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Toward a Conceptual Framework for Operational Arms Control in Europe's Central Region

Paul K. Davis

A Report from
The RAND Strategy Assessment Center

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This study sketches a military framework for conceiving and evaluating measures for operational arms control in Europe's central region--i.e., arms control affecting the operations and readiness of forces. Such measures are complementary to structural arms control, which affects size and composition. In the past, operational arms control has been largely associated with confidence-building measures that have limited, although worthy, ambitions. This study argues, however, that operational arms control has the potential to substantially improve NATO's military security. Although operational arms control has considerable potential by itself, this study concludes that it should no longer be treated as a separate subject, but should be integrated with structural measures.

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Paul K. Davis

November 1988

Prepared for the
Office of the Under Secretary of Defense
for Policy

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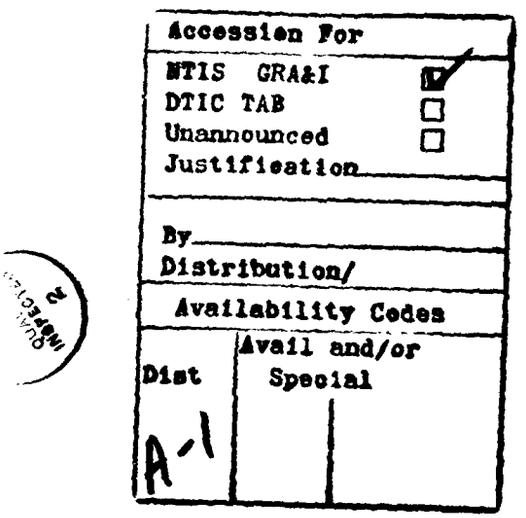
PREFACE

This study was developed under a project on conventional arms control conducted for the Office of the Under Secretary of Defense for Policy. The intention was to provide an independent and unclassified thinkpiece that would stimulate discussion and help frame concepts. The work was accomplished in the RAND Strategy Assessment Center, which is part of RAND's National Defense Research Institute, a Federally Funded Research and Development Center supported by the Office of the Secretary of Defense.



SUMMARY

PURPOSE OF THE STUDY

This study sketches a military framework for conceiving and evaluating measures for operational arms control in Europe's Central Region—i.e., arms control affecting the *operations and readiness of forces*. Such measures are complementary to structural arms control, which affects size and composition.

In the past, operational arms control has been largely associated with confidence-building measures with limited, although worthy ambitions. This study argues, however, that *operational arms control has the potential to substantially improve NATO's military security*. This potential has gone largely unappreciated in the past, because its effects are not seen in standard NATO-conservative scenarios. They are most evident in scenarios developed to represent the possible viewpoint of a Pact military commander charged with developing an invasion plan. Operational arms control could greatly increase the risks seen by such a commander.

Although operational arms control has considerable potential by itself, at least in the abstract, this study concludes that it should no longer be treated as a subject apart, but rather should be integrated with structural measures. One concern here is that the Soviet Union might gain most of its principal arms control objectives, such as an improved East-West atmosphere leading to increased Western investments underwriting *perestroika*, with operational arms control agreements that would not even address the quantitative imbalance that is at the heart of NATO's security problem. Another problem is that certain operational arms control measures that seem intuitively virtuous to their proponents could in fact cause considerable mischief, and could even reduce NATO's military security. It is against this backdrop that the present study provides a top-down discussion of what NATO's objectives for operational arms control might be, what strategies it might follow in seeking those objectives, and what principles might guide its assessment and tuning of particular proposals. The next paragraphs summarize conclusions of that discussion.

OBJECTIVES

The objectives for operational arms control should be the same as those for conventional arms control more generally, which in turn should be a subset of high-level coalitional objectives. Postulated NATO security objectives are:

- To deter aggression and coercion;
- If war begins, to defeat the aggressor and restore the prewar boundaries while minimizing the devastation of war and avoiding use of nuclear weapons; or, failing that, to reestablish deterrence and convince the aggressor to withdraw;
- To increase crisis stability;
- To increase arms race and political stability, and to reduce accordingly the peacetime cost of armaments;
- To avoid misunderstandings and miscalculations that might lead to unintended crises or conflicts; and
- To maintain alliance unity.

In examining arms control initiatives, NATO should place more *relative* emphasis on improving its military security, and somewhat *less relative emphasis on the less critical though worthy objectives of* avoiding accidental wars and building confidence. The preferred approach can then be captured by a single *paramount objective,* which would contribute to all of the above security objectives:

- To improve the actual and perceived prospects of the defender should war occur.

This formulation is consistent with the growing emphasis on *stability*, but it makes explicit the connotation intended.

DEFINING A STRATEGY: IDENTIFYING CONCRETE PROBLEMS ARMS CONTROL COULD MITIGATE

To achieve the above objective, arms control should focus on the alliance's actual military problems. The study draws on previous military analysis that characterized the warfighting balance in terms that identify possible failure modes for NATO's conventional defense.

Some of the failure modes can be addressed only by unilateral improvements (e.g., procuring adequate munitions), but many can be addressed by a combination of arms control and defense programs. The possible failure mode in which NATO succeeds in enforcing its operational strategy of forward defense, but loses a war of attrition by virtue of the Pact's quantitative advantages or what proves to be Pact superiority of doctrine or strategy, must be addressed primarily by defense programs' increasing forces and their technical effectiveness, and by structural arms control in the form of highly asymmetric reductions involving destruction rather than the mere withdrawal of Soviet and other Pact forces. There is little role for operational arms control in this domain.

By contrast, operational arms control could significantly improve the defender's prospects in other ways summarized by Fig. S.1, which constitutes a broad strategy motivated by observations from analytic war gaming. Notable elements of the strategy are:

- **Avoiding strategic and operational surprise.** Some constraints would not only make surprise less likely by assuring warning signs (which would probably exist anyway), but more importantly would decrease the *ambiguity* of such signs and thereby greatly increase the likelihood of an early cohesive response.
- **Raising risks for the attacker.** Some constraints would increase the objective vulnerability of a would-be attacker to preemption during his final preparations, and would thereby tend to deter destabilizing preparations in crisis (even if the defender, like NATO, had a highly defensive doctrine and mindset and no capability to initiate a serious offensive).
- **Improving the defender's tactical odds.** Some constraints would increase the defender's tactical odds on D-Day by increasing the complexity and reducing the likely efficiency of the attacker's immediate preattack operations. This could be critical for NATO by reducing the likelihood of immediate penetrations of the zone of prepared defenses on which it so strongly depends.

