

**AFTER CONVENTIONAL CUTS:
NEW OPTIONS FOR NATO GROUND DEFENSE**

Carl Conetta and Charles Knight

Institute for Defense and Disarmament Studies
2001 Beacon Street
Brookline MA 02146 USA
617/734-4216

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Preface

Advocates of nonoffensive defense have routinely had to meet the criticism that their thinking was too far ahead of the times or that it failed to address the strategic verities governing NATO defense policy. But times change. Things considered virtually unthinkable within the defense establishment just six months ago are accepted as commonplace today. However, change has come largely by virtue of "new thinking" and new policy initiatives on the Eastern side. Although Western policymakers have now begun to face the future, they have not yet begun to *make* the future. NATO policy changes -- such as the decision to abandon deployment of a follow-on to the Lance missile -- still have the feel of concessions to reality. And, of course, nonoffensive defense is not yet on NATO's public agenda; indeed, several Western military establishments continue to extol the virtues of deep-attack doctrines and forces.

Today, one advantage that the alternative defense paradigm enjoys over its official counterpart is that it wears better against the winds of change. The following analysis was substantially complete in October 1989 -- before the full implications of the revolution in Eastern Europe became clear. Yet, the analytical framework it offers and the policy guidelines it advances remain relevant.

Following a brief introduction, Part One provides a framework for understanding the evolving dilemmas of European defense and for assessing policies meant to address these dilemmas. Part Two uses this framework to evaluate NATO deep-attack doctrines and structures. Part Three presents guidelines for developing an alternative defense posture and evaluates a detailed proposal for NATO nonoffensive defense -- the spider-and-web model. Appendix 1 contrasts this nonoffensive defense model with others, making clear why we chose to present the spider-and-web model as the best alternative to current policy. Finally, Appendix 2 examines and responds to the standard criticisms of nonoffensive defense.

Although our critique and alternative to NATO policy reflect the disposition of European conventional forces circa 1989, our overall analytical framework provides a basis for evaluating recent changes in policy and for progressively adjusting our alternative policy prescriptions.

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Carl Conetta
Charles Knight

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1. Introduction

The recent, remarkable changes in Soviet and East European domestic politics and security policy have overturned many of the longstanding premises of NATO's defense strategy. To Western publics, the changes in the East make possible what economic and demographic constraints make necessary: a significant reduction in the size of NATO's standing military. Yet, as NATO contemplates deep cuts it will face the issue of maintaining the essential coherence of its defense strategy. And, although conventional force parity is a likely result of the first phase of the negotiations on reducing conventional forces in Europe (CFE), parity alone will not guarantee stability.¹ Moreover, the broader process of political change in Europe is giving rise to new stability concerns regarding, for instance, the future of Germany and nationalism in the East.

If NATO is to make the most of the opportunity to achieve greater stability and security in Europe at significantly lower levels of force, it must fashion a security policy that aligns defense and arms control objectives with the new political, economic, and demographic realities. In the following we examine one component of present NATO security policy -- ground defense of the central front -- and set out an alternative: the spider-in-its-web defense.² By comparison with present policy, this alternative, comprising a mix of light-static and heavy-mobile forces, would better meet the requirements of stability at lower levels of force, and promises a more effective defense under the conditions likely to prevail on a future European battlefield.

¹ The destabilizing effect of offense-oriented forces could increase with substantial arms reductions even if a state of parity is reached. See Albrecht von Mueller, "Conventional Stability in Europe: Outlines of the Military Hardware for a Second Detente" (working paper of the Research Program on Stability-oriented Security and Defense Policies, Max Planck Society, Starnberg FRG, 1987).

² See Lutz Unterseher, "A Different Army: Essential Details," in Study Group on Alternative Security Policy, *Vertrauensbildende Verteidigung -- Reform Deutscher Sicherheits-Politik* (Gerlingen: Bleicher, 1989). An English-language translation of this chapter is available from the Institute for Defense and Disarmament Studies, Brookline MA 02146, USA. For a short introduction in English see John Grin and Lutz Unterseher, "The Spiderweb Defense," *Bulletin of Atomic Scientists*, Vol 44, No 7, September 1988.

2. NATO Ground Force Posture and the Goal of Greater Stability at Lower Levels of Force

The conventional component of NATO's strategy for defending the central front has been shaped by political, economic, and demographic constraints on the size of NATO's standing, theater-deployed forces and by NATO's lack of defensive depth. The force constraints preclude a *cordon* defense of sufficient troop density to block all potential points of enemy concentration -- giving rise to NATO's "force-to-space" problem. At the same time, it is argued, depth constraints preclude solving this problem by sacrificing space to gain the time needed to fully mobilize and deploy NATO reserves.

US Army planners sought to resolve this dilemma in their 1982 AirLand Battle doctrine by returning depth and maneuver to NATO's defense, but without resorting to a space-for-time tradeoff. Instead, relying on larger tactical and operational reserves, NATO units would quickly assume the offensive, attacking the flanks and rear of the invading force. Primarily, AirLand Battle seeks to win not by massing combat power in frontal engagements, but rather by applying it in a way that disorients, dislocates, and hence softens-up an adversary for defeat. These key features of AirLand Battle doctrine have their counterparts in the unified NATO doctrine set out in the 1983 *Allied Tactical Publication 35(A)*. Complementing plans for counteroffensive maneuver is NATO's Follow-On-Forces-Attack (FOFA) concept, which prescribes using deep fire to attack the WTO's second echelons and other military assets in the rear. Under this scheme NATO can break the tempo of a WTO offensive, support counteroffensive maneuvers by its own units, and alter to the West's advantage the ratio of forces being fed into the close-in battle.³

NATO planners hope that by emphasizing operational-level counteroffensive maneuver and deep-fire missions, the alliance can make optimal use of its maneuver and firepower assets and extend the battle eastward, thereby compensating for both force-level and depth constraints. They also see deep attack and counteroffensive maneuver as a means to regain initiative and quickly conclude a war on terms favorable to the alliance. Expected radical changes in the conventional balance after the implementation of an initial conventional force reduction (CFE 1) treaty have only begun to stimulate official discussion of changing NATO's present doctrinal

³ For a summary of FOFA concepts see *New Technology for NATO: Implementing Follow-On Forces Attack* (Office of Technology Assessment, Washington DC: June 1987), chapters 3-6. For a presentation of AirLand Battle Doctrine see, *Field Manual 100-5, Operations* (Department of the Army, Washington DC: June 1984).

emphasis.⁴ As we will show in the following sections, this emphasis is in several respects inconsistent with the treaty mandate's stated goal of creating greater stability in Europe at significantly lower levels of force.

2.1 Stability Problems

Both AirLand Battle and its predecessor, Active Defense, entail force structures and deployments that render ground forces vulnerable to preemptive attack. The deployment of the majority of ground forces in large, concentrated units -- whether close to the border (as in Active Defense) or farther back in large operational reserves (as in AirLand Battle) -- presents attractive targets for precision-guided and area-fire weapons.

AirLand Battle deployment patterns introduce additional stability problems since they make necessary early mobilization in times of heightened tension. By planning to mobilize early NATO commanders hope to reduce the uncertainties inherent in NATO's current defense scheme, which holds a substantial portion of Western defense forces far back from the border to be defended. In the event of a crisis, field commanders would want to move their mechanized battalions 50 kilometers or more to the east, into prepared positions. But eastward movement by heavy units trained and equipped for wide-ranging maneuver at a time of political tension would be highly provocative. Thus, NATO political authorities would face an unattractive choice: either delay mobilization and accept the attendant uncertainties in hope of defusing the crisis, or take steps that will mitigate the military uncertainties but increase the likelihood of armed conflict.

