modern U.S. Military Weapons* (New York: Berkley Publishing Group, 1995), pp. 232–235; and Foss, *Jane's Armour and Artillery*, p. 68.

74. Laur and Llanso, *Encyclopedia of Modern U.S. Military Weapons*, pp. 227, 235, 270–271; Foss, *Jane's Armour and Artillery*, p. 67; and Department of Defense, *Conduct of the Persian Gulf War*, pp. T-126 through T-129.

75. U.S. Army, FM 71-2; *The Tank and Mechanized Infantry Battalion Task Force* (Washington, D.C.: U.S. Department of Defense, June 1977), pp. 5–12, cited in Posen, "Measuring the European Conventional Balance," in Miller, *Conventional Forces and American Defense Policy*, p. 109.

76. The ROK's 1,700 Korean infantry fighting vehicles have 25-millimeter cannons with hundreds of rounds of ammunition aboard, and are on the whole probably as potent as the U.S. Bradley fighting vehicles against soft-skinned armor. See Foss, *Jane's Armour and Artillery*, pp. 364–365; Scales, *Certain Victory: The U.S. Army in the Gulf War*, p. 275; and Laur and Llanso, *Encyclopedia of Modern U.S. Military Weapons*, pp. 204–206.

given vehicle, its survival probability would thus decrease to only 40 percent. They could generally do this before being seen or fired upon by opposing North Korean vehicles. The DPRK armored formations as a whole would then be weakened roughly to the point of ineffectiveness, without even counting breakdowns or attrition from obstacles, airpower, artillery, and mines, given the common assumption that a unit that loses 50 to 70 percent of its armored strength becomes ineffective.<sup>77</sup>

To achieve these results, allied defenses would need to fire about 50 antitank rounds and 250 other types of antiarmor rounds per minute. Doing so would be straightforward. The allies would, as noted above, be expected initially to have 100 tanks and 150 armored personnel vehicles in the front line of defenses in the corridor in question, and to be able to quickly reinforce with again as many weapons from backup defensive belts. Each of these vehicles could fire at least three rounds per minute, achieving several times the necessary rate of fire (even without counting other weaponry, such as TOW-2A missiles, heavy machine guns, airpower, or mechanized reinforcements). Given that they would generally be firing from prepared positions, they should also have ammunition stocks available to reload if necessary.

What about attrition to ROK armored vehicles? Based on Gulf War data, a technologically superior, well-trained force attacking an exposed adversary could suffer just one-fortieth the losses of its opponent.<sup>78</sup> In this Korean scenario, the matchup might be even more favorable to the United States and South Korea because allied vehicles would be dug in while DPRK tanks and fighting vehicles would be fully exposed. Even if the exchange ratio were only five to one in the allies' favor, they would retain enough firepower in their three frontline defensive belts to decimate the entire DPRK armored thrust.

ARTILLERY AND INFANTRY. The above discussion shows why a traditional armored attack by North Korea would be so straightforward to defeat. But what if its armor were reserved as an exploitation force only, and the initial North Korean attack consisted of massive artillery barrages followed by a huge infantry assault? North Korea's goal would be to use its own artillery to so weaken South Korean artillery and gun positions that DPRK infantry troops would then stand a good chance of overrunning allied defensive lines.<sup>79</sup>

---

77. See Posen, "Measuring the European Conventional Balance," in Miller, *Conventional Forces and American Defense Policy*, p. 92.

78. Biddle, "Victory Misunderstood," p. 167.

79. At least one Pentagon analysis expects the war to begin with such preparatory fire from artillery; see Defense Intelligence Agency, *North Korea*, p. 58.

This scenario is more complex to assess analytically, especially in view of the limited availability of data about North Korean artillery shelters and other factors shaping this type of battle. But simple calculations can shed some light on the basic nature of the artillery and infantry dueling that would occur—and strongly suggest that it too would be heavily weighted in the allies' favor.