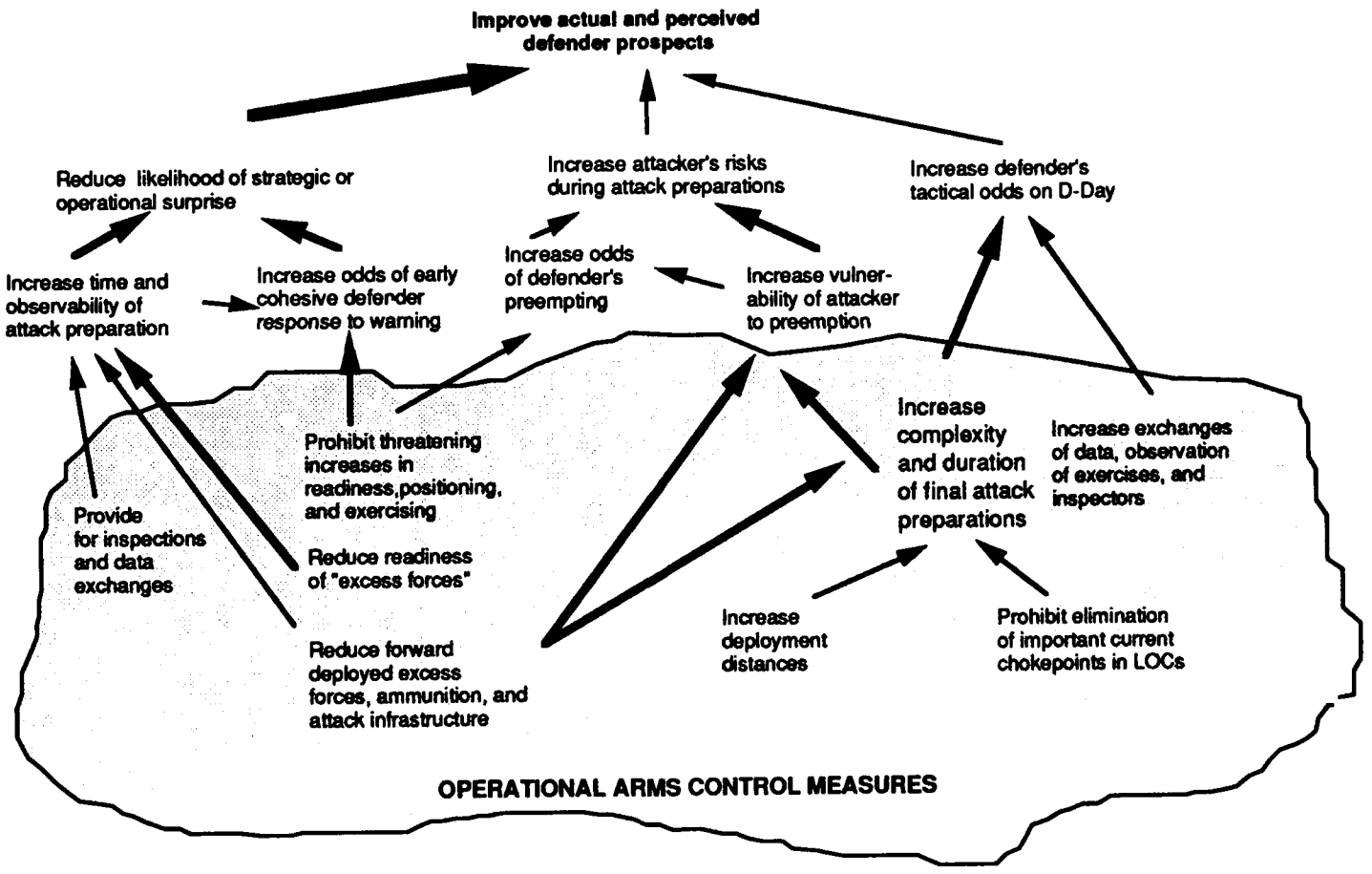


Fig. S.1—Potential role of operational arms control in improving defender prospects

PRINCIPLES FOR CONCEIVING AND EVALUATING PROPOSALS

Considerations

Figure S.1 indicates a broad strategy for using operational arms control, but to develop concrete proposals requires taking into account numerous considerations and asymmetries. Of these, the most important appear to be the following:

- The Pact has an excess of ground forces overall and an excess of forward-deployed forces in particular. This is the most *fundamental* threat to NATO's security. The continued rate at which the Soviet Union is modernizing those forces is very troublesome.
- Because of its quantitative disadvantages and shortfalls, NATO depends more heavily than the Pact on high operational readiness. This stems also from the strategy of forward defense and terrain factors. Also, exercises like Reforger play an important political function and improve coalitional cohesion. Thus, improperly designed readiness limitations could hurt NATO's security on balance. Whether various limitations would be good or bad depends on what one assumes about the threat level (i.e., on the results of structural arms control).
- Similarly, many formulas for geographical disengagement would on balance hurt NATO, because NATO's defense depends upon having prepared defenses in depth everywhere along the border, total familiarity of defending forces with the local terrain, and holding forward. In a mobilization race reintroducing forces to the forward regions, the Pact would probably have the advantage The Soviet Union would also enjoy interior lines of rail and road communication, and—importantly—centralized control; NATO's more complex mobilization process would depend on long air and sea lines of communication, and on complex political and military coordination among the independent sovereign nations that constitute NATO. Again, however, the net effect of disengagement

formulas would depend on the force levels, and perhaps even the composition of those forces.[1]

Several principles about operational arms control follow from these and related considerations:

- Operational arms control should henceforth be integrated with structural arms control, because the net effects of each will depend on the other.
- The sides should strive for an outcome in which both sides have (or at least have the right to have) enough high-readiness in-place or early-arriving forces to provide a basic level of initial defense (coverage of the front, plus reserves). This will continue to be critical for NATO under all arms control regimes, because of NATO's forward-defense strategy. The principle, however, is symmetric: Having high-readiness forces adequate for defense is "good," despite the intuition of many people that high readiness is "bad." Forces beyond the defensive minimum can be regarded as *excess forces*.
- Theater commanders will need to develop better estimates on this matter, but the apparent minimum Central Region requirement for initial defense (including some reserves) is on the order of 25-35 equivalent divisions, given current types of forces and approximate parity in force levels. NATO's current minimum is larger because the threat is much larger. Even with parity, lower force levels could be destabilizing.
- The sides should seek readiness limitations on excess forces (until such forces are eliminated), because they would improve the defender's prospects in a short-mobilization war and would thereby improve stability. However, such limitations should not be regarded as an adequate endpoint: Without the *elimination* of the excess forces, imbalances and instabilities will continue to exist. At the same time, avoiding such useful operational limitations until final agreements are reached on

[1]Some concepts for partial disengagement maintain forces on the front, but preferentially withdraw (perhaps by 50 km) assault elements rather than defensive elements such as antiarmor equipment. Such approaches may require significant changes in composition and doctrine, but would have the advantage of creating larger operational reserves.

everything would seem foolish and might doom prospects generally. A balance will be needed.

- The excess-force concept implies that readiness limitations should be conceived and formulated in terms of *ceilings* on the number of forces in each of several readiness categories. These ceilings should permit initial defense.
- Although hypothesized changes in force composition and doctrine might make it possible in the future to improve stability and perhaps reduce the defensive minimum by preferentially reducing "offensive" systems, increasing the use of obstacles, and imposing partial disengagement zones, the most straightfoward and compelling way to improve the defender's prospects (and stability) is *to eliminate or prohibit excess forces generally, and high-readiness excess forces as a first priority*. No changes in composition are required.

An Illustrative Program of Measures

Figure S.2 *illustrates* what might be accomplished over time, although the description is highly simplified and it is likely that the actual path of arms control will combine features of all the illustrative phases early. The principal elements are three:

- **Preparation phase:** Define categories of readiness for military units (probably at the division level). Agree on data characterizing the current number of units and distribution of units among categories. Do similarly for categories of force positioning. Discuss, and agree to the extent possible, on concepts of stability and security. Discuss verification concepts.
- **Phase one: mostly unilateral Soviet actions** (Fig. S.2b): The Soviet Union withdraws some or all of its excess forces to the Soviet Union. The sides establish a ceiling on the number of units in categories of readiness allowing them to be employed with only a few weeks of preparation. The Pact relegates some Category I and II units to a low-readiness Category III status, or disbands them altogether—acting primarily in its own self interest (reducing expenses and improving relations with the West). The sides agree that violations

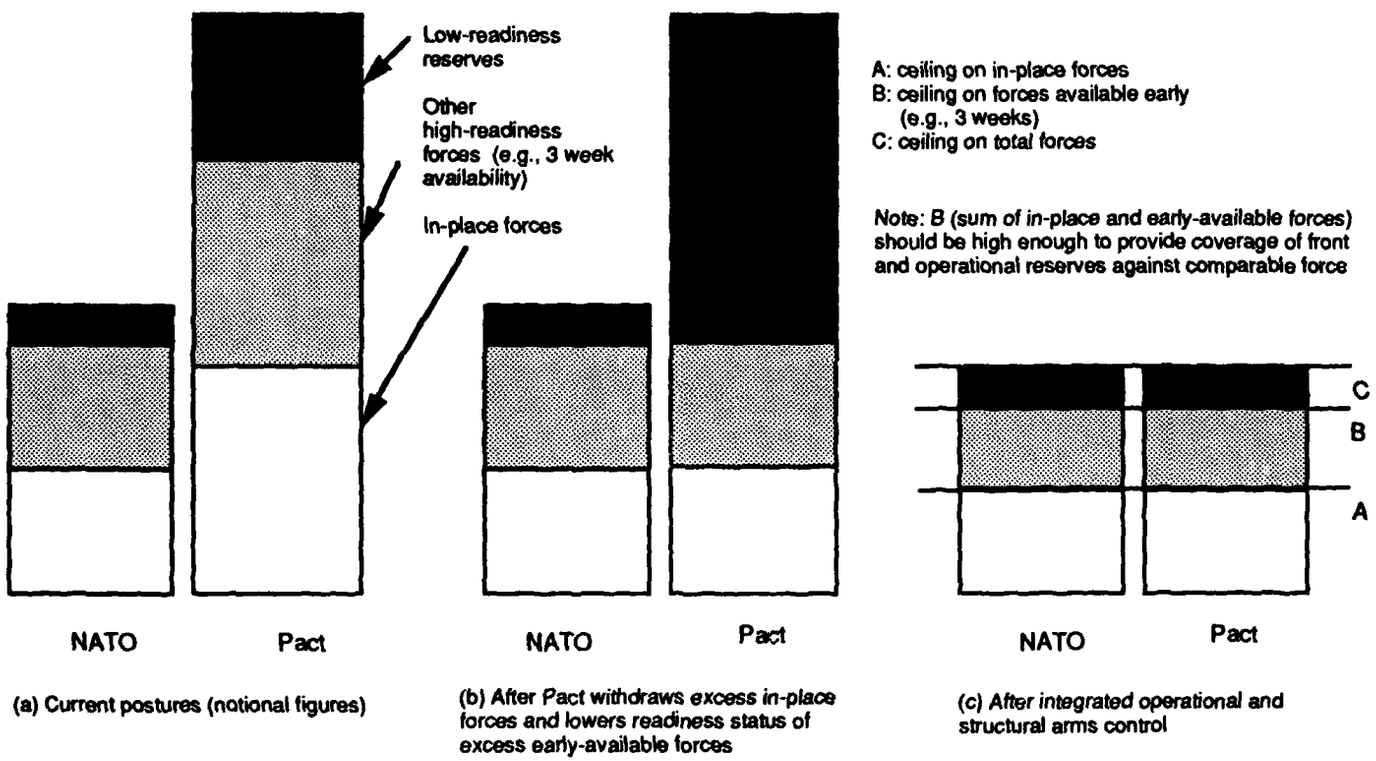


Fig. S.2—A possible sequence of operational and structural arms control

of the ceiling would be both prohibited and provocative (*casus belli* conditions). They also agree on ceilings limiting the magnitude of ammunition and bridging equipment in forward areas, again establishing the ceilings by reference to defensive requirements. Finally, they agree on verification-related measures that include detailed data exchange, inspections, and routine monitoring of LOCs.