Although NATO's maneuver and deep-fire assets are integrated within an overall defensive posture, "any military force that can effect a mobile defense surely has significant offensive capability," as John Mearsheimer points out.⁵ In the future, this capability will grow by virtue of asymmetrical Soviet force reductions and the disintegration of the WTO. On the Soviet side, contingency planning may fixate on the possibility, however remote, of a Western limited-aims offensive. Of more immediate concern to Soviet leaders might be the political effect of a Western cross-border offensive capability, or perceptions of such a capability, on events in Eastern Europe. If Soviet military planners take such "worst case" thinking seriously, as surely they must, then any substantial NATO deep-attack capability would contribute to

⁴ For a detailed assessment of current force reduction proposals, see Forsberg, et al, *Cutting Conventional Forces 1: An Analysis of the Official Mandate, Statistics, and Proposals in the NATO-WTO Talks on Reducing Conventional Forces in Europe* (Institute for Defense and Disarmament Studies, Brookline MA: 1989).

⁵ John Mearsheimer, "Maneuver, Mobile Defense, and the NATO Central Front," *International Security*, Vol 6, No 3, Winter 1981/82, footnote, p 110.

instability in a crisis and generate tensions between East and West. And this effect will increase as the Soviet Union withdraws its forward-deployed forces behind Soviet borders. Given current trends in the East, the wisest course for NATO is to reassure Soviet leaders that a continuing reduction in their Europe-deployed and -oriented forces will not lead to greater Western military prerogatives in the East.

2.2 NATO's Force-to-space Problem

Western analysts have long argued that NATO lacks the forward-deployed standing troop strength it needs for a stalwart conventional defense of Western Europe against a Soviet assault. Just as important in this calculation as the East-West balance is the ratio of NATO's forces to the space they must defend -- a ratio that many contend would vary little with changes in the force balance. Many argue that because current NATO force levels barely meet the minimum force-to-space requirement for a reliable defense, the alliance has little latitude for negotiating substantial cuts in its ground forces, or for reducing them in accordance with new economic and demographic conditions.⁶ However, most NATO estimates overlook the role of doctrine and force structure in determining force-to-space requirements. In fact, NATO's present force-to-space quandary results from the interaction of two problems: NATO's relative lack of defensive depth, and *its reliance on force structures, deployments, and operational concepts that do not make the most of available depth.*

To better understand the nature of this interaction, it is helpful to adopt the distinction, suggested by B H Liddell Hart, between the minimum *strategic* (meaning "theater-strategic") force-to-space requirement, which applies across an entire front, and the minimum *tactical* (meaning battlefield) requirement.⁷ Estimates vary widely for the tactical force-to-space requirement,⁸ but seldom are these given as a range of values, as might be expected, given the many variables involved.⁹

⁶ In 1988 Stephen Flanagan and Andrew Hamilton calculated that NATO required 40 division equivalents for a robust defense. And, because NATO central region strength would not exceed 43-45 equivalent divisions until US reserve component forces arrived, Flanagan and Hamilton argued that NATO force levels were already near the minimum required. They concluded that given "the relative ease with which any Soviet forces or equipment withdrawn could be reintroduced" into the area, "arms control is unlikely to diminish Western military requirements substantially." In a similar vein, NATO commander General John Galvin writes, "Reductions...could not cut very deep before the considerations of terrain and force-to-space ratios would become a dominant factor." Flanagan and Hamilton, "Arms Control and Stability in Europe," *Survival* Vol 30, No 5, Sept/Oct 1988, p 456. General Galvin, "Some Thoughts on Conventional Arms Control," *Survival* Vol 31, No 2 March/April 1989, p 103.

⁷ B H Liddell Hart, *Deterrent or Defense: A Fresh Look at the West's Military Position* (New York: Frederick A Praeger, 1962), p 170.

⁸ William Mako quotes estimates for divisional defensive frontage ranging between 30 and 60 kilometers. Barry

Most analyses focus, perhaps understandably, on determining the minimum for those sectors especially susceptible to armored assault. But such analyses should not be expected to generate estimates that are applicable across the entire front. Further, as some analysts note, since the end of World War II estimates of the force-to-space minimum have not kept pace with improvements in the surveillance, target acquisition, and firepower capabilities of combat units.¹⁰ These analytical shortcomings are likely to lead to an overestimation of tactical requirements. Regarding the theater-strategic or whole-front minimum requirement, a different sort of problem leads to a similar predicament: NATO's current doctrine, force structure, and operational plans may actually *increase* its theater-strategic force-to-space requirement.

The relationship between the tactical and theater-strategic minima has several determinants: the length and permeability of the border to be defended, the susceptibility of the defense to surprise attack, the available defensive depth, and the defender's mobility relative to an aggressor's likely rate of advance.¹¹ Also relevant is the number of primary attack axes an aggressor can effectively employ, which in turn correlates directly with the size of the aggressor's ground force.

Posen proposes 25 kilometers as a conservative estimate. See William Mako, *US Ground Forces and the Defense of Central Europe* (Washington DC: Brookings, 1983), pp 36-37; and Barry Posen, "Measuring the European Conventional Balance," *International Security*, Vol 9, No 3, Winter 1984, p 74.

⁹ The tactical minimum for each sector is determined by several factors: the amount of force an attacker can optimally concentrate; the nature of the terrain; the degree to which the defender has prepared the battlefield; the quality of the defender's reconnaissance, surveillance, and target acquisition assets; the range, quantity, and lethality of the defender's fire; and the mobility of the opposing forces, assessed relative to each other and their individual missions. To determine local reserve requirements, it is necessary to calculate defense advantage, which depends on how the defender chooses to deploy and fight. Finally, the tactical minimum depends heavily on the specific mission of the defending units. In all cases units will seek to detect an invading force; in most cases they will also seek to engage it. But beyond this, will they attempt to delay, contain, or defeat the invader? The answer will vary from sector to sector, depending on overall theater strategy.

¹⁰ In *Deterrent or Defense*, Liddell Hart observes that frontages have not increased proportionately with weapon development, although area control hinges significantly on the ability of a force to rain a "curtain of fire" on any intruder. In 1979, the US Army estimated that its mechanized divisions in Europe had about five times the firepower of 1950 armored divisions, and that improvements in the 1980s would again "dramatically increase divisional capabilities." *Field Manual 71-100: Armored and Mechanized Division Operations* (US Department of the Army, Washington DC: 1979) p 1-3.

¹¹ Liddell Hart argues that the historical differences between the minimum tactical force-to-space ratio and the theater-strategic minimum ratio "shows that the crucial factor in the defense of any wide front is the time factor. This turns not only on the relative mobility of the attacking and defending forces, but on the defender's correct appreciation of the attacker's line of advance. And also on the degree to which the attacker's mobility is cramped by natural obstacles, fortifications, and counter threat." Liddell Hart, *Deterrent or Defense*, p 174.

Because NATO lacks defensive depth, it can neither confidently trade space for time nor easily wield operational reserves to quickly block a WTO penetration. The Active Defense solution to this problem was to develop a capability to defend far forward along *all potential avenues of advance* until reinforcements could arrive. But even granting the feasibility of some lateral reinforcement, this approach increased NATO's theater-strategic force requirements. In a sense, NATO required redundant standing forces in the theater; lacking these, it faced a theater-strategic force-to-space problem.

The AirLand Battle solution, by contrast, makes larger operational reserves available for use in counteroffensives. The doctrine addresses the risk of NATO armies running out of depth by prescribing early offensive action. But because this approach requires surrendering in good part the advantages of fighting on the defensive, it means wagering heavily on the early success of operational-level counteroffensive action. NATO has hedged this bet by setting a high quota for operational reserves. As a consequence, however, NATO once again faces a need for redundant forces.