First, consider just how vulnerable DPRK soldiers on foot or in jeeps or trucks would be against allied artillery. As noted, South Korea would have about 2,000 mortars and artillery pieces in the front lines of the sector at issue. The lethal radii of mortars and artillery are at least 10 to 20 meters against exposed humans (though just 1 to 3 meters against dug-in positions or armored vehicles like those the allies would benefit from). The sheer density of artillery fire that those 2,000 tubes could produce is staggering. Across the 15-kilometer front, they could essentially maintain a continuous line of lethal fire just to their north. Although they would probably not operate this way, they could theoretically barrage a roughly 100-meter-wide swatch of land across the entire front once per sixty seconds.<sup>80</sup>

This calculation does not even include the additional effects of allied machine guns and other automatic weapons, which could be almost as deadly themselves. For their part, South Korean troops would generally not be vulnerable to such small-arms fire unless their bunkers were directly approached and penetrated. But North Korean troops would be highly vulnerable, day or night, to automatic weapons in the final 200 to 300 meters of their assaults of a given defensive line.<sup>81</sup>

So to stand any chance of success, North Korea would have to first cause massive losses in allied defensive lines with preparatory artillery bombardments. The above calculation suggests, in fact, that it would have to cause allied losses in excess of 50 percent to give its own soldiers a remote chance of surviving transit through perhaps the most dangerous swatch of land in the world. It is very unlikely that it could do so. In this dueling, North Korean tubes would be vulnerable to allied fire guided by counterartillery radars of a type the DPRK does not possess. Instead, it must rely on forward spotters—special forces who would quietly approach South Korean lines and estimate the position of artillery based on sight and sound. Unclassified data permitting

---

80. U.S. Army, *Ranger Handbook*, pp. 6-15 through 6-17, 15-3. W.J. Schultis et al. *Comparison of Military Potential: NATO and Warsaw Pact* (Alexandria, Va.: Weapon System Evaluation Group, June 1974), cited in Stephen Biddle, "Assessing Theories of Future Warfare," paper presented to the 1997 Annual Meeting of the American Political Science Association, Washington, D.C., p. 12.

81. *Ibid.*, pp. 6-20 through 6-24; and Dunnigan, *How to Make War*, p. 64.

precise calculations are unfortunately not available, but allied artillery could easily be three to five times more accurate and at least five times more lethal (even allowing for the hardness of many North Korean artillery shelters) than the more numerous DPRK tubes.<sup>82</sup> Achieving a five-to-one or greater advantage in the artillery duel would more than compensate for the allies' numerical artillery disadvantage of nearly three to one in the attempted breakthrough sector.

The tables could turn even more in the allies' favor if they were able to jam radio transmissions between forward-deployed North Korean spotters and the artillery batteries those spotters were attempting to direct. Also, if the weather cleared at all, North Korean artillery and shelters could be attacked with high effectiveness by an allied air force that already knows most of their locations and could use laser-guided bombs against them.

Still, there are enough uncertainties in this calculation that it may behoove South Korean planners to consider adding more insurance to their frontline posture. Specifically, they might consider purchasing more long-range (and quieter) artillery like multiple rocket launchers, which could be based farther behind front lines and complicate North Korea's attempts to send spotters forward to observe them. (I return to this subject in the conclusion.)

In summary, over a range of scenarios and as assessed by a variety of dynamic techniques, allied defenses look highly capable of stopping North Korean assaults—and exacting a very heavy toll on DPRK forces—before main defensive lines in South Korea could be penetrated. But does this conclusion hold up in the event of chemical attack?

### *Chemical Weapons*

North Korea's only real hope of overcoming this overwhelming array of handicaps is probably to employ weapons of mass destruction. Fortunately, when superimposed on a conventional balance tilted heavily to the allies' advantage, even such extreme measures are highly unlikely to swing the basic course of battle in the DPRK's favor.