- **Phase two: coordinated reductions and controls toward a stable posture** (Fig. S.2c): The sides pursue reductions and operational measures together. They set a ceiling on total forces (line C in Fig. S.2c), on the sum of in-place and early-available forces (line B), and on in-place forces (line A). Again, ceiling B is established at a high enough level to assure coverage of the front plus a supply of reserves. The sides move toward the endpoints on an agreed schedule. They agree that even in crisis, mobilizing or preparing more forces than are permitted under ceiling B would be an act of provocation. So also would reintroduction of excess forces into the forward areas. Finally, they complete agreements on verification measures.

The picture painted here could be even simpler if one could ignore economic considerations. From the viewpoint of stability, high-readiness in-place forces are "good," so long as they are not too numerous. It is the mobilization process (including readiness upgrades) that could be frightening and destabilizing. However, the high relative cost of maintaining active in-place forces implies that the sides will continue to depend to some extent on high-readiness reserves for even their minimum defense requirements. This is the motivation for having multiple ceilings, and explicitly permitting, even in crisis, that degree of mobilization required to reach the defensive-minimum ceiling (line B). Such a scheme requires the ability to monitor the magnitude and location of forces, but is well within the bounds of the feasible if an appropriately firm verification regime were negotiated.

It is recognized, of course, that the burden of initial actions would fall primarily on the Soviets—with highly asymmetric reductions and

withdrawals.[2] That, however, is a logical consequence of the current force posture and the requirement for equal security as an outcome. Bluntly put, the currently adverse balance and instabilities exist because of unilateral Soviet actions, and creating a context that would allow NATO to participate safely in ambitious reductions and demobilization will also depend primarily on Soviet actions. NATO should encourage and applaud such actions, but should not plan to "pay" for them. The Soviet Union's *perestroika* should benefit from the improved international environment resulting from pullbacks. It would be tragic if the Soviet leadership were unable to make the necessary changes, which would probably be in the best interests of the Soviet Union, because of misguided notions about asymmetric changes being "unfair" or about their being able to strike a better deal.[3] It is to be hoped that the sides will focus on the principle of equality of *outcomes* rather than on the asymmetric requirements for reaching that outcome.

TECHNICAL ISSUES

Implementing a program of conventional arms control will probably prove to be extremely complex, both technically and politically. The old adage that the trouble is in the details applies strongly. The study's observations on this were:

- Defining readiness categories will be difficult but not impossible so long as doing so is a serious objective. Key criteria will include cadre levels, the activity level of reservists (e.g., number of days of training per year), the availability and use rate of equipment, and the nature of reservist activity (e.g., individual training vs unit training vs large-scale exercises).
- Because the purpose of readiness limits is to make it difficult for the sides to employ low-readiness reserves without months

[2]This study did not examine issues involving tactical air forces, navies, or forces slated for the Northern or Southern flanks. This omission was without prejudice to how these other forces should be treated in negotiations or whether current asymmetries in these forces favor NATO or the Pact.

[3]After this manuscript was completed (November 1988), Secretary General Gorbachev announced a significant unilateral withdrawal of forces from Europe (address at the 43d session of the United Nations General Assembly, December 7, 1988).

of training, and because higher-level exercises could be conducted quickly with prior preparations, it will be important to emphasize constraints on *low-level* (e.g., battalion) *training activities,* even though this will violate the intuition and preferences of many, and introduce verification challenges requiring intrusive measures.

- Circumvention of readiness limitations would be substantially more difficult for the Soviet Union if a ceiling were placed on the number of yearly draftees. Reducing the size of the recently trained reservist pool would be a significant complement to readiness constraints. It is possible that equal ceilings could be established for alliance-wide trained manpower.
- Readiness-related verification problems will unquestionably be complex. They will be mitigated by the large numbers of personnel involved in armies: Raising the readiness of low-readiness units would involve hundreds of thousands of people drawn from the civilian economy, as well as some large and visible activities. Also, although assuring high-confidence verification may prove complex, it is especially important in considering operational arms control to compare the dangers of imperfect verifiability with the dangers of *not* having the limitations at all. This study concludes that those dangers are considerable.

NEXT STEPS: AN AGENDA FOR FURTHER STUDY

One principle left unstated above is the general admonition: "Do no harm." This certainly applies to operational arms control, because the issues are complex and there is little current understanding in the NATO policy community of what the implications of alternative measures would be. Although this study may improve that situation, more research and analysis on specific topics are needed. Priority topics appear to be the following:

- Developing a primer on training, exercising, and other aspects of improving readiness. As part of this, comparing estimated Pact, estimated NATO, and historical force-generation processes, and translating information on those processes into

more discriminate analytic descriptions distinguishing, for example, among effectiveness for defense, assault operations, and exploitation operations. The current study lays the analytic basis for such discrimination, which goes far in explaining the long-standing discrepancies in force-generation times.

- Analytic war gaming to assess various readiness limitations in the light of possible changes in Pact practices and exploring implications of new weapons, forces, force levels (especially low levels), and doctrines, including those deemphasizing armor and artillery in forward areas.
- Developing an integrated *global* framework for both structural and operational arms control, one considering potential events over perhaps a 15 year time period and a broad range of assumptions about factors dominating military assessment.
- Reviewing verification issues starting from first principles; also, conducting technical studies and games to define appropriate inspection measures *and* to define potential NATO concepts of operations that would, in time of war, exploit the enhanced difficulties for the attacker that had been created by arms control constraints.
- Developing and elaborating a theory of stability that would draw specifically on insights from analytic war gaming to help guide both analysis and negotiations on such issues as the effects of new-technology systems and criteria for distinguishing between "offensive" and "defensive" capabilities.
- Assessing alternatives for reciprocal unilateral measures that might be proposed by either the Soviet Union or the United States recognizing that negotiating a formal agreement on conventional arms control might prove extremely difficult and time consuming.

ACKNOWLEDGMENTS

This study benefited from many discussions, not only with RAND colleagues and government officials with diverse views, but also with Western and Soviet participants in two conferences held during 1988 on the subject of conventional arms control (the first one at RAND and the second in Moscow). Richard Kugler and Kenneth Watman provided useful reviews of the draft report. The final result, however, is the author's responsibility.

CONTENTS

FIGURES

I. INTRODUCTION

DEFINING OPERATIONAL ARMS CONTROL

Operational arms control consists primarily of regulations affecting the operations and associated readiness of forces. It may include limitations on the way combat and support forces are trained, exercised, and positioned; on the way combat equipment, stocks, and specialized equipment for such forces are stored or positioned; and such verification-related measures as the exchange of data bases and providing for permanent, scheduled, and short-notice inspection. Operational arms control is a complement to structural arms control, which limits the size and composition of force structures. As with many distinctions there is a realm of ambiguity. For example, limits on the ratio of active forces to reserve forces might be considered either structural or operational. Also, the peacetime location of forces is sometimes considered under structural arms control when the aim is to reduce forces in the Atlantic to the Urals region. Since forces can change their locations fairly quickly, however, peacetime locations are considered here to be an *operational* rather than structural matter, without prejudice to which negotiating forums might be involved.

PURPOSE OF THE STUDY

The purpose of this study is to outline a conceptual military framework for conceiving and evaluating operational arms control measures for Europe's Central Region and, ultimately, for other military theaters in Europe and worldwide. Such a study is needed because neither the potential benefits nor the complications and potential drawbacks of operational arms control—especially in coordination with structural arms control—have been discussed much in the past, except in relatively abstract terms and without the benefit of military analysis to guide discussion. Even the objectives to be sought are not yet agreed on, much less the detailed criteria for distinguishing among good and bad proposals.

HISTORY OF PRIOR ANALYSIS

Previous work on the subject has been dominated by interest in confidence-building measures related to efforts to avoid accidental wars.[1] Earlier RAND work under this project (Ben-Horin, Darilek, Jas, Lawrence, and Platt, 1986) began defining a more nearly top-down approach starting with inferred objectives that could be used to assess proposals for negotiations on confidence- and security-building measures (CSBMs). It also recommended that greater relative attention be paid to the *security* part of CSBM issues, in particular the goal of making surprise attacks more difficult. Figure 1 is adapted from that earlier work. The general and specific objectives were inferred by the authors from a variety of formal and informal sources. The "core objectives" were the ones emphasized by the authors as the basis for evaluating proposals.