Viewed from this perspective, the prospects for arms reduction appear quite limited. Because NATO's need for redundant forces arises in part from its lack of defensive depth, the requirement will not decrease proportionally with Eastern arms reductions. Although such cuts might reduce the number of possible simultaneous Soviet attack axes, these could still fall anywhere. So, as before, NATO must prepare to defend everywhere. Facing fewer attack axes, NATO might enjoy greater freedom to redeploy reserves, but an aggressor could prevent NATO from making optimal use of reserves by keeping the axes of attack widely separated.

Resolving this quandary begins with the recognition that NATO's theater-strategic force-to-space requirement hinges as much on overall force structure, deployment, and operational plans as it does on the immutable features of the European theater. Greater stress on countermobility operations and consistent area coverage, for instance, would increase the time and effective depth at NATO's disposal. Placing greater emphasis on light units performing some of the less-demanding functions of a covering force would lessen the requirement for heavy units.¹² And the wider employment of static light units in an area-covering role would create greater opportunities for using reserve forces. Such changes would lower NATO's theater-strategic requirement for active-duty troops and heavy units, thus opening the way to a more responsive arms control policy.

¹² Typical defensive covering force missions include destroying enemy reconnaissance and air defense elements, forcing the enemy to deploy, reinforcing terrain with barriers and obstacles, identifying an aggressor's main attack area and strength, and identifying and disrupting follow-on forces. Major James K Greer, "A Light/Heavy Covering Force in Europe," *Military Review*, Vol 31, No 2, July 1988.

US Army thinking is already moving in the general direction of "lightening" the force mix in Europe.¹³ Citing the work of retired FRG General Franz Uhle-Wettler, NATO commander General John Galvin suggests that light forces defending towns and forests could provide defensive strongpoints around which heavy units could pivot.¹⁴ These pivot points would limit an aggressor's freedom of movement while screening the actions of friendly units. Such an arrangement responds to the concern that lower force density in Europe might, in the case of war, mean a more fluid battle with greater opportunities for deep penetration. Former US Army Chief of Staff General Edward C Meyer (retired) suggests that after the implementation of a first-phase CFE agreement, mobile light forces employing new defensive non-armor technologies, like the US High Technology Motorized Infantry Division, might play a bigger role in border defense.¹⁵ The US Army's new "Heavy-Light Assessment" is examining such ideas, along with proposals for increasing the mobility and firepower of light units.

None of the changes in force mix under open discussion by the NATO command stray very far from the prevailing NATO orthodoxy, however. NATO planners view options for lighter forces only in the context of continuing and upgrading operational maneuver and deep fire capabilities.¹⁶ In general, they have made no attempt to address the stability problems created by current strategy. However, given a dramatic reduction in the number of tanks deployed in the region and significant Soviet withdrawals from Eastern Europe, highly mobile lighter forces might prove more destabilizing than current deployments. And, because Eastern leaders would probably want to include highly mobile light forces in the arms reduction process, wider employment of these would not help resolve the tension between meeting force-to-space requirements and maintaining momentum in the reduction process.

¹³ See Michael J. Mazarr, "The Light-Heavy Debate Rears Its Head Again," *Armed Forces Journal International*, October 1989. For an overview of possible roles for light mobile forces in Europe see Steven Canby, "Military Reform and the Art of War" in Asa Clark IV, et al, eds, *The Defense Reform Debate* (Baltimore: John Hopkins University Press, 1984); and, Canby, "Territorial Defense in Central Europe," *Armed Forces and Society*, Vol 7, No 1, Fall 1980.

¹⁴ "NATO Ponders Troop Mix in Europe," *New York Times*, 30 November 1989.

¹⁵ Henry Owen and Edward C Meyer, "Central European Security," *Foreign Affairs*, Vol 68, No 3, Summer 1989, pp 32-37.

¹⁶ See "Galvin: Mobility and Interdiction to Gain Importance After CFE," *Aerospace Daily*, 20 October 1989; and Gary Guertner, "Conventional Deterrence After Arms Control," *Parameters*, Vol 19, No 4, December 1989, p 73.

3. The Operational Limits of Deep Fire and Maneuver Warfare

According to the rationale for emphasizing operational counteroffensive and FOFA capabilities, these provide a guarantee that if NATO comes under attack, it can quickly regain battlefield initiative and conclude the conflict on favorable terms. Even in a state of numerical parity after CFE 1, an attacker would enjoy the important operational advantages of setting the time, place, and initial pace of battle. Ending a conflict quickly requires more than fighting an aggressor to a standstill -- a process that could exhaust both sides. To actually defeat aggression, the defender must recast the terms of battle. But the attractiveness of AirLand Battle and FOFA in this regard rests on unduly optimistic assumptions about (1) the degree of comparative advantage in weapon performance the West can attain by integrating emerging technology; (2) what can be accomplished by wide-ranging maneuver and the suitability of current structures for such operations; and (3) the successful exercise of command and control under conditions of high-intensity combat. The following sections take a closer look at these issues, with the aim of further clarifying the minimum requirements for a viable European defense posture for the 1990s.

3.1 The False Allure of FOFA

NATO's existing deep-attack capabilities fall far short of those called for by FOFA or even AirLand Battle.¹⁷ Current reconnaissance, surveillance, and target acquisition (RSTA) systems cannot provide the type of continuous, broad, and deep coverage of both stationary and mobile systems required for disabling strikes against second-echelon units. Available non-nuclear munitions for long-range systems are effective against soft area targets and some hard, fixed targets, but not against armor in motion. Furthermore, at present, aircraft provide virtually the only means of delivering munitions beyond the immediate battle area; yet those aircraft capable of deep strikes are already assigned to other missions, such as Offensive Counter-Air (OCA). Even if these aircraft assumed a FOFA role, NATO studies of the similar OCA mission suggest they would suffer an unacceptable rate of attrition.¹⁸

¹⁷ See *New Technology for NATO*, Office of Technology Assessment; Steven Canby, "New Conventional Force Technology and the NATO-Warsaw Pact Balance: Part I," Adelphi Papers, No 198 (London: International Institute for Strategic Studies, 1985); and John Grin, "Reconnaissance and Target Acquisition Systems for FOFA: Assessing Military Effectiveness and Implications for Crisis Stability," doctoral dissertation, Department of Physics, Free University of Amsterdam, chapter 10.

¹⁸ The NATO study estimates that for each WTO aircraft destroyed on the ground by NATO aircraft flying

Forthcoming airborne RSTA systems -- like the Joint Surveillance Target Attack Radar System (J-STARS) -- may make deep attack more feasible. But to be effective to the depths required by FOFA, surveillance craft would need to fly near or over the Forward Edge of the Battle Area (FEBA), making them susceptible to enemy interceptors and ground-based air defense. J-STARS-equipped aircraft could mitigate this by flying farther back and only occasionally rushing forward, but this would render them incapable of tracking targets deeper than 80 kilometers beyond the FEBA.¹⁹ Even flying near or over the FEBA would compromise the capacity of future RSTA systems to track targets deep in enemy-held territory because such targets are frequently masked by terrain and they are easily shielded by jamming. Moreover, discerning the value and mission of enemy assets and units becomes more difficult as their distance beyond the immediate battle area increases, making it difficult to optimize deep fire.²⁰

Overall, FOFA illustrates an unfortunate tendency to build new operational concepts around the assumption that currently immature technology can be employed successfully in the near term and at the margins of tested effectiveness to achieve dramatic new combat effects. This approach can only ensure suboptimal use of emerging technologies.

A better approach to the integration of new technology would seek a balanced increase in combat performance, reliability, and maintainability -- as well as reduced cost. Rather than attempting a "great leap forward" in combat capabilities, NATO planners should seek to increase the probability of success of *already feasible* missions through synergistic integration of new technology and existing technology and methods. One study of FOFA capabilities has concluded that because the limits on the performance of deep-strike technology are inversely related to target depth, the new technology can be used more efficiently to fight the close-in battle.²¹ And the priority of the close-in battle can only increase as force reductions thin the Soviets' follow-on echelons.