The primary concern is chemical weapons. Any nuclear weapons the DPRK may have are unlikely to be of great benefit on the battlefield. If they exist,

---

82. Allied artillery might typically have inaccuracies of a few meters, whereas North Korean rounds might typically be off by several tens of meters, at least initially. For data on modern artillery-tracking radars, see, for example, Jane's Information Group, *Jane's Weapon Systems 1988–1989*, pp. 291–292.

they are probably too big to be transportable by missile, and too few in number to risk being carried in airplanes or armored vehicles where they could well be destroyed before reaching South Korean targets.<sup>83</sup> A surprise North Korean nuclear strike that got through allied defenses might nevertheless be able to create a hole of perhaps one to two kilometers radius in South Korean defensive lines. But that would open up DPRK forces to the prospect of rapid U.S. nuclear retaliation, quite likely in the same sector where they had attacked South Korean defenses—probably denying North Korea the opportunity to exploit the gap that had been created. North Korean biological weapons would probably be too difficult to employ in a militarily effective manner that did not also threaten DPRK troops, and would in any case be of limited benefit in the early days of a surprise attack.<sup>84</sup> Any use of biological weapons would also raise the prospect of allied nuclear retaliation.<sup>85</sup>

Would North Korean leaders really be willing to run the risk of using weapons of mass destruction? They might elect not to use chemical weapons in the hope that, if they then lost the war, their earlier restraint might improve the odds that allied forces would accept a conditional surrender and grant them asylum (especially if they had also shown restraint by not heavily attacking Seoul with conventional weapons). Also deterring them would be the prospect of a nuclear reprisal by the United States. Airbursts over North Korean troops massing in attack corridors on their own territory or within the DMZ would be of relatively high military effect. If low-yield weapons, they would have a lethal radius of no more than several kilometers, probably making it possible to avoid large numbers of allied and North Korean civilian casualties (assuming they were detonated high enough, at an altitude of at least 1,000 feet or so, that their fireballs would not touch the ground and produce significant amounts of fallout).<sup>86</sup>

But initiating any kind of large-scale war would represent a desperation option for North Korea. If it chose to exercise such an option, therefore, it might see little point in showing restraint, instead gambling that the allies would not

---

83. Steve Fetter, *Toward a Comprehensive Test Ban* (Cambridge, Mass.: Ballinger Publishing, 1988), pp. 169–174; and Congressional Budget Office, “Implementing START II” (Washington, D.C.: U.S. Congressional Budget Office, March 1993), p. 48.

84. Defense Intelligence Agency, *North Korea*, pp. 60–62.

85. On the plausibility of using U.S. nuclear weapons to respond to a chemical or biological attack, see R. Jeffrey Smith, “Clinton Directive Changes Strategy on ‘Nuclear Arms,’” *Washington Post*, December 7, 1997, p. A1.

86. Samuel Glasstone and Philip J. Dolan, *The Effects of Nuclear Weapons*, 3d ed. (Washington, D.C.: Department of Defense, 1977), pp. 28–36, 543–570.

escalate to nuclear retaliation. The fact that a number of other countries have used chemical weapons in the past, even as recently as the 1980s, lends further credence to the idea that Pyongyang could see chemical munitions as usable and employ them on a large scale.

#### CHEMICAL ATTACK AGAINST MAJOR FIXED ASSETS

This article focuses on the halt phase of battle, and also assumes only limited effectiveness for allied airpower in the first days of war; as such, the safety of South Korean ports, airfields, and other fixed assets against chemical attack is not of primary concern here. But a word is in order nonetheless. The chief effect of DPRK chemical attacks against such sites would be to slow operations, necessitating that allied forces wear chemical gear and routinely decontaminate that gear as well as other equipment.