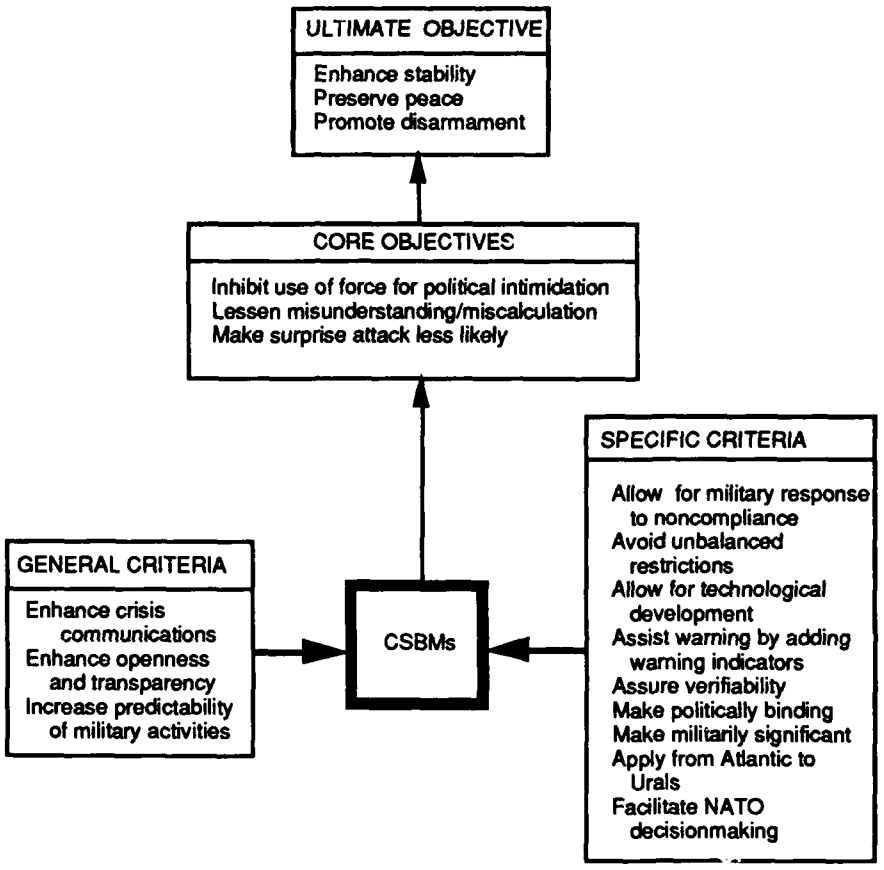
In September 1986, shortly after completion of the Stockholm negotiations and in the wake of the Reykjavik Summit, the author and colleague Robert Howe briefed elements of a Central Region balance assessment to a workshop on the future of CSBMs held under OSD auspices and attended by senior representatives of several government agencies. That assessment was based on extensive analytic war gaming and considered a broad range of scenarios and nonstandard assumptions. One conclusion was that small and incremental reductions could *reduce* NATO's security and that planners should therefore think about much more ambitious and asymmetric formulas. Another result was to recommend an important role for *readiness limitations* in improving NATO's military security—a much more important role than had previously been considered.[2]

In the last two years considerable attention has been paid to high-level political issues such as the implications of INF and potential formulas for reductions.[3] Early RAND work on the subject (Thomson and Gantz, 1987) emphasized the need for coherent defense planning

[1]An exception is Flanagan and Hamilton (1988), published as the draft of this study was first circulating. Although not discussed further here, their paper has much in common with the current study.

[2]Davis (1988) describes the philosophy and methodology of the assessment, and some of its general conclusions.

[3]See Nerlich and Thomson (1988) for a survey of European and American viewpoints as of mid-to-late 1987. See also Blackwill (1988) and Snyder (1988), the latter reviewing Soviet positions and suggestions.



Adapted from Ben-Horin, Darilek, Jas, Lawrence, and Platt (1986), Fig.1.

Fig. 1—Inferred NATO objectives for CSBM negotiations (circa 1986)

and arms control objectives, working toward the goal of a *stalwart* conventional defense (i.e., one that would prevent significant loss of territory, even in stressful short-mobilization cases). The authors used analytic war gaming and simpler arguments to estimate the implications of such a goal for reduction formulas. They concluded that reductions should be much more asymmetrical than usually assumed (i.e., on the order of 4 or 5:1 rather than 2:1), because the reductions

should eliminate "excess forces" (those above and beyond the needs for defense), of which the Pact has an abundance and NATO has only very few, if any. The initial controversy about this conclusion illustrated the nontrivial difference in judgments about what is intuitively fair and important when one does or does not analyze proposals for their implications to military security.

The present report builds on these earlier efforts in providing a top-down security-oriented structure based on military analysis to guide discussion, debate, research, and analysis. Its primary emphasis, however, is on elaborating the potential of *operational* arms control for improving military security, which has heretofore been given too little analytic attention.[4] The report also *begins* the process of integrating thinking about operational arms control and arms control more generally.[5] It does not consider political strategies or negotiating tactics. Nor does it consider limitations on air forces, navies, or forces other than those slated for the Central Region. These omissions are without prejudice to how such forces should be treated in negotiations and whether NATO or the Pact has more of them currently.

APPROACH

The approach taken in the remainder of this report involves:

1. Reviewing and postulating top-level security objectives to which arms control should contribute.
2. Drawing on military analysis in the form of analytic war gaming to identify conceptually distinguishable subordinate objectives and to identify potential contributions of operational arms control specifically.
3. Discussing tensions and complications that must be considered in developing and evaluating specific proposals.
4. Proposing principles for developing and evaluating proposals.

[4]For discussion of more traditional confidence-building issues, see Kahan et al. (1987), which describes two political-military games conducted to test likely consequences in crisis of the Stockholm accords.

[5]A parallel RAND project led by colleague Kenneth Watman under Army sponsorship is exploring issues of structural arms control.

5. **Identifying the principal unresolved empirical and analytical issues, which need to be studied in more depth before policy positions are taken.**

II. ARMS CONTROL OBJECTIVES

Arms control is not, of course, an end in itself. Instead, it is one among many activities designed to serve the higher security interests of nations and alliances. Let us begin, then, by reviewing what some of those higher interests may be. Although this may seem pedantic to some, it is appropriate because there is a wide range of views, both explicit and implicit, about what conventional arms control objectives are and should be.

POSTULATED SECURITY OBJECTIVES

The issues under discussion in this report are by their nature coalitional issues and it is therefore important to review NATO's stated objectives and strategy. Although the basic document (MC 14/3) is classified, enough information is available in the public domain to support the needs of this report. According to Legge (1983, p. 9), the principal concepts of NATO's flexible-response strategy are as follows:

> The strategy set out in MC 14/3 seeks to deter aggression by the maintenance of conventional, theater nuclear and strategic nuclear forces that would enable the alliance to respond to any attack at an appropriate level. The initial response would be direct defense, seeking to defeat the aggression on the level at which the enemy has chosen to fight. If the aggression could not be contained, the alliance would be prepared to conduct a deliberate escalation, raising but where possible controlling the scope and intensity of combat, with the aim of making the cost and risk disproportionate to the aggressor's objectives and the threat of nuclear response more imminent. The ultimate objective, if deterrence failed, would be to convince the aggressor of the unacceptable degree of risk involved, thus causing him to cease his attack and withdraw. Finally, in the event of a major nuclear attack, NATO would maintain a capability for a massive strategic nuclear response.

One objective, then (not adequately supported by defense programs over the years), is to be able to defend successfully at the conventional level.[1]

[1]It is often said that the *minimum* requirement for conventional forces is that they provide an initial defense that would give NATO enough time to make the decision to

NATO has additional objectives that can be inferred from many years of official pronouncements, attitudes, and positions in arms control negotiations. For the purposes of this report it is useful to draw these together and sharpen them somewhat. It is postulated here that the NATO security objectives most relevant to conventional arms control are:

- To deter aggression and coercion directed at alliance members.
- In the event war begins, to defeat the aggressor and restore prewar boundaries (without resorting to nuclear weapons); *or*, failing that, to reestablish deterrence and convince the aggressor to cease aggression and withdraw.
- To limit the damage and devastation of war should it occur.
- To avoid misunderstandings that might lead to unintended crisis or conflict.
- To enhance crisis stability.[2]
- To enhance arms-race stability and political stability, and to reduce peacetime costs of defense through reductions and other measures.
- To maintain alliance unity.

The first three of these are identical in spirit to familiar U.S. national security objectives as they are often expressed in the context of strategic-nuclear policy; they are also consistent with MC 14/3. The others are adaptations of classic arms control objectives that seem important enough to be considered top-level NATO-security objectives. Reducing the peacetime costs of defense is a security objective as well as an economic objective, because the rising costs of defense resulting from the sides' modernization and the continued high levels

use nuclear weapons. It is increasingly recognized that such a minimum capability is not enough.