Offensive Counter-Air missions, the West would also lose one plane to the East's air defense system. "NATO's Central Front," *The Economist*, 30 August 1986.

¹⁹ An Office of Technological Assessment report concludes that the system "could provide good coverage to at least the range of an MLRS rocket." John Grin concludes that J-STARS could provide reliable target acquisition up to about 80 km. See *Follow-on Forces Attack*, Office of Technology Assessment, p 149; and Grin, "Reconnaissance and Target Acquisition Systems for FOFA."

²⁰ Canby, "New Conventional Force Technology," pp 90-91.

²¹ For a summary of the report, produced by Industrieanlagen-Betriebsgesellschaft mbH of Munich, see *New Technology for NATO*, Office of Technology Assessment, p 214.

3.2 The Limits of Maneuver Warfare

As in the case of deep fire, a number of factors combine to make existing plans for counteroffensive maneuver unrealistic. Although today's mechanized divisions, with their high ratio of vehicles to troops, might appear well-suited to wide-ranging maneuver, neither side in a future European war could easily achieve the type of mobility *advantage* that provided the foundation for the World War II practice of blitzkrieg. Effective maneuver also requires an advantage in intelligence, communication, and information-processing capabilities. In this area too, as John Mearsheimer writes, "It is highly unlikely that such a disparity in capabilities will obtain in a war between the Warsaw Pact and NATO."²²

Indeed, commanders attempting a maneuver-based defense will find it difficult to locate and attack the flanks or rear of a force with comparable maneuver capabilities. Given NATO's current forces, the likely result of maneuver counterattacks would be a series of meeting engagements in which NATO units could not avail themselves of the advantages of fighting on the defensive.²³ And because a maneuver-based defense (at present force levels) means bigger gaps in the forward defense line and exposed flanks, it entails greater risks.²⁴

Apart from the West's lack of a reliable maneuver *advantage* and the uncertainties inherent in maneuver-based defense, NATO's existing mechanized units are structurally ill-suited for the type of rapid, wide-ranging movement prescribed by AirLand Battle doctrine.²⁵ This becomes obvious when maneuverability is measured by a yardstick other than the ratio of troops to vehicles. Neither the command, control, communications, and intelligence (C3I) systems nor the sustainment infrastructure of most NATO armies are well adapted to maneuver warfare. Also, the great size of today's mechanized units presents a daunting problem. These shortcomings constitute a hardware-doctrine mismatch that could, in war, render NATO's defense efforts incoherent.

²² Mearsheimer, "Maneuver, Mobile Defense, and the NATO Central Front," p 112.

²³ See Mearsheimer, *Maneuver*, pp 112, 113.

²⁴ Edward Luttwak argues, "[R]elational maneuver offers the possibility of success with an economy of means but entails a proportionately higher risk of failure," partly because it depends heavily on the "accuracy with which enemy weaknesses are identified." Edward N. Luttwak, "Attrition, Relational Maneuver, and the Military Balance," *International Security*, Vol 8, No 2, Fall 1983, p 178.

²⁵ Indeed, an approach march exercise conducted by the Third Corps during REFORGER 87 did not exceed or even match the speed of the approach march executed by the Third Army during the 1944 Battle of the Bulge, when it was ordered to relieve Bastogne. Colonel Ted A Cimral, "Moving the Heavy Corps," *Military Review*, Vol 68, No 7, July 1988, p 33.

In the area of sustainment, NATO faces two problems. Not only do most NATO divisions drag about a cumbersome and vulnerable "tail," but also existing sustainment structures cannot adequately support heavy mobile units in wide-ranging maneuvers -- especially not operations deep in enemy-held territory.²⁶ Exacerbating this, many of the personnel responsible for sustainment are reserves stationed in the United States. Despite frequent calls for beefing-up sustainment, simply adding to existing structures would only aggravate the problems of dragging about a long tail.

Despite the cautions raised here, maneuver theory *can* make an important contribution to NATO's conventional defense, at least in the near term.²⁷ The theory's emphasis on defeating an enemy by concentrating strength against weakness and by setting the terms of battle provides an attractive means for turning the tide of battle against an aggressor.

Unfortunately, no one has creatively adapted the theory to present conditions. Developing a successful maneuver approach -- one which can reasonably meet both defense and stability criteria -- requires a break with key aspects of AirLand Battle doctrine. For stability, NATO must strike a different balance between units deployed far forward and those retained as operational reserves. Planners must complement counteroffensive maneuver with greater emphasis on consistent area coverage, preparation of the battlefield, and countermobility operations. Further, NATO must adopt limited maneuver objectives and abandon plans for wide-ranging operational maneuvers. Finally, NATO must structure its maneuver units in a way that ensures an advantage when fighting on the strategic defensive.

3.3 Command and Control on the High-intensity Battlefield

US Army *Field Manual 100-5: Operations*, the handbook of AirLand Battle, notes that an East-West conflict in Europe would likely exhibit a combat intensity unmatched in previous wars. This would pose formidable new challenges for battlefield command and control. Yet, other than a modest decentralization of command functions, little of substance in the doctrine is tailored to meet these challenges.

²⁶ For an overview of the logistic requirements of AirLand Battle see Lt Col B D Sullivan, "Logistical Support for the AirLand Battle," *Military Review*, Vol 64, No 2, February 1984; and Colonel William A Brinkley, "The Cost Across the FLOT," *Military Review*, January 1985.

²⁷ In a future Europe with greatly reduced armed forces, maneuver units could be reduced to a handful, leaving nations to rely mainly on territorial defense forces, border guards, and political institutions for security. See Randall Forsberg, "Confining the Military to Defense as a Route to Disarmament," *World Policy Journal*, Vol 1, No 2, Winter, 1984.

In a future war, greater force dispersion and tactical mobility and more intense fire will interact to produce a nonlinear battlefield; that is, opposing armies will not face and fight each other over a discernable battle line.²⁸ At the same time, the great range, quantity, and lethality of modern firepower will create a virtually "crowded" battlefield.²⁹ In this context, the increased tempo of tactical engagements will likely result in paralysis rather than progress at the operational level. Indeed, as one analyst observes, "Vicious, destructive dogfights between attack helicopters, tanks, infantry fighting vehicles, antitank vehicles, ground support aircraft, and tank-killer teams of effectively equal capabilities and mobility can slow the overall advance of maneuver units down to the speed of foot infantry."³⁰

Also contributing to confusion on the battlefield will be the centrifugal tendency of large combat units in motion. Their greater size and complexity make modern heavy units more susceptible than their World War II counterparts to friction, and more dependent for their proper functioning on complex C3I systems. At the same time, C3I systems will probably not function smoothly, due to the effects of electronic warfare, the greater vulnerability of centralized systems to direct and indirect fire, and the effect of information overload. As a result, "Commanders will find it difficult to determine what is happening. Small units will often have to fight without sure knowledge about their force as a whole."³¹ One military analyst paints an even darker picture:

NATO, and the Warsaw Pact to lesser extent, will be crippled by its own modern capabilities. Command elements still tend to be centralized, talk too much on the radio, and are relatively easy to neutralize or destroy. Data processing and intelligence facilities may actually disconnect the decision, command, and leadership link as each level tries to fight too many battles at once with near perfect information.³²

Given these realities, Airland Battle's injunction to maneuver wide and deep places unrealistic demands on C3I systems. To allocate firepower and maneuver units on the scale and at the pace envisioned by the doctrine requires constant, close coordination between combat units and commands horizontally and vertically, and between army and air force. Not only must fire be allocated for the main battle area, but also over much greater distances on many targets

²⁸ *Field Manual 100-5*, pp 1-1 and 1-2.