For airpower, the tempo of operations might be cut in half by enemy use of chemical weapons (or even the threat of use).<sup>87</sup> But a robust pace of aerial attack could continue nonetheless. Also, airbases in Japan would be out of range of all types of North Korean missiles now deployed<sup>88</sup>—and more Japanese airfields could now be available to the United States in light of the revised 1997 U.S.-Japan Defense Cooperation Guidelines.<sup>89</sup> Any aircraft carriers on station in the region could also be operated out of range of missile attack (though that might not even be necessary, because North Korea would probably not be able to find and target them during hostilities).

Transport ships coming from the United States with reinforcements and supplies could be slowed down by chemical weapons used against major South Korean ports. But the flow of supplies would not be stopped. Smaller vessels could use other ports that had not been contaminated. Also, the United States has several dozen ships with self-contained cranes and an increasing number with roll-on roll-off capabilities that minimize the need for shore equipment. They would make it possible to unload supplies even in ports where fixed shore equipment had been contaminated and not yet rendered usable.<sup>90</sup>

Furthermore, each type of DPRK chemical attack would be difficult to execute properly. Planes conducting aerial attacks—the more effective way to

---

87. Victor A. Utgoff, *The Challenge of Chemical Weapons: An American Perspective* (New York: St. Martin's Press, 1991), pp. 172–181.

88. U.S. Forces Korea, "U.S. Forces Korea in the Republic of Korea, 1997," p. 18.

89. See U.S.-Japan Security Consultative Committee, "The Guidelines for U.S.-Japan Defense Cooperation," September 23, 1997, Section V.2.(2).a.

90. Schmidt, *Moving U.S. Forces*, p. 25.

deliver chemical munitions for maximum effect<sup>91</sup>—would run a high risk of being shot down. Submarines with special forces aboard might be able to literally hand-carry chemical warheads into ports—but that would require penetrating militarily sensitive areas and approaching an unloading area undetected, hardly a trivial undertaking. Developing missile systems to disperse chemical or biological agents is technically challenging. Moreover, in the next few years, improvements in U.S. theater missile defense capabilities may reduce the odds that DPRK missile warheads could reach fixed, well-defended sites.<sup>92</sup> And even if future defenses achieve only modest reliability, present North Korean missiles have average miss distances or “circular errors probable” of about one kilometer—large enough that many ports or airfields might escape the lethal range of chemical warheads anyway.<sup>93</sup>

Other complications could afflict allied logistics, too. Notably, U.S. ships with prepositioned equipment aboard might have to delay their arrival in South Korean ports for days or even weeks, until mine countermeasures ships and attack submarines could arrive in force from the United States to clear out avenues of approach. (North Korea could not conduct this operation extensively without tipping off the allies that war was imminent, but it might be able to lay enough mines clandestinely to cause serious headaches.) Even then, the prepositioning and transport ships would still run some risk of being damaged.<sup>94</sup> But these types of potential delays do not change the fact that frontline allied forces should be capable of stopping an initial attack without U.S. ground reinforcements or even much help from airpower already in the region.

#### CHEMICAL ATTACK AGAINST FRONTLINE TROOPS

In addition to attacks against major fixed assets, North Korea could conduct an artillery barrage with those weapons capable of reaching allied troops from

---

91. Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, OTA-ISC-559 (Washington, D.C.: U.S. Congress Office of Technology Assessment, August 1993), pp. 52–57.

92. Lisbeth Gronlund, George Lewis, Theodore Postol, and David Wright, “The Weakest Line of Defense: Intercepting Ballistic Missiles,” in Joseph Cirincione and Frank von Hippel, *The Last 15 Minutes* (Washington, D.C.: Coalition to Reduce Nuclear Dangers, 1996), pp. 51–60.

93. The lethal radius of a one-ton chemical warhead might be about half a kilometer on a cloudy day with low wind. See Janne E. Nolan, *Trappings of Power* (Washington, D.C.: Brookings Institution, 1991), pp. 33, 70–72; and Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction*, p. 54.