[2]This issue is closely related to that of strategic-nuclear first-strike stability, which is discussed, for example, in Kent, deValk, and Thaler (1988) and Davis (forthcoming). The former discusses the effects of force posture on stability; the latter develops a theory of decisionmaking that includes behavioral factors likely to be important in crisis and conflict.

of mobilization are making it increasingly difficult to maintain constant security over time.[3]

These postulated objectives are consistent with a considerable body of current thinking within the alliance—especially when it is recognized that there is room for interpretation. Taken by themselves, the postulated objectives do not specify the confidence NATO should have in its ability to defend conventionally, the relative emphasis to be given to nuclear or conventional deterrence, or the actual strategy to be employed in crisis or war.[4] Despite this ambiguity, the group of objectives has the intended flavor of emphasizing capabilities for conventional defense more heavily. The appropriateness of that flavor is a premise of this report, and seems to be consistent with the expressed views of many policymakers on both sides of the Atlantic.

THE ROLE OF ARMS CONTROL

Broad Considerations

Arms control can be considered to be one of four top-level components of security strategy, the others being military strategy, economic strategy, and diplomatic strategy. Alternatively and more traditionally it can be considered subordinate to diplomatic or military strategy (e.g., Reagan, 1987). Giving it the elevated status of a top-level component of security strategy may be appropriate as a practical matter for discussions in the European context because of the high priority most Europeans place on arms control objectives per se—including those going beyond the more narrowly construed

[3]There are other candidate objectives. For example, many would argue that a principal objective for NATO should be the normalization of relations between West and East, which would include substantial demobilization. Although that could be considered to be covered by the above-mentioned objectives, it provides a different connotation—one raising such high-policy issues as the pullback of superpower forces, normalization of relations between Western and Eastern Europe, a potentially dominant role in NATO's defense for the European partners, and even de facto reunification of the Germanies. There are no agreed understandings among the NATO nations on any of these issues, much less between NATO and the Warsaw Pact. See Blackwill (1988) for a candid description of the tensions underlying the lack of agreement and the problems this poses for conventional arms control.

[4]Recent U.S. national military strategy deals with related issues (Reagan, 1987, p. 14) by describing a policy of deterrence that confronts the would-be aggressor with three possible responses—direct defense, the threat of escalation, or the threat of retaliation—without specifying the relative weight to be given to each.

aspects of military security.[5] However one conceives this, the principal point is that arms control cannot be considered in isolation.

Independent of how one constructs the hierarchy of objectives, this report argues that *the joint objectives of the two sides in conventional arms control should be the security objectives cited above.*[6] This is significant because many of those interested in conventional arms control have a narrower focus. Some are concerned primarily about avoiding the coercive uses of force; some about avoiding misunderstandings and miscalculations (e.g., avoiding accidental wars); others about improving the military balance; and still others about the potential of conventional arms control for transforming the political relationships in Europe.

It shall now be asserted that *the objectives of operational arms control should be the objectives of arms control more generally,* although the original objectives were much narrower and related to confidence building.

Stated NATO Objectives

Although it is *possible* that both alliances will accept these or equivalent joint objectives, there will also be alliance-specific objectives. For NATO, what should probably be the most important objective (improving the conventional balance)[7] is entirely consistent with the first three of the above-mentioned joint objectives. So also is the broader official "Brussels Declaration on Conventional Arms Control," which states that the objective is "strengthening stability and security in the whole of Europe, through increased openness and the establishment of a verifiable, comprehensive and stable balance of forces at lower levels."[8] This is possible because NATO is a manifestly

[5]French views tend to be different from German views in this regard (e.g., see Blackwill, 1988, p. 32).

[6]Clearly, useful arms control agreements might be relevant to some objectives and not at all to others. On the other hand, failure to take seriously the more ambitious objectives could lead to faster negotiations at the expense of losing important opportunities. A basic problem here is that the Soviets might accomplish most of their principal objectives with arms control agreements that would improve the political atmosphere (and thereby encourage capitalization of *perestroika* by the West) without improving the objective military situation at all.

[7] See, for example, Nerlich (1988), Ruhl (1988), and Thomson and Gantz (1988).

[8]This formulation is given also in the "Halifax Statement" of 30 May 1987 quoted in *Survival*, Vol. 29, No. 5, September/October, 1987, p. 466.

defensive alliance with strictly limited war objectives should deterrence fail.

Stated and Unstated Pact Objectives

Official Pact statements about objectives are similarly acceptable in a joint two-sided framework, and emphasize stability and reductions.[9] However, unstated Soviet-specific objectives almost surely include using the general arms control process to promote denuclearization and the delegitimizing of nuclear use.[10] The Soviets probably want also to increase the relative European role in security discussions, to reduce the relative U.S. role in European affairs, and to reduce the rate at which NATO introduces the next-generation weaponry that could render obsolete current concepts of operations and force the Pact to pursue an expensive technological competition it probably cannot win. Most importantly, the Soviet Union may see asymmetrical conventional arms control as the price it must pay to help create the general international environment necessary for the economic revitalization that is so fundamental to Gorbachev's policies. Some observers fear that the Soviets will go no further in conventional arms control than necessary for this objective, and that operational arms control measures, although very useful in themselves, could end up being an unfortunate substitute for more far-reaching reduction measures that would significantly improve the current balance.

The Do-No-Harm Objective

In discussing alliance- or nation-specific objectives for arms control, it is appropriate to note that all parties concerned should have a particular "negative objective" reminiscent of Hippocrates' admonition to physicians: "Above all, do no harm." This concern is real, serious, and overt in the NATO countries for several reasons: The balance is so tenuous now that well-intended provisions such as inadequately

[9]See, for example, "Address of Warsaw Treaty Member States," quoted from the *Soviet Weekly Supplement* of June 21, 1986, in *Survival*, Vol. 29, No. 5, September/October, 1987, p. 463. See Snyder (1988) for a survey of Soviet commentary. See also MccGwire (1988).

[10]See Van Oudenaren (1988).

asymmetric reductions or inadequately considered readiness limitations could have severely adverse military consequences; there is considerable opportunity for self deception when dealing with confidence-building measures; and, most importantly perhaps, there are great uncertainties about political consequences to the alliance.

Although they do not discuss it openly, the Soviets must also be worried about political uncertainties, most particularly about the possibility that a side effect of conventional arms control will be a resurgence of independent action by the East European nations. On the other hand, a successful conventional arms control process benefiting the non-Soviet Pact countries might dampen such actions and reduct the risk of revolution. In any case, the stakes are high for the Soviets and for Gorbachev personally.

A Paramount Objective

It is convenient to seek a "one liner" objective capturing the essence of the longer list of objectives. Upon looking over that longer list, we may observe that at least four and perhaps all six are consistent with and closely related to the following, which this report now treats as the *paramount objective*:[11]

- To improve actual and perceived prospects for the defender in the event of war.

If the defender has the advantage, then deterrence and crisis stability are both enhanced. This, in turn, may encourage confidence in and satisfaction with the status quo, thereby promoting arms-race stability, political stability, and alliance cohesion.

[11]Establishing this paramount objective is not trivial. If, for example, one believed the current conventional balance to be acceptable, then one might not wish to emphasize improving it so much as reducing the likelihood of inadvertent war. Or, if one believed that arms control simply could not be a significant factor in improving the balance, then one might be chary about establishing arms control objectives that would clearly not be met. It can be argued that many of the problems encountered by SALT and START stem from the unrealistic objectives asserted for SALT with respect to solving the ICBM survivability problem. Regardless of one's views on SALT and START, however, it seems clear that conventional arms control *does* have the potential to improve security. Furthermore, the current conventional balance as measured by likely war outcomes is at best fragile (Davis, 1988) and at worst distinctly adverse although complex.

The paramount objective proposed here extends the objectives proposed in earlier RAND work. Note that:

- It addresses both actual and perceived prospects, because it is concerned about both the warfighting balance and deterrence. Since aggressors seldom start wars if they expect them to be long and costly, even if they would expect to win eventually, the distinction is *important*;[12] and
- It goes beyond "reducing the likelihood of surprise attacks" in setting ambitions (although measures to help avoid such attacks will be a major element in what follows).

As a practical matter, the NATO nations are far more concerned about improving prospects for a successful defense *by NATO* than about improving prospects for "the defender" in the abstract. Given the current highly asymmetric quantitative balance, such a position would be quite defensible. If one is contemplating *major* arms control agreements, however, then the two-sided (joint) formulation is preferable because, in the long run, unrestrained efforts to achieve one-sided military security tends to encourage arms race *instability*—creating expenses, political tensions, and anxieties. Indeed, this has been the consequence of the lengthy Soviet military buildup in conventional forces over several decades, and Soviet leaders (who probably feel no less deterred from invading Europe now than in the past) are discussing openly this downside aspect to their past policies. It is for such reasons that some authors in both Europe and the Soviet Union have emphasized concepts such as "defensive defenses" and various measures of two-sided crisis stability.[13] Those authors have objectives very similar to the paramount objective proposed above.