²⁹ Chris Bellamy, *The Future of Land Warfare* (New York: St. Martin's Press, 1987), p 275.

³⁰ Noyes B Livingston, "Blitzkrieg in Europe: Is It Still Possible?", *Military Review*, Vol 66, No 6, June 1986.

³¹ *Field Manual 100-5*, p 1-3.

³² Livingston, "Blitzkrieg in Europe," pp 31-32.

behind the enemy's lines. And commanders must constantly reassess the relative importance of targets together with their kill probabilities.³³

Rather than expect more from C3I systems that are likely to deliver less, NATO could adopt a force structure and operational concepts that place fewer demands on C3I systems. This requires training and equipping forces to fight in a more decentralized mode, developing a simpler and more flexible command organization, and abandoning plans for wide-ranging operational maneuver.³⁴

³³ John Grin, "Command and Control: Force Multiplier or Achilles' Heel?", *Defense Analysis*, Vol 5, No 1 1989, pp 61-76.

³⁴ Grin, "Command and Control," p 73.

4. Toward a Ground Force Posture for the 1990s

From our analysis of current NATO structure and doctrine follow several guidelines for reconfiguring Western ground forces. First, the volume and lethality of firepower on the future battlefield will put a premium on force dispersion, decentralization, smaller-unit action, and simple and robust C3I and sustainment structures. Second, important advantages accrue to the defender, and NATO should exploit them fully. Consistent area coverage, the use of cover and concealment, prepared fields of fire, and countermobility assets -- like minefields and obstacles -- *may afford the only sure advantages on the next battlefield.* Third, although maneuver tactics can enhance NATO's defense, the use and deployment of maneuver units must be consistent with complete area coverage and optimization of defense advantages. Fourth, NATO should lower its expectations about boosting the performance of weapons and C3I systems through the use of emerging technology.

Can a coherent, integrated defense be built along these lines? We think so. In broad strokes such a defense would: (1) maintain an infantry net in the forward area, making optimal use of the relatively abundant German reserves along with active troops; and (2) integrate with this net a smaller mechanized force.

The forward infantry net would provide intelligence, logistic support, and cover for the mobile component, enabling it to engage and ultimately defeat an aggressor by means of intensive maneuver and active defense tactics, and firepower used on an efficient scale. The consistent area coverage provided by this mix of light-static and heavy-mobile units will make both early mobilization and large operational reserves unnecessary; and it will reduce demands on C3I and sustainment systems to realistic levels, while providing a strong foundation for their operation.

The "spider-in-its-web" model developed by Lutz Unterseher and the International Study Group on Alternative Security Policy (SAS) embodies this approach to the ground defense of the European central front. Unterseher's is one of a number of recent approaches that seek to limit the role of offense-oriented forces and place them in a context of area defense.³⁵ His spider-and-web defense comprises a static net of light infantry battalions (the "web") and a mobile element of mechanized battalions (the "spider") that operate within the net. The net,

³⁵ See Appendix 1: A Comparison of Defensive-defense Models.

up to 72 kilometers in depth, is designed to extend along the border behind a 14-km deep sensor and minefield zone.³⁶

In the SAS proposal, one-third of the infantry battalions, consisting entirely of active-duty troops, would cover the first 36 kilometers of the net. The remaining two-thirds of the infantry battalions, composed of 25 percent active-duty troops and 75 percent reserves, would cover the remaining 36 kilometers. Hence, the second zone would have twice the force density of the first. The reserves would come from the region of their assigned sectors and thus could be in the field within one day of mobilization.

A net infantry battalion's combat companies could fight from numerous prepared positions, but primarily they would support mobile force elements by operating intelligence, communication, and supply networks. Embodying a decentralization of combat support functions, the battalion would also incorporate a strong indirect-fire company, an air defense platoon, and a combat engineer platoon with mine-laying and obstacle-creating capacity. Taken together, these battalion components would provide a cost-effective means of achieving area coverage. Within this framework, NATO can achieve a flexible concentration of mobile elements.

In this model, the mobile "spider" units consist of three types: mechanized infantry, cavalry, and armor or shock battalions.³⁷ All three can mass for short periods and bring considerable firepower to bear. Most of the time these mobile units would remain within the net; the cavalry deployed forward, the armor units to the rear, and the mechanized infantry spread throughout.³⁸

4.1 Meeting the Challenge of the Future Battlefield

The spider-and-web's adaptation to high-intensity combat is evident in the wide dispersion of its elements, which affords indirect protection. The area-covering infantry units, which represent three-quarters of the forward combat battalions, will normally have high enough

³⁶ The sensors are to be unobtrusive and the mines should be rapidly-deployable by means of combat-ready engineer companies and missile-delivery systems.

³⁷ The light mechanized infantry would engage an attacker's infantry units and, in covered terrain, mechanized units. Cavalry units would screen the movements of heavy units, temporarily hold terrain, and reinforce the net infantry where necessary. The armored units would engage in flanking counterattacks on open terrain.

³⁸ Like the net infantry battalions, mobile elements would incorporate an indirect-fire company. Added at the division- and corps-level would be artillery battalions plus air defense, reconnaissance, and antitank helicopter units. A separate force of 550 security companies and 35 mobile battalions would provide rear-area security. See Unterseher, "A Different Army: Essential Details."

dispersal and a low enough unit value that they will offer no attractive target for preemptive firepower. The "nodes" of the net's intelligence, communication, and logistics systems would also be dispersed -- as well as redundant, hardened, and well-camouflaged -- and, hence, less vulnerable to attack than in their current form. Although the mobile battalions will continue to offer valuable targets, they will be less likely to concentrate or run the risks of wide-ranging maneuvers.

The model's specialization for maneuver rests on the synergistic interaction of its two elements.

The net plays the most important role by "conditioning" the battlefield to the benefit of the maneuver units. This "conditioning" involves both C3I and sustainment systems. The intelligence and communication net will greatly enhance the acquisition of targets by artillery and simplify the challenge of mobile operations against a moving enemy. The logistics net will allow a simplification of the necessary sustainment infrastructure, reducing the logistic drag on friendly maneuver units. Supplies will generally have shorter distances to travel to reach units on the battlefield and much less chance of being interdicted or delayed at traffic chokepoints. At the same time, the net units, acting in their secondary role as combat forces, will attack the invader's reconnaissance units and strip its vulnerable support elements. In sum, the net will provide a medium that enhances the maneuver capability of friendly units while degrading that of the attacker's.

A relatively simple and flexible command organization also contributes to the defender's maneuver advantage, as do operational concepts that reduce considerably the demands on C3I systems. Fewer deep strike operations, which are lower priority, make command decisions much less complicated. Unlike AirLand Battle, which has added many tactical functions to the duties of higher command, the proposed force structure returns to a more traditional specialization of command functions. Higher level command staffs attend primarily to operational issues such as maneuver coordination and allocation of resources, while unit commands make tactical decisions concerning tactical maneuver and the application of firepower.³⁹

The operational concepts informing the spider-and-web defense can best be appreciated by envisioning how this defense might work to contain and defeat aggression.⁴⁰ At the outset of

³⁹ For a fuller exposition of the command, control, communication, and intelligence aspects of the SAS model see Grin, "Command and Control."