94. For a good analysis of the state of mine warfare technology in the U.S. Navy, and of the nature of the likely threat, see Director of Expeditionary Warfare, *U.S. Navy Mine Warfare Plan* (Washington, D.C.: Office of the Chief of Naval Operations, 1994), pp. 22, 46–65.

their current positions. By using 100 tons of chemical agent, perhaps 40 percent of its total inventory, it could under low-wind conditions contaminate more than 200 square kilometers of territory—enough to blanket allied forces in the attempted breakthrough sector.<sup>95</sup>

Such an attack would probably use nonpersistent or “high-volatility” chemical agents. Use of persistent chemicals might cause very serious troubles to allied forces, who probably do not have adequate protection and decontamination equipment against such attacks.<sup>96</sup> But it would also prevent North Koreans, who likely lack sufficient numbers of good protective suits and would have trouble covering several kilometers of land on foot while wearing them anyway, from exploiting any holes they created in a timely fashion.<sup>97</sup>

Chemical attacks using nonpersistent or “high-volatility” agents would still be very dangerous. But they would generally require only that allied units use gas masks (not suits), and then only for a relatively short time. In addition, although wearing gas masks is always difficult, it is far less taxing when one is manning a fixed defensive position than when on the assault. In that regard, North Korean military leaders could face a difficult choice if attempting to profit from their gas attack promptly—either force their own troops to breathe heavily through gas masks while attacking, or delay the attack (and still leave them vulnerable to gas that might persist longer than expected and be carried in unexpected directions by the wind). South Korea could lose some troops in the very early stages of a chemical attack, if they were surprised. But most troops keep their masks nearby at all times. Even if nothing else did, the flight times of artillery shells would provide a reasonable amount of initial warning. On the whole, the chemical threat against frontline dug-in troops appears modest in magnitude.<sup>98</sup>

This assessment is reinforced by reference to other wars in which chemical weapons were generally not a dominant cause of casualties. For example, in the Iran-Iraq War they were responsible for less than 5 percent of all casual-

---

95. See Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction*, pp. 53–54.

96. For a limited discussion of the needs to improve U.S. chemical protection and decontamination capabilities, see Cohen, *Report of the Quadrennial Defense Review*, pp. 24, 49. For what little information is publicly available on other countries’ detection, protection, and decontamination capabilities, see Terry J. Gander, ed., *Jane’s NBC Protection Equipment* (Alexandria, Va.: Jane’s Information Group, 1995).

97. Militaries short on training can have serious problems in this, as in many other facets of warfare. For example, early in the Iran-Iraq War, Iraq killed more of its own soldiers than of its enemy when employing mustard gas. See David Kay, Ronald F. Lehman, and R. James Woolsey, “First the Treaty, Then the Hard Work,” *Washington Post*, April 13, 1997, p. C7. See also Utgoff, *The Challenge of Chemical Weapons*, pp. 148–188.

98. *Ibid.*, pp. 162–170.

ties.<sup>99</sup> Even in World War I battles involving chemical weapons, when protective equipment was rudimentary, poison gas caused no more than one-third of all casualties and less than 10 percent of all deaths.<sup>100</sup> And when used most lethally in the form of relatively persistent mustard gas, it was often unhelpful for offensive operations because it contaminated large areas of land for an extended period.<sup>101</sup> Given that allied forces have several times the firepower needed to halt a North Korean attack, as demonstrated above, a degradation of several percent in their strength should not change the basic course of battle.

### *Conclusion*

The Korean peninsula is a good place to wage defensive warfare. Possible channels of attack are few and narrow, and the terrain is heavily prepared with explosives and obstacles. Also, the combination of South Korean armed forces and U.S. units in Japan and South Korea makes for a remarkable military capability. The allied defensive posture is the best in the post-Cold War world, bar none. Ground-combat equipment such as M1 and K1 tanks; Cobra and Apache attack helicopters and F-16 fighters; TOW-2A antitank weapons and multiple launch rocket systems with area-effect munitions; advanced all-weather day-night reconnaissance systems; and well-trained, dedicated troops represent enormous power.