[12]The importance to a would-be aggressor of quick and relatively painless victory has been discussed empirically by Mearsheimer (1983). Although defense planning should largely revolve around worse-than-expected cases, it should not underestimate the deterrent value of what conservative analysis would consider to be marginal or even inadequate capability. On the other side of the ledger, we have countless historical examples to show that conventional deterrence often fails—often, because the attacker's perception of the defender's vulnerabilities is different from the defender's perception on the subject. See Knorr and Morgan (1983, Chapter 8) for a thoughtful discussion.

[13]See, for example, Huber (1988),von Muller (1987), and quotations from Mil'shtein, Gorbachev, and other Russians given in Snyder (1988).

III. MILITARY PROBLEMS ARMS CONTROL COULD MITIGATE

BACKGROUND ON THE WAR FIGHTING BALANCE

Classes of Problem

Having established as a preeminent objective of conventional arms control the improvement of the defender's prospects, the next step is to identify specific problems to be solved or mitigated by reviewing aspects of the military balance.

It is increasingly being recognized that the military balance is a complex and multifaceted subject. Indeed, many disagreements about "the balance" originate in the fact that there are *several* balances. This is not the place to discuss some of them (e.g., the balance in "inputs" as measured by dollar or ruble investments, or the balance of "beancount outputs" describing numbers of divisions, tanks, and the like). Instead, given the objective specified above, we are concerned here with the *war fighting balance* as it may be perceived by both the Pact and NATO.[1]

Whereas simpler methods can be quite adequate and even superior for discussing the balance of potentially available resources (e.g., divisions over time), it is difficult to study the war fighting balance systematically without resorting to more sophisticated and complex methodologies such as human war gaming and simulations. Many military, government, and civilian organizations conduct games and simulations on one or more aspects of the war fighting balance, but what follows draws most heavily on the multiscenario analytic war gaming methods developed by the author and colleagues at RAND (Davis, 1988). These have particular advantages for strategic-level analysis, which in this case means theater-level analysis for coalition warfare.

[1]For a more general unclassified discussion of the Central Region military balance see Levin (1988), Thomson (1988), Davis (1988), Mearsheimer (1988), Posen (1988), Epstein (1988), Holmes (1988), and Cohen (1988). The Levin report is the broadest of these and contains an extensive bibliography. The articles by Holmes and Cohen are essentially critiques of the articles by Mearsheimer, Posen, and Epstein.

Figure 2 illustrates the general approach by highlighting the types of issues that are *explicitly* addressed as variable "inputs." For example, one can vary not only assumptions about the available resources (e.g., the number and capabilities of divisions available over time by nationality), but also assumptions about the sides' military strategies, the efficiency of command-control, the loss rates in diverse types of battle, and the cohesiveness of the two alliances. The result of any one set of assumptions is a single analytic war game (a simulation that may reflect insights gained from considerable interactive gaming, and that is reviewed daily by military analysts to assure military plausibility). By conducting many such simulations (e.g., hundreds over a period of months), one can develop a broad view of the war fighting balance that reveals both sides' vulnerabilities and opportunities. This can help establish priorities for military spending, changes in strategy and doctrine, and arms control. As with other types of analysis, the results depend ultimately on the analysts and their assumptions rather than on the underlying models—although the models matter also.

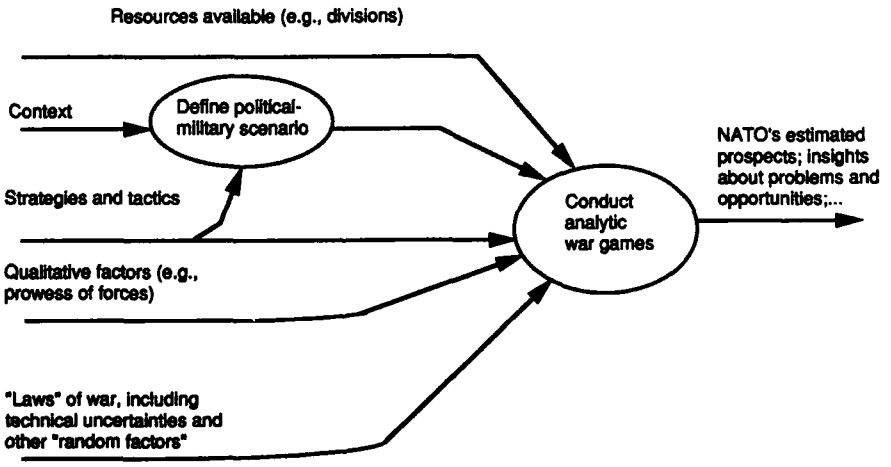


Fig. 2–Assessing NATO's prospects for conventional defense

Figure 3 draws on such multiscenario analysis to summarize the types of problems a NATO military planner confronts. It is a "fault tree" showing alternative ways that NATO could lose in the Central Region.[2]

An Important Distinction: Attrition vs Maneuver Warfare

To understand Fig. 3 it is necessary to appreciate the distinction between a war of attrition and a war of maneuver. A war of attrition is one in which the sides' large formations confront each other more or less head-on, with the attacker assaulting the defender's prepared positions (or with the sides taking turns attacking each other's position, as in World War I). What appears to be a war of attrition from a strategic perspective may be a very active and maneuver-filled war at a lower level (see, for example, Simpkin, 1982, Part 5). A competent defender will probably leave his prepared defenses to mount counterattacks and flanking actions at the tactical level. From the higher perspective, however, the war appears relatively static, with long defensive lines that remain, on average, rather cohesive, even if they are stretched and distorted, until and unless the defense is exhausted.

In a war of maneuver, by contrast, maneuver of larger formations such as Pact armies or fronts is a major characteristic of the overall campaign—although there may be periods of attrition warfare. An objective in such warfare is often to cut off and encircle opponent forces at the strategic level (e.g., "bagging" significant portions of corps or army-sized formations) (Hines and Petersen, 1986). A traditional objective short of such encirclements is to exploit local breakthroughs with the rapid and massive insertion of forces deep into the opponent's rear. Such deep penetrations can cut off logistics and withdrawal routes, seize important ground, overrun retreating

[2]Pact analysts' fault trees would be quite different, perhaps highlighting wars in which NATO seizes a portion of Eastern Europe or goes on to threaten the Soviet homeland. A realistic Soviet planner would be concerned about anti-Soviet activities by East European states. A Soviet planner working more bureaucratically standard scenarios might be concerned about NATO mobilizing and invading the Pact with the Pact not reacting properly to strategic warning. As bizarre as such scenarios may sound to Westerners, they are apparently prominent in some Soviet analyses, especially studies that include postulated NATO deep-strike capabilities that could interfere with the delayed Pact mobilization. See, for example, articles by Gareev and Kulikov referenced and discussed in Snyder (1988).

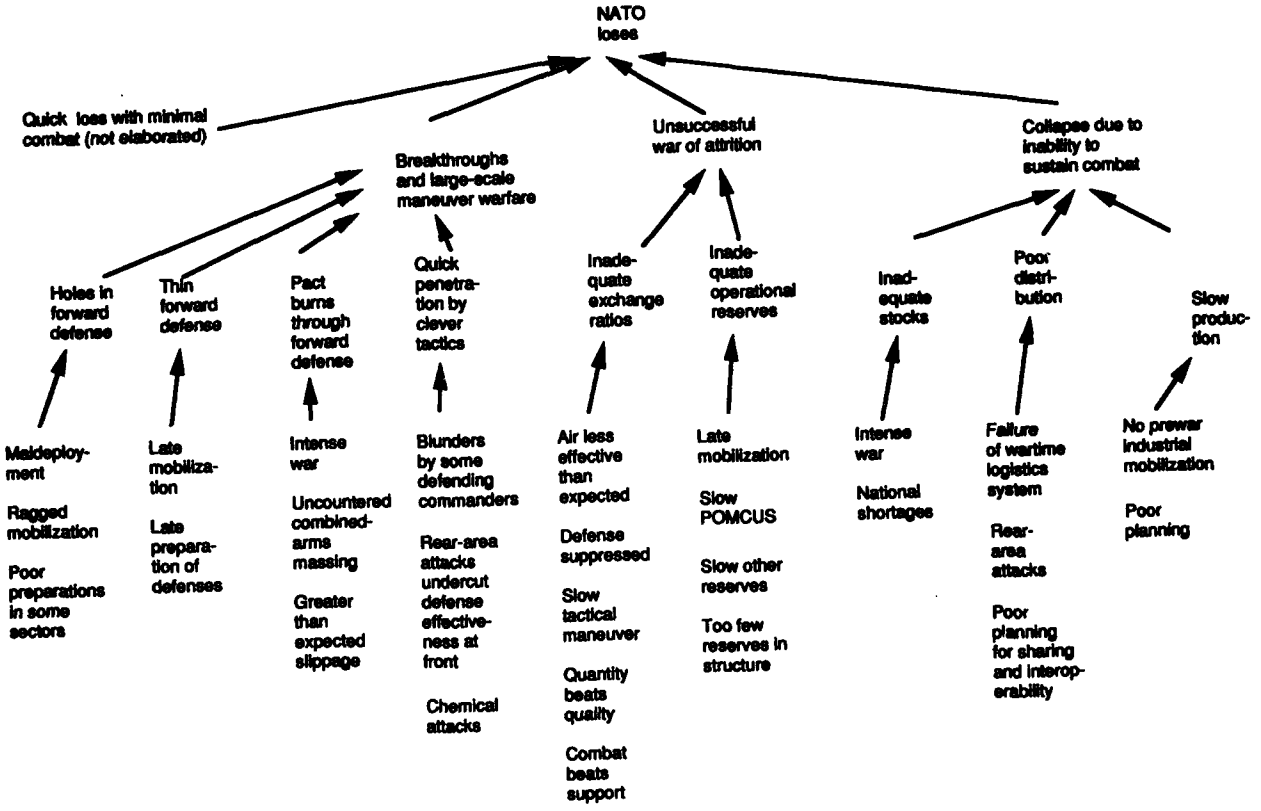


Fig. 3— A fault-tree depiction of NATO's defense problems

forces and command posts, and contribute to higher-level encirclement operations.