⁴⁰ In this analysis we do not examine how a spider-and-web ground defense might articulate with NATO air forces. However, SAS analysts and others have outlined the general features of an air power component that embodies the principle of limited offensive potential. See Lutz Unterseher, "The SAS Approach to Air and Coastal Defense," *Defense & Disarmament Alternatives*, Vol 2, No 2/3, February/March 1989, p 4.; and Bjorn Moeller, "Air Power and Nonoffensive Defence: A Preliminary Analysis," (paper for the ISA Convention, London, 26 March-1 April 1989).

an attack, the sensor and minefield zone would provide a space for indirect fire to do initial damage to an invader. Cavalry squadrons might also begin to engage enemy units in this zone. Such a zone, together with the forward sectors of the net, would guarantee early detection and action against any incursion.

In the second phase of the battle, commencing when the attrited enemy force enters the web, infantry units would begin more precise target acquisition and, together with the mobile units, begin to heavily engage the enemy. Minefields and rapidly-deployable obstacles would delay and canalize enemy forces. These defensive efforts will cause the adversary to fully commit its forces early, revealing the main axes of attack, and give the defender's remaining maneuver units time to organize in an optimal operational formation.

Throughout the battle, maneuver units would use a series of short-duration flanking attacks to further attrit, disrupt, and channel the invading columns. In the third phase, these attacks will become more frequent and intense until, with the help of division- and corps-level artillery fire, they create a bottleneck, allowing the insertion of a holding force in front of the slowed and depleted enemy units. The net infantry battalions can serve, in many cases, as a significant part of the holding force, freeing armored units to perform their optimal function as shock forces. In the final phase, maneuver units would turn or envelop the stalled enemy forces.

In the context of NATO defense of the inner-German border, SAS analysts calculated in 1988 that 450 net battalions of the type they propose, acting together with 150 maneuver battalions, would suffice to defeat any likely WTO attack within 35-45 kilometers of the border.⁴¹ Fully substantiating this claim will require numerous field trials and combat simulations, although some tactical simulation studies have already been conducted and are supportive.⁴² To firmly

⁴¹ The 1988 SAS proposal involves deployment in Federal Germany of 265,000 Bundeswehr and up to 150,000 other NATO active-duty army troops. FRG ready reserves would total about 335,000. Should all maneuver units be configured along SAS lines, weapon totals for forces in the FRG would include 2,350 tanks, 1,450 light and heavy infantry fighting vehicles, 1,150 mobile protected guns, 5,000 artillery pieces and mobile mortars (over 100 mm), 1,350 antiarmor drone launchers, 400 multiple-launch rocket systems, 2,300 air-defense launchers and guns, and 650 transport helicopters adapted for an antitank role. Excluded are totals for rear security forces. Estimates derived from Unterseher, "A Different Army: Essential Details." SAS is currently developing an updated version of this model which takes into account recent changes in the disposition of armed forces in Europe.

⁴² A computer simulation of tactical combat found that SAS-style infantry battalions, *acting without the support of mobile units*, could attrit three consecutive Soviet motor rifle regiments before these could reach a depth of 80 kilometers. An SAS battalion-size cavalry regiment with corps-level and divisional artillery support *but without the support of net units* was able to attrit the same force within 20 kilometers. H W Hofmann, R K Huber, and K Steiger, "On Reactive Defense Options," in R K Huber, ed, *Modeling and Analysis of Conventional Defense in Europe: Assessment of Improvement Options* (London: Plenum, 1985).

establish the optimal level and mix of static and mobile elements, future research must determine both the degree of defense advantage conveyed by the proposed structures and the maneuver advantage of spider units over more conventionally-structured mobile forces.⁴³

4.2 Integrating Allied Ground Forces

In the SAS proposal, the Federal German army provides net infantry for all corps sectors. Allied armies, together with the Bundeswehr, would provide the "spider" battalions in their respective corps areas, for a total of 70 Bundeswehr and 80 other NATO maneuver units.⁴⁴ The two US Corps areas, for instance, would get approximately 100 of the 450 Federal German net infantry battalions. These would comprise about 70,000 soldiers, half active-duty, half ready-reserves. Eighty percent of the net personnel would be allocated to combat and combat support tasks and 20 percent primarily to service support roles.

Integrating the US Army into the structure would require some reorganization, though not necessarily below the brigade level. An initial restructuring phase should aim to create an optimal balance between US maneuver and supporting Bundeswehr net forces, and between the various types of maneuver units. This could be accomplished by selective withdrawals occurring as part of bilateral negotiated reductions in maneuver units.

Currently US maneuver units in the Fifth and Seventh Corps sectors total about 22 armor, 24 mechanized infantry, and 10 cavalry battalions and squadrons.⁴⁵ The addition of 100 Bundeswehr static infantry battalions to the US corps sectors should permit withdrawal of at least one-third of the US mechanized force *before* taking WTO unilateral and negotiated reductions into account. Notably, the requirement for mechanized infantry would fall dramatically with the addition of net infantry, which can support armored action and assist in halting the advance of enemy forces. The requirement for tank units should also decrease, reflecting a reduced demand for these units to act as a fixing force. By contrast, the number of cavalry units should be maintained near current levels. This reflects their increased combat

⁴³ See Appendix 2: The Critique of Area Defense.

⁴⁴ Clearly this plan implies a significant change in the balance between Bundeswehr and other NATO troops involved in the early days of a conflict. This shift could have some adverse political affects. Mitigating these, however, is the continuing vital participation of non-FRG allied troops in the front-line defense of the Federal Republic. In their 1988 proposal, SAS analysts suggested a bottom-line non-FRG NATO commitment of 100,000 troops commanding the same German corps sectors as today.

⁴⁵ Excluded from these totals are the Southern European Task Force, Special Forces unit, Berlin Brigade, units assigned to the Pershing force, and the elements of the Third Brigade, Second Armored Division deployed in northern Germany.

potential when supported by the infantry net, and their greater importance in an operational plan that seeks to conserve armored strength until an attacking force has been compelled to reveal its main lines of advance.

Because each of the 100 net battalions adds an indirect-fire company as well as a combat engineer and an air defense platoon, some portion of divisional and corps-level field artillery, air defense, and engineering units become redundant as well. As for combat service support units, restructuring should involve reductions proportional to the withdrawal of combat units, and -- due to the service support provided by net infantry -- some trimming of the remaining service support infrastructure as well. Finally, optimal integration into the spider-and-web defense would require a greater emphasis on independent action by US brigades with a concomitant devolution of some command, intelligence, and logistic functions.

4.3 Conclusion: Toward Greater Stability at Lower Levels of Force

Outside of the political sphere, the greatest single impediment to NATO negotiating deep cuts in active-duty troops is its perceived force-to-space requirement for defending the central front. The spider-and-web system addresses this force-density problem by having units with a greater average proportion of reservists -- the net battalions -- perform many of the less demanding functions of a covering force. In this way, area coverage can actually be improved using fewer active-duty troops. In turn, better area coverage, together with thorough preparation of the battlefield and substantial countermobility efforts, will mitigate NATO's depth problem, thereby lowering its theater-strategic force-to-space requirements. Further, by dividing area-coverage tasks between web and spider forces, this approach gives the alliance the option of negotiating deep bilateral cuts in maneuver forces without risking a comparable reduction in its ability to cover the forward area.

The structure would also ease the pressure for rapid reinforcement by US-based units, and would make rapid intervention by heavy maneuver units based in the United States less vital. On the other hand, light infantry divisions would prove more useful than expected, by acting to reinforce sections of the static infantry net.

Several features of the approach recommend it as a stabilizing alternative to existing policy. By minimizing the number of valuable targets presented to an adversary, the proposed structure radically decreases the vulnerability of NATO's major military assets to preemptive

attack. Similarly, the structure would reduce the "bonus" for any type of surprise attack because it provides for more complete and consistent area coverage than does the present structure. And, because of the inherent low mobility of the net battalions, there is little or no provocation in fully mobilizing them in time of political crisis, and much less need for early deployment of mechanized spider forces. Regarding these spider forces: their counteroffensive strength derives from their interaction with the net battalions; outside the net their offensive potential quickly diminishes.