Allied forces, with South Korea providing most or all of the ground-combat units in a sector of attempted breakthrough, could almost certainly hold off a North Korean attack. They could do so even if bad weather greatly reduced the effectiveness of allied aircraft early in such a battle and if frozen rice fields, marshes, and rivers were usable by DPRK vehicles. In fact, the allies would chew up DPRK armored forces mercilessly in zones that could wind up resembling the famous Iraqi "highway of death." Dug-in and well-armed allied forces profiting from excellent surveillance and targeting systems would exact a huge toll on advancing North Korean troops; if the attack continued long enough for the weather to clear, the battle would become even more lopsided. North Korean use of chemical weapons would not change the situation markedly, because such an attack is expected, and because it could also hamper the DPRK's offensive operations.

---

99. Cordesman and Wagner, *The Lessons of Modern War, Volume 2*, p. 518.

100. Dupuy, *Attrition*, p. 58.

101. Utgoff, *The Challenge of Chemical Weapons*, pp. 6-7.

This is not to say that the ROK and the United States should be content with their current capabilities. If the confidence with which a North Korean attack could now be stopped is 90 or 95 percent, for example, the goal should be to raise it even higher. For instance, the small chance that DPRK forces would have to effect a breakthrough could be further reduced through better chemical decontamination equipment and better protective gear for South Korean troops. The QDR report acknowledges that U.S. forces themselves are insufficiently able to detect, protect against, and clean up after chemical attack. In fact, roughly \$1 billion is being added for investments in enhanced chemical gear for U.S. troops. The report also implies that similar or greater weaknesses afflict the South Koreans, who would bear the brunt of any attack;<sup>102</sup> so do what few public reports are available on the subject.<sup>103</sup> Being fully ready for a full-fledged and protracted chemical attack would be a prudent insurance policy.

Other improvements in allied and especially ROK forces are also warranted. Most would be sufficiently inexpensive that South Korea could undertake them despite its recent economic setbacks. For example, greater South Korean emphasis on acquiring multiple rocket launchers rather than traditional artillery could complicate North Korea's efforts to conduct counterbattery fire, because rocket launchers have greater ranges and are less noisy. At present, nearly 15 percent of large U.S. artillery pieces worldwide are rocket launchers, but less than 4 percent of South Korea's are.<sup>104</sup> Given the all-weather effectiveness of U.S. multiple rocket launchers against Iraqi troops in Desert Storm, augmenting these capabilities could also partly compensate for any future decision to reduce allied dependence on antipersonnel land mines.<sup>105</sup> So could continued ROK efforts to expand use of tank barriers and obstacles, given that antipersonnel mines are now often used to "protect" antitank mines from removal by enemy forces.<sup>106</sup> In addition, South Korea's ongoing improvements in artillery fire control systems and counterbattery radars, about which little detail is publicly available, should be continued.<sup>107</sup> Finally, if effective theater missile defenses become available, there would be no better place to base them than in Korea.

---

102. See Cohen, *Report of the Quadrennial Defense Review*, pp. 13, 24, 49.

103. See, for example, Rich Roesler, "U.S. Army Chemical Unit Trains S. Koreans," *Pacific Stars and Stripes*, July 24, 1997, p. 3.

104. IISS, *The Military Balance 1997/98*, pp. 19, 185.

105. Department of Defense, *Conduct of the Persian Gulf War*, pp. T-147 through T-150.

106. Ministry of National Defense, ROK, *Defense White Paper 1996-1997*, p. 82.

107. *Ibid.*, p. 106.

Although the subject is beyond the scope of this analysis, major arms control measures could also make good sense in Korea; the new South Korean president, Kim Dae Jung, and U.S. officials should consider them. Nothing about ensuring the viability of the allied military deterrent precludes simultaneous efforts to improve security through other means. My own preference would be for an arms control regime that required considerably greater verifiable force reductions from the DPRK than from the allies, but that was combined with the offer of substantial economic assistance to North Korea. The Pyongyang regime, though militarist and hard-line, has demonstrated the ability to respond flexibly to compelling appeals to its core interests before, notably in the 1994 nuclear reactor deal, and may be willing to do so again.<sup>108</sup> But for now, such arms control regimes clearly cannot be presupposed.