Fast large-scale maneuvers can sometimes *avoid* attrition-warfare battles by gaining decisive positions or collapsing the opponent's defense.[3] In other instances, the purpose of the large-scale maneuver is to establish favorable circumstances for attrition-warfare battles—i.e., circumstances where the force ratios, terrain, and other factors permit a decisive victory at a relatively low cost in terms of exchange ratio and, perhaps, absolute casualties. Thus, attrition is very much a part of maneuver warfare even if "maneuver warfare" and "attrition warfare" are usually considered opposites (see also Simpkin, 1985).

There are many historical examples of maneuver warfare, but in the current century it is associated with Nazi blitzkrieg operations, Soviet Eastern Front operations late in World War II, the Soviet Manchurian campaign against the Japanese in 1945, and certain operations by General George S. Patton. Soviet military planning has been built around such concepts of large-scale maneuver for decades.

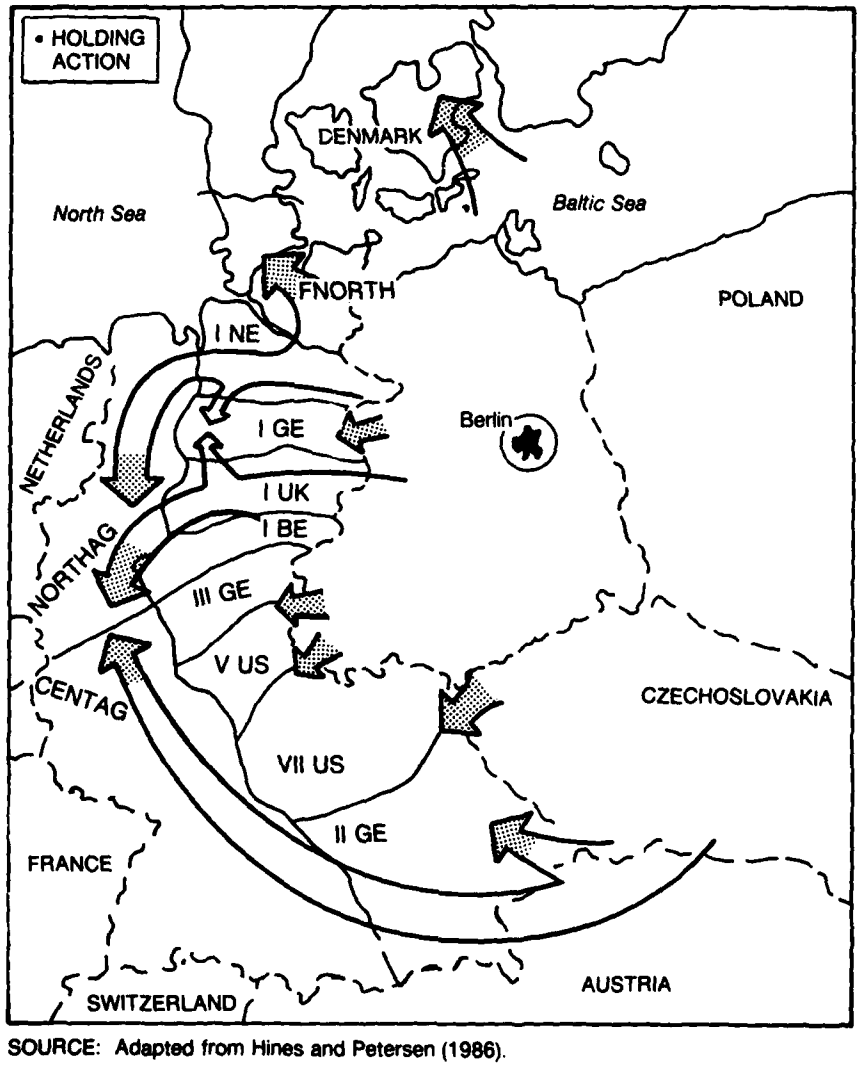
Figure 4 illustrates the *type* of campaign plan that Soviet planners would contemplate for the Central Region. The appropriateness of this general image (drawn from published work by Lt. Col. John Hines, then of OSD's Office of Net Assessment) is well validated from Soviet military writing, military-academy teaching, and exercises.

THE SIGNIFICANCE OF ASYMMETRIC STRATEGIES

NATO's Defensive Strategy

NATO's military strategy attempts at the strategic level to assure a war of attrition in which the Pact's forces would have to assault prepared defenses in depth—i.e., a zone tens of kilometers deep with several layers of defensive positions and alternative firing positions within each of these. Opportunities for tactical-level maneuver would

[3]Patton (1947) describes the successful operations of his forces in World War II and demonstrates the value of speed and momentum. Despite being manifestly on the offensive, Patton's forces enjoyed a highly favorable exchange ratio in their sweep across Western Europe.



SOURCE: Adapted from Hines and Petersen (1986).

Fig. 4—An illustrative Pact strategy for invading the Central Region

also be essential for success. In such circumstances the defender has distinct advantages (concealment, protection, obstacles, knowledge of the terrain and, often, the ability to prevent the attacker from having more than a fraction of its available forces on line) and the attacker, even if numerically superior, may be roundly defeated.

Most attackers attempt to avoid fighting under such circumstances. Maneuver-oriented armies such as those of the Warsaw Pact attempt to concentrate forces, penetrate the prepared defenses locally, and then exploit the penetrations with large-scale "breakthrough" operations and encirclements. Such operations can be frustrated in some instances by fallback maneuvers, but NATO has little strategic depth, has its most defensible terrain near the border, and has political imperatives dictating an operational strategy in which giving ground (much less practicing for it) is anathema.

With this background, Fig. 3 is now more intelligible. On the extreme right we see NATO losing even though it maintains a war of attrition; the problem is that NATO runs out of supplies. Moving leftward we see the case in which NATO maintains a war of attrition, but is unable to fight as effectively as needed to overcome the Pact's large quantitative advantages. Eventually, NATO runs out of operational reserves. This may occur in a matter of 10 days when Soviet second-echelon forces are committed, much later, or not at all. As suggested above, there are many uncertainties in the nature of modern combat and the defender has significant advantages in attrition warfare. It is therefore by no means certain that NATO would be defeated in an attrition war (so long as it had adequate supplies, which it apparently does not have currently). To a Pact commander, the prospect of such a war of attrition would be dispiriting because it would be contrary to doctrine and fraught with enormous risks. On the other hand, to a NATO commander, prospects in a war of attrition are not favorable. Using assumptions that such a commander would regard as nothing more than prudent, he would fear collapse after a week or so because he would expect to have a fragile front line and a small operational reserve. Thus, if any of many things went wrong, defeat could come quickly. An attrition war in the Central Region, then, would be a war that neither side would evaluate favorably.

Likely Pact Strategy

Returning to the probable Pact perspective, it is likely that Pact commanders would attempt to achieve their victory through massing and early penetrations exploited subsequently by the insertion of reserves for high-speed large-scale maneuver. These are the NATO-failure modes illustrated by the leftmost two branches of the fault tree. The first branch, not elaborated upon here, is an extreme case in which the initial assault is so rapid and so quickly exploited that it brings about an immediate collapse—much as was suffered by France early in World War II. The more standard planning case for Pact commanders would probably be the second branch, with a campaign plan something like that of Fig. 4 and a time scale of perhaps two to three weeks for achieving victory.

Although most defense analysts in the United States and NATO *assume* a war of attrition along the lines of the third or fourth branches, it can be argued that deterrence probably depends most heavily on assuring that neither of the first two branches would apply. It follows that *arms control measures making it more difficult to achieve early penetrations and subsequent large-scale maneuver would be especially significant for deterrence.*

How, then, would a Soviet commander hope to create the type of scenario in which he could achieve the early breakthroughs? Figure 3 suggests some of the more likely mechanisms, most of which involve exploiting one or another form of strategic surprise in the extended definition introduced above. For example, if NATO received early strategic warning but some of the allies were tardy in implementing the full-out mobilization effort, the attack might come where NATO's forward wall had a weak spot—probably not a true "hole," since German forces would cover the entire front if necessary, but a weak spot. Subsequent events would have little to do with the types of warfare modeled in standard NATO corps-level war games.