Because the capabilities of a light-static, heavy-mobile force are *not* symmetrical with regard to offensive and defensive operations, a bilateral shift to this type of defense would have a uniquely stabilizing effect.⁴⁶ A transition to this type of structure by the Bundeswehr and National Volksarmee of the GDR (or their combined units) in particular, would lessen concerns about a unified Germany. Indeed, looking beyond the current bipolar orientation of central European armies, the adoption by nations in the region of spider-and-web defenses, reconfigured to provide all-around security, would help ensure the necessary military foundation for peaceful political, social, and economic development.

⁴⁶ In 1988 Andreas von Buelow advanced a bilateral version of the spider-and-web defense. See A. von Buelow, *Conventional Stability NATO-WTO: An Overall Concept* (Hearings before the US House of Representatives Armed Services Committee, Washington DC, 1988).

Appendix 1. A Comparison of Defensive-defense Models

Most of the recent defensive-defense models share several characteristics. They all emphasize the use of Bundeswehr light infantry units in an area-defense or covering-force role, greater use of reserves, and a division of the battlefield into distinct zones, each with characteristic forces. Some of these models exclude maneuver units, prescribe a sharp division of the battlefield into direct- and indirect-fire zones, and rely heavily on the combat effectiveness of high-tech weaponry.⁴⁷

A second set of models, including Unterseher's "spider-in-its-web" concept,⁴⁸ combine a core of light units with a heavier maneuver component and place less stress on high-technology weapon systems. Albrecht A C von Mueller's "integrated defense" model, for instance, comprises three forward zones -- a fire/sensor zone, a light infantry zone, and a maneuver zone. The fire zone extends 5 kilometers west of the border on the FRG side and up to 50 kilometers into the GDR, and includes combat drones and semi-intelligent mines among its indirect-fire assets. Behind the fire/sensor zone, the light infantry zone extends to a depth of 25 kilometers. Here 40,000 active troops, supplemented by 80,000 reserves, would employ precision-guided munitions and other direct-fire weapons, as well as obstacles. Finally, deployed behind the infantry net are NATO heavy armor units, which would serve to destroy any intruders who might fight their way through the net. These armor units would be more dispersed than current forces, but not much smaller in number.⁴⁹

This group of models also includes the early blueprints of Andreas von Buelow and Major-General Jochen Loeser, both of which comprise "shield" and "sword" components. These models integrate indirect-fire and other combat-support assets with the two components in a fairly traditional manner; that is, they integrate them primarily at the brigade, division, and corps levels. Both analysts suggest that NATO armored units constitute the sword

⁴⁷ In this group are Lt. Col. Norbert Hannig's "fire barrier" model and Horst Afheldt's 1976 "techno-commando" scheme. In 1983 Afheldt offered a transitional version, the "porcupine defense," incorporating a mobile armored component.

⁴⁸ For a short introduction in English see John Grin and Lutz Unterseher, "The Spiderweb Defense," *Bulletin of Atomic Scientists*, Vol 44, No 7, September 1988.

⁴⁹ See von Mueller, "Conventional Stability in Europe"; and von Mueller, "Integrated Forward Defense: Outline of a Modified Conventional Defense for Central Europe" in Hylke Tromp, ed, *Non-Nuclear War in Europe: Alternatives for Nuclear Defence* (Groningen, Netherlands: Groningen University Press, 1984).

component, but they differ on the nature of the shield element. For von Buelow these are dispersed and relatively static light infantry units deployed to a depth of 40-60 kilometers. For Loeser they are highly mobile light infantry, employing maneuver tactics and using minefields and other prepared obstacles as pivot points.

In several respects, von Buelow's shield resembles the web proposed by Unterseher. Their *average* density is about the same (approximately 450 infantry soldiers per 100 square kilometers), but Unterseher's net is somewhat deeper, with a density that increases with depth, and a forward half consisting of active troops only. Von Buelow sees his infantry units fighting in a manner similar to Unterseher's, and likewise sees them providing intelligence for indirect-fire elements and cover for mobile forces. However, von Buelow emphasizes the combat role of these forces, whereas Unterseher stresses their support function.⁵⁰

In this second set of models the addition of heavier mobile direct-fire elements increases defense flexibility; it variegates the challenge an aggressor must face and enhances the defenders' capacity to respond quickly to unforeseen developments, like a breakthrough. However, excepting the spider-and-web model, none manage to fully integrate their various elements at the tactical level. Most have a "layered" character, with heavier mobile units operating behind the light units and, for the most part, well back from the border. The intention is to mitigate the potentially destabilizing effect of deploying traditional maneuver units. Yet, if the "sword" components resemble current maneuver forces in size and character, their deployment behind a thin crust of light area-defense forces -- in some cases only 25 kilometers deep -- would provide little reassurance to anyone concerned about cross-border offensive capability. Moreover, combining such forces with the type of interdiction capabilities suggested by von Mueller, or the highly-mobile "shield" proposed by Loeser would further stimulate such concerns, especially in the context of Soviet withdrawals from Eastern Europe.

Only the SAS approach successfully balances the need for fully integrating the various combat elements and the goal of achieving the greatest possible degree of stability. It does this by (1) increasing the depth and density of the infantry net and making its primary function one of supporting the mobile force; (2) lightening the mobile units and making them dependent on the net for intelligence and logistic support; and (3) deploying the maneuver element *within* the net. These moves enhance the combat synergism of the two elements while greatly restricting the cross-border offensive capability of the maneuver element.

⁵⁰ See Andreas von Buelow, "Restructuring the Ground Forces," in Marlies Ter Borg and Wim Smit, eds, *Nonprovocative Defense as a Principle of Arms Reduction and its Implications for Assessing Defense Technologies* (Amsterdam: Free University Press, 1989); and, Jochen Loeser, "The Security Policy Options for Non-communist Europe," *Armada International*, March/April 1982.

Appendix 2. The Critique of Area Defense

Critics of area defense argue that an attacker wishing to defeat infantry-based area defense schemes has several viable options.⁵¹ In one, the aggressor circumvents the net by attacking with highly mobile forces along the net's gaps or fault lines. In another, the aggressor simply rends the net with massive firepower, opening a corridor for heavy mechanized units. In a third, the aggressor adds mobile light infantry to the mix of artillery and armor, and seeks to suppress the net battalions long enough to permit insertion of armor and infantry forces, who, in turn, defeat the net units in detail.

The first approach has found expression in Soviet operational concepts emphasizing probing attacks and the use of operational maneuver groups (OMGs) along widely separated axes. Facing such forces, the defense must find, fix, and defeat them before they reach operational depth. Area-defense forces, critics allege, lack the maneuver units and firepower necessary for such a countermove. But, as noted, the spider-and-web defense includes a considerable heavy mechanized component, and even the web elements have a fair degree of "firepower mobility," since they are not limited to typical light infantry weapons. In fact, a defense that combines consistent area coverage with a net-assisted mobile element should be better able than current forces to quickly detect, degrade, and halt operational maneuver groups. Further, because its structure is less dependent on centralized and hierarchial command, control, communication, and intelligence (C3I) and supply systems, a deep WTO penetration, should it occur, would have less profound repercussions.