This article also does not answer the question of how many U.S. and ROK forces, and of what type, might be needed in any attempt to counterinvade North Korea, overthrow its government, and reunify the peninsula under Seoul's control. Given the likelihood that such an operation would follow any attempted North Korean breakthrough effort, a complete military analysis of the Korean peninsula cannot be conducted without full consideration of that scenario.<sup>109</sup>

Nonetheless, the results presented in this article are directly relevant to U.S. force planning. If North Korean forces could be stopped in their tracks with very high confidence, the likelihood that large numbers of American forces would need to participate in two Desert Storm-like counteroffensives almost simultaneously would decline appreciably. With a North Korean attack defeated, Seoul already largely evacuated, and DPRK forces vulnerable to extended aerial bombardment, a counterinvasion and occupation could be delayed if necessary. Moreover, if North Korea attacked with the abandon assumed here, its forces would be severely weakened during the halt phase itself. They might be incapable of holding off a counterattack thereafter, even if it were not significantly aided by U.S. ground forces.<sup>110</sup>

---

108. On the latter point, see Leon V. Sigal, "The North Korean Nuclear Crisis: Understanding the Failure of the 'Crime-and-Punishment' Strategy," *Arms Control Today*, Vol. 27, No. 3 (May 1997), pp. 3–13. See also Bruce G. Blair and John D. Steinbruner, "Northeast Asia and U.S. Nuclear Planning"; Michael O'Hanlon, "Conventional Arms Control on the Korean Peninsula"; and Mike M. Mochizuki, "Crisis Management in Korea," in Sung-Han Kim, ed., *Crisis Management on the Korean Peninsula: Korea-U.S. Responses* (Seoul: Institute of Foreign Affairs and National Security, 1997), pp. 13–19, 21–29, 75–85.

109. See Oberdorfer, *The Two Koreas*, p. 312.

110. Similarly, in 1992 then-Representative Les Aspin (D-Wisc.) argued that the U.S. contribution to any future defense of South Korea could probably be handled just by a Desert Storm equivalent

This line of logic should not be pushed too far. Specifically, it would be unwise to weaken the U.S. commitment to South Korea's defense or to make an additional sweeping round of cuts in the U.S. defense budget.<sup>111</sup> In a worst case, things could still go wrong during an initial halt-phase operation. More likely, pressures for a rapid counterinvasion involving large U.S. forces could indeed arise under certain circumstances. For example, if Seoul and Washington had serious reason to worry that North Korea might be nearing completion of a nuclear device as a war unfolded, they might do everything possible to overthrow the Pyongyang government before it could use such a weapon.<sup>112</sup> Also, if Pyongyang limited itself to an initial probing or standoff attack, but then held its fire and its positions, any immediate counterattack by ROK-U.S. forces would encounter the bulk of the North Korean military. That battle in turn might require large U.S. reinforcements. For these reasons, my recommendations for U.S. defense planning are more nuanced and moderate than my disagreement with the Pentagon over the state of the Korean military balance and the likely early course of any war on the peninsula.

But the implications are significant nonetheless. They can do much to relieve the mounting budget pressures on the Pentagon. U.S. national security spending is set to decline more than \$20 billion under the recent balanced-budget act, from roughly \$267 billion in 1998 to \$245 billion in 2002 (as expressed in constant 1998 dollars). Yet the Pentagon's equipment procurement budget will soon need to increase in order to keep the force safe and reliable and carry out at least some targeted modernization programs. Savings from base closures, other reforms, and the QDR's modest additional personnel cuts will not begin to free up the necessary resources.<sup>113</sup> Nor is it likely that more money will

---

of airpower, one heavy brigade on the ground as a tripwire, and potential use of an amphibious assault capability. See Les Aspin, chairman, House Armed Services Committee, "An Approach to Sizing American Conventional Forces for the Post-Soviet Era," White Paper, January 24, 1992, pp. 16-17.

111. For studies that make such an argument about the feasibility of large U.S. spending cuts and/or strategic retrenchment, see Eugene Gholz, Daryl G. Press, and Harvey M. Sapolsky, "Come Home, America: The Strategy of Restraint in the Face of Temptation," *International Security*, Vol. 21, No. 4 (Spring 1997), especially pp. 17-30; and William W. Kaufmann, *Assessing the Base Force: How Much Is Too Much?* (Washington, D.C.: Brookings Institution, 1992), pp. 48-62.

112. Saving Seoul from artillery, missile, and special-forces attack would almost assuredly *not* provide a plausible reason to hurry a counterinvasion. Too much damage could be done too quickly. Even if deploying just two or three U.S. divisions provided enough combat punch when teamed with ROK forces, to initiate the counteroffensive, that deployment would still take a month or so to complete. And deploying the full number of forces envisioned under the BUR and QDR would take at least 75 days. See Schmidt, *Moving U.S. Forces*, p. 79.

113. The Congressional Budget Office estimates that annual real funding would need to go up by roughly \$20 billion (though perhaps as much as \$40 billion) to sustain the planned force through

rapidly appear as a result of real increases in defense spending after 2002 or privatization of many defense support activities. To keep the armed forces ready and ensure that their aging equipment remains reliable and safe, force structure will probably have to be cut by another 10 percent or so, primarily in ground and naval units.<sup>114</sup>

This article demonstrates that such reductions are indeed feasible. Specifically, it presents a strong rationale for a U.S. military strategy premised on the capability to fight one and one-half rather than two overlapping major theater wars. Adding in smaller forces for a significant operation other than war, as would be prudent, the resulting “Desert Storm plus Desert Shield plus Bosnia” active-duty force posture would still remain roughly 90 percent as large as under the “two Desert Storm” approach of the QDR. But the cuts in forces, together with some judicious choices about which weapons modernization programs can be pared back, would save enough money to redress the looming funding shortfall that continues to haunt the Pentagon.<sup>115</sup> At the same time, some further selected improvements in U.S. transport and prepositioning capabilities could help the U.S. military deploy forces of Desert Shield magnitude to a major theater war faster than they could today—improving the odds of a successful initial defense in Southwest Asia and providing enough force to quickly begin a counterinvasion of North Korea should that be deemed necessary.<sup>116</sup>

The alternative approach—keeping a larger U.S. force than needed—is at best a waste of money. More likely, given fiscal constraints and political realities in the United States, it is a prescription for damage to readiness and troop morale, a gradually atrophying Defense Department equipment stock, and even greater American reluctance to engage in peace operations like that in Bosnia. All these outcomes would badly serve the United States and the international community.

---

the next decade and beyond. See “CBO Finds Potential \$55 Billion or Higher Defense Budget Shortfall,” *Inside the Pentagon*, November 6, 1997, p. 1.

114. For a fuller development of this argument, see O’Hanlon, *How to Be a Cheap Hawk*.

115. For more on weapons modernization, see Andrew F. Krepinevich, *The Air Force of 2016* (Washington, D.C.: Center for Strategic and Budgetary Assessments, October 1996); and O’Hanlon, *How to Be a Cheap Hawk*. For general thoughts on the declining importance of “platforms” such as ships and fighters, and increased importance of sensors, munitions, and electronics, see Joseph S. Nye, Jr. and William A. Owens, “America’s Information Edge,” and Eliot A. Cohen, “A Revolution in Warfare,” *Foreign Affairs*, Vol. 75, No. 2 (March/April 1996), pp. 20–25 and 44–46, respectively.

116. See O’Hanlon, *Defense Planning for the Late 1990s*, pp. 42–72.