The purported vulnerability of area defense to the second type of attack is said to be a function of the vulnerability of light infantry to massed artillery fire. Critics contend that an artillery offensive of sufficient scale could clear a corridor through an infantry net. A 1976 simulation of a large-scale Soviet artillery offensive, conducted by the Bundeswehr's Infantry School in

⁵¹ For a variety of views on light forces and criticisms of area defense strategies see Steven Canby, "Military Reform and the Art of War," in Asa Clark, et al, eds., *The Defense Reform Debate*, Steven Canby, "Territorial Defense in Central Europe," *Armed Forces and Society*, Vol 7, No 1, Fall 1980; Charles Dick, "Soviet Responses to Emerging Technology Weapons and New Defensive Concepts" and "Dialogue on the Military Effectiveness of Nonprovocative Defense" in Barnaby and Ter Borg, eds, *Emerging Technologies and Military Doctrine*, (London: Macmillan Press, 1986); Stephen J Flanagan, "Nonprovocative and Civilian-based Defenses," in Joseph S Nye, Jr, et al, eds, *Fateful Visions: Avoiding Nuclear Catastrophe* (Cambridge MA: Ballinger, 1988), pp 93-110; Stephen J. Flanagan, "Nonoffensive Defense is Overrated," *Bulletin of the Atomic Scientists*, Vol 44, No 7, September 1988; David Gates, "Nonoffensive Defense: A Strategic Contradiction?"; David Gates, "Area Defense Concepts: The West German Debate," *Survival*, Vol 29, No 4, July/August 1987.

Hammelburg, found that traditionally dug-in infantry troops suffered 30 percent losses (generally regarded as the level at which "neutralization" occurs); even those squads with overhead cover lost 10 percent.⁵² In light of this study, and considering that the spider-and-web defense provides for multiple static and rapidly-constructable shelters, one might expect a large-scale artillery attack on net infantry troops to achieve an attrition rate somewhere between 10 and 30 percent. However, dispersion is as important as direct protection in reducing the overall effectiveness of indirect fire and, as noted, net infantry units are exceptionally well dispersed.

Soviet artillery destruction tables estimate that a standard infantry battalion dispersed over 7 square kilometers and occupying prepared defensive positions will suffer 3 percent attrition for every 100 tons of (modern but not "improved") artillery fire.⁵³ But a typical net infantry battalion in the forward net zone would occupy 144 square kilometers. While this increased dispersion would not likely result in a proportionately reduced attrition rate (to 0.14 percent per 100 tons of shells), a very substantial improvement for the defense should nonetheless occur. If we conservatively assume an attrition rate of 0.7 percent per 100 tons of shells, an attacker would need to lay down nearly 4300 tons to "neutralize" a typical web battalion.

But a further adjustment is in order: because the net battalions are designed to fight in a decentralized mode, they can sustain a higher proportion of casualties before being neutralized. Inflicting 50 percent casualties on these battalions would require more than 7000 tons of shells. Extrapolating from this, the neutralization of all defending units in a sector 12-km wide and 36-km deep -- containing less than 1 percent of the spider-and-web force -- would require most of the artillery ammunition available to a Soviet army.

Of course, this very rough estimate of the effectiveness of an idealized Soviet artillery offensive does not consider many factors -- but only some of these would ease the attacker's task. Air-delivered aerosol explosives, for instance, would make a more efficient infantry killer. But their delivery platforms would be vulnerable, as would all Soviet air and artillery assets, especially as they attempted to advance into the Federal Republic of Germany.⁵⁴ Particularly

⁵² David C Isby and Charles Kamps Jr, *Armies of NATO's Central Front* (London: Jane's, 1985), p 205. Elsewhere Isby estimates that a Soviet artillery offensive in conjunction with a breakthrough attack may involve 80-100 guns and use 10,000-20,000 shells per kilometer of frontage. See David C Isby, *Weapons and Tactics of the Soviet Army* (London: Jane's, 1988), p 225.

⁵³ James F Dunnigan, *How to Make War: All the World's Weapons, Armed Forces, and Tactics* (New York: Quill, 1983), p 83. Also see Isby, *Weapons and Tactics*, pp 235 and 241.

⁵⁴ Unlike some earlier nonoffensive defense models, an SAS-style spider-and-web could muster the firepower necessary to make very costly the concentration of artillery or armor by an attacker. Also, the SAS model does not preclude all air assets -- only those designed for deep-strike missions. See Unterseher, "The SAS Approach

vulnerable would be the logistics structure needed to sustain the attack. And, to further complicate the task of Soviet artillery, the net battalions would produce numerous false targets. In sum, blasting a corridor through this type of defense hardly seems the easy option that critics of area defense contend.

A more feasible way to defeat an area defense would be an artillery-supported infantry assault. In this scenario, artillery would serve to open a smaller window for insertion of infantry by air or on tracks. These, in turn, would suppress NATO's net infantry, either securing an area well in advance of heavy units or moving in closer coordination with them. As NATO net infantry units or strong points are uncovered, artillery fire would be directed on them.⁵⁵

This approach might be effective against some forms of area defense, but it would not defeat the spider-in-its-web. As suggested earlier, most net infantry in a battalion sector would escape the barrage. Although the assault would temporarily send the net infantry under cover, it would also announce the enemy's intention. And once the barrage passes, the net infantry needn't expose themselves by directly engaging enemy infantry and armor units. Instead, they could call down battalion- and higher-level indirect fire on enemy units. The enemy infantry, whether mounted or dismounted, would be the first to fall before NATO fire.⁵⁶ The net infantry could then, in conjunction with mobile units, directly engage the depleted enemy units with the standard aim of channeling them into a bottleneck -- the setup for a "hammer and anvil" operation.

At any rate, forcing an aggressor into this type of heavy-light force offensive would serve one of NATO's immediate military objectives: to significantly reduce the tempo of an attack.⁵⁷ The slower tempo would permit better counter-concentration, and the invading force, depleted by

to Air and Coastal Defense."

⁵⁵ Supporting the feasibility of this attack scenario is a study by the Dutch Ministry of Defense showing how antitank-oriented defense postures could be severely degraded by artillery-supported infantry attacks. Government of Netherlands, Ministry of Defense, Memorandum by the Minister of Defense, Jacob de Ruiter, "Reinforcement of the Conventional Defense and 'Emerging Technologies,'" 26 June 1985. Cited in Flanagan, "Nonoffensive Defense is Overrated."

⁵⁶ The Bundeswehr Infantry School study on the effectiveness of massed artillery offensives found that mechanized infantry vehicles suffered an attrition rate of up to 40 percent. Even tank forces suffered damage resulting in a loss of mobility for 25 percent of their tanks. See footnote 49 in the main text.

⁵⁷ Reflecting on a similar infantry net-mobile force defense model, Richard Simpkin writes, "The net's task is not attrition, but mobility denial in the broadest sense, based on the blocking of routes. The aim is to pose a sufficient threat to force the enemy to move up massed infantry, dismount it, and clear through the hindering terrain on foot.... [N]obody with experience of clearing through under threat of opposition will be in any doubt of what this would do to the attacker's tempo." Simpkin, *Race to the Swift*, p 302.

the forward area-covering defense, would be ill-prepared when NATO mobile units maneuver for a counterattack.

About the Authors

Carl Conetta joined the IDDS staff in 1985 as editor of the IDDS bulletin, *Defense & Disarmament Alternatives*. During his 3-year tenure as *DDA* editor he also co-edited, with Randall Forsberg, the *Peace Resource Book 1988-1989*. In 1989 Mr Conetta became an Institute research fellow. Before joining the IDDS staff Mr Conetta was an instructor in the Economy and Society program at the University of Connecticut, and an editor at the South End Press where he oversaw the foreign and military affairs list. Mr Conetta holds a Masters Degree in anthropology from the University of Connecticut.

Charles Knight, an IDDS research fellow since 1989, is also president of the Commonwealth Institute in Cambridge, Massachusetts, a research organization which develops economic and social policy proposals and publishes *The Commonwealth Report*, a newsletter of politics and public opinion analysis. Formerly he was publisher of *Working Papers* magazine and a research associate at the Cambridge Institute. Mr Knight has a BA from Boston University and an MA from Beacon College in human relations.