Even if the Pact were unable to achieve strategic surprise, it might achieve its early breakthroughs with clever tactics such as a shift of axis or unconventional warfare along the defender's key roads, or by the sheer speed and momentum of its initial operations. Although NATO has technical and human mechanisms to provide warning and early intelligence, the likely pace and intensity of D-Day warfare

might include considerable tactical surprises for NATO's defenders and reduce their initial effectiveness. Such problems have been routinely encountered by forces in initial battles (or in exercises such as those held at the National Training Center).

Figure 5 highlights the portions of the fault tree where strategic, operational, or tactical-surprise effects are important, as well as D-Day tactical inefficiencies.

RUDIMENTARY FRAMEWORK FOR ARMS CONTROL

Failure Modes as Problems to Be Worked

For the purposes of this report it is useful to characterize the failure modes indicated by Figs. 3 and 5 as:

- NATO loses for lack of adequate total resources (divisions, supplies, etc.).

- NATO loses because of adverse large-scale maneuver warfare early in the war—the result, in turn, of:
  —Superior Pact operational strategy;
  —Details of the political-military scenario;
  —Early Pact-favorable results at the tactical level (e.g., Pact weapons or tactics prove superior, or NATO forces do not fight effectively in the critical first hours).

Many analysts argue that NATO "should not" lose a war for lack of total resources—that *if* both the Pact and NATO have time to mobilize and deploy the forces assigned to the Central Region, then the overall force ratio would be only mildly adverse (somewhere between, perhaps, 1.1 and 1.5).[4] Other analysts conclude that the force ratios would still be greater than 2:1 and that the Pact would be expected to win on the basis of mass alone.[5]

Relatively detailed war gaming and simulation can be very illuminating for some issues, but it has not resolved the disagreements

[4]See, for example, Mearsheimer (1988), Posen (1988), Epstein (1988), and CBO (1988).

[5]See Levin (1988, pp. 17 ff), Hamilton-Eddy (1988), and DoD (1988) for relevant information.

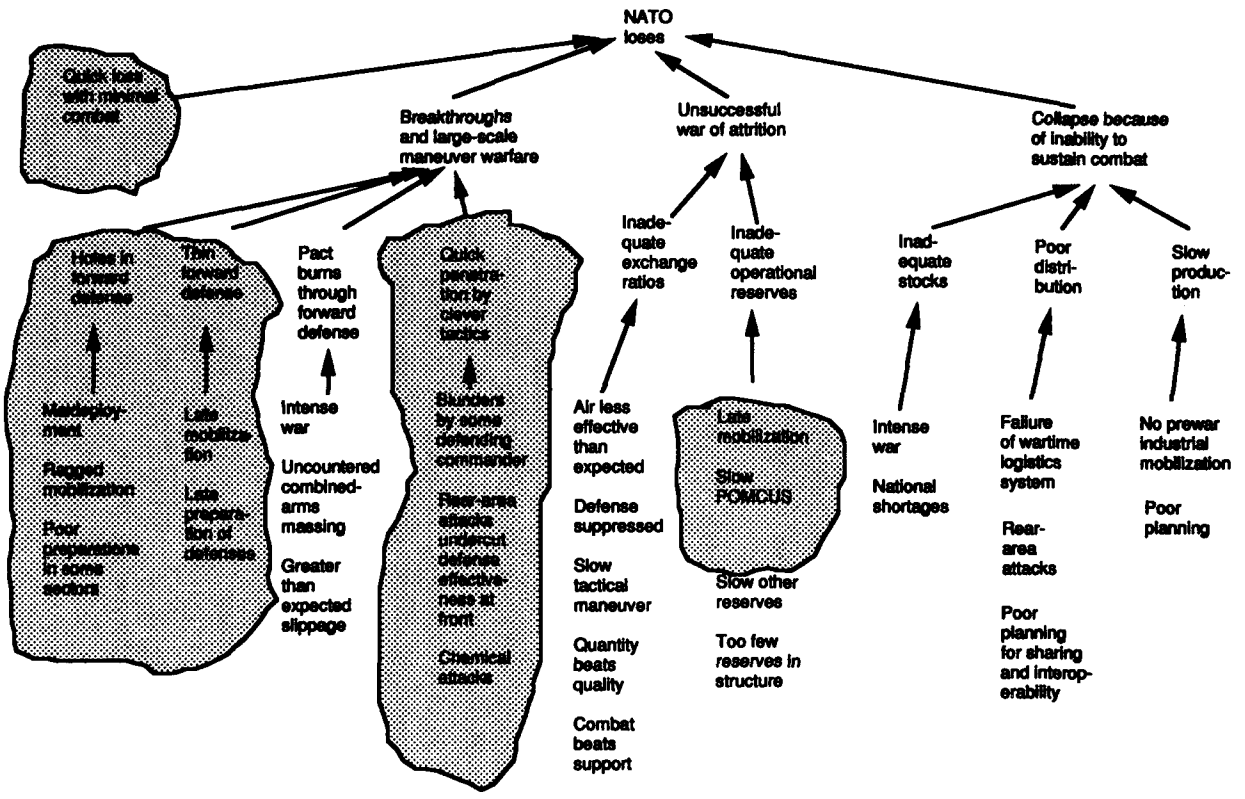


Fig. 5— The role of surprise in potential NATO defeats

about NATO's prospects in a full-mobilization case. There are now and will probably continue to be fairly detailed studies of such cases that show NATO doing well for about a month of combat, and other studies showing it losing badly over the same period of combat. Some of the discrepancies relate to differences among models, but there can be major apparent discrepancies even when the same basic models are employed. The typical origins of the apparent discrepancies in studies regarding likely 30-day performance by NATO are:

- The year to which the assessment applies (results being more adverse in the early 1990s because of the continued pace of Soviet modernization as represented, for example, by T-80 production and emergence of a new tank);
- Which forces would be committed (e.g., availability for the Central Region of Soviet strategic reserves);
- The scores assumed and the scoring *system* used to characterize forces;[6]
- The rate of modernization assumed for Soviet and non-Soviet Pact forces and the extent to which and pace with which NATO introduces next-generation weapons; and
- The possible bonus score to be ascribed to NATO units because of their superior support structure (Posen, 1988).

Whatever the "best" assumptions on such matters may be, this aspect of the military balance (the likely results of combat after *extensive* mobilization) would not obviously be affected by *operational* arms control and will not be discussed further here.

[6]There are significant differences among scoring systems such as WEI/WUV 2, WEI/WUV 3, and TASCFORM. Moreover, each agency—and to some extent each analyst—develops its own variant of the basic scoring system nominally in use. Variants differ with respect to which weapon systems are counted (e.g., shoulder-fired antitank guided munitions (ATGMs) may or may not all be counted) and what scores are assumed for relatively new and future weapon systems. There are no "official" scores for the newer or future weapon systems. Roughly speaking, scoring systems that give more credit to qualitative improvement in weapon systems tend to reduce the effectiveness of all second- and third-echelon Pact forces (and many NATO reserve forces). On the other hand, they may increase the effectiveness of first-echelon Pact forces in the Group of Soviet Forces, Germany (GSFG). This affects not only the absolute outcomes of various scenarios, but even the relative outcomes. Another important issue in scoring systems is the relative significance ascribed to artillery. Systems giving artillery more weight (in large part because of its potential suppressive effects) produce simulations favoring the Pact.

The other potential failure modes could all be affected by operational arms control and are therefore suitable subjects for this report. Upon looking them over, we note the prominence of surprise-attack effects, which will be the subject of the next section. Following that, we shall consider some of the other issues, notably improving the likely tactical-level performance of NATO's forces from the very start of war.

With this background, Fig. 6 inverts the problem and highlights the *different ways that operational arms control could enhance the defender's prospects*. On the left side, we see arms control helping by reducing the threat of strategic/operational surprise. There are two aspects to this: (1) making the process of preparations for war lengthy and observable, *and* (2) prohibiting many of the important elements of those preparations so that if the preparations occurred and were observed there would be strong pressures on political leaders to heed them.

The other portions of Fig. 6 attempt to improve real and perceived prospects for the defender by complicating and raising risks for the attacker, and also by improving the likely timeliness and quality of tactical warning. Although it is usually assumed in studies that D-Day forces are fully effective, the reality would more likely be that attackers, defenders, or both would have problems because of lack of experience. The defender might not maneuver fast enough in response to initial intelligence, or might not be ready to cope with the sheer momentum of the attacker and would therefore be overrun. Or, the attacker might find itself unable to maintain the discipline required for efficient echeloning and immediate exploitation of local penetrations. Traffic jams, unanticipated problems, and general confusion might play an important role. Or, they might not. In any case, one purpose of operational arms control should perhaps be to increase the likelihood that the complications hurt the attacker more than the defender on D-Day. Arms control could raise greatly the risks of attacking by increasing both vulnerability to preemption and the likelihood of that preemption. Although these may not seem realistic for a defensive alliance such as NATO, there should be deterrent value nonetheless.

In the following two sections, then, we explore these ideas in more detail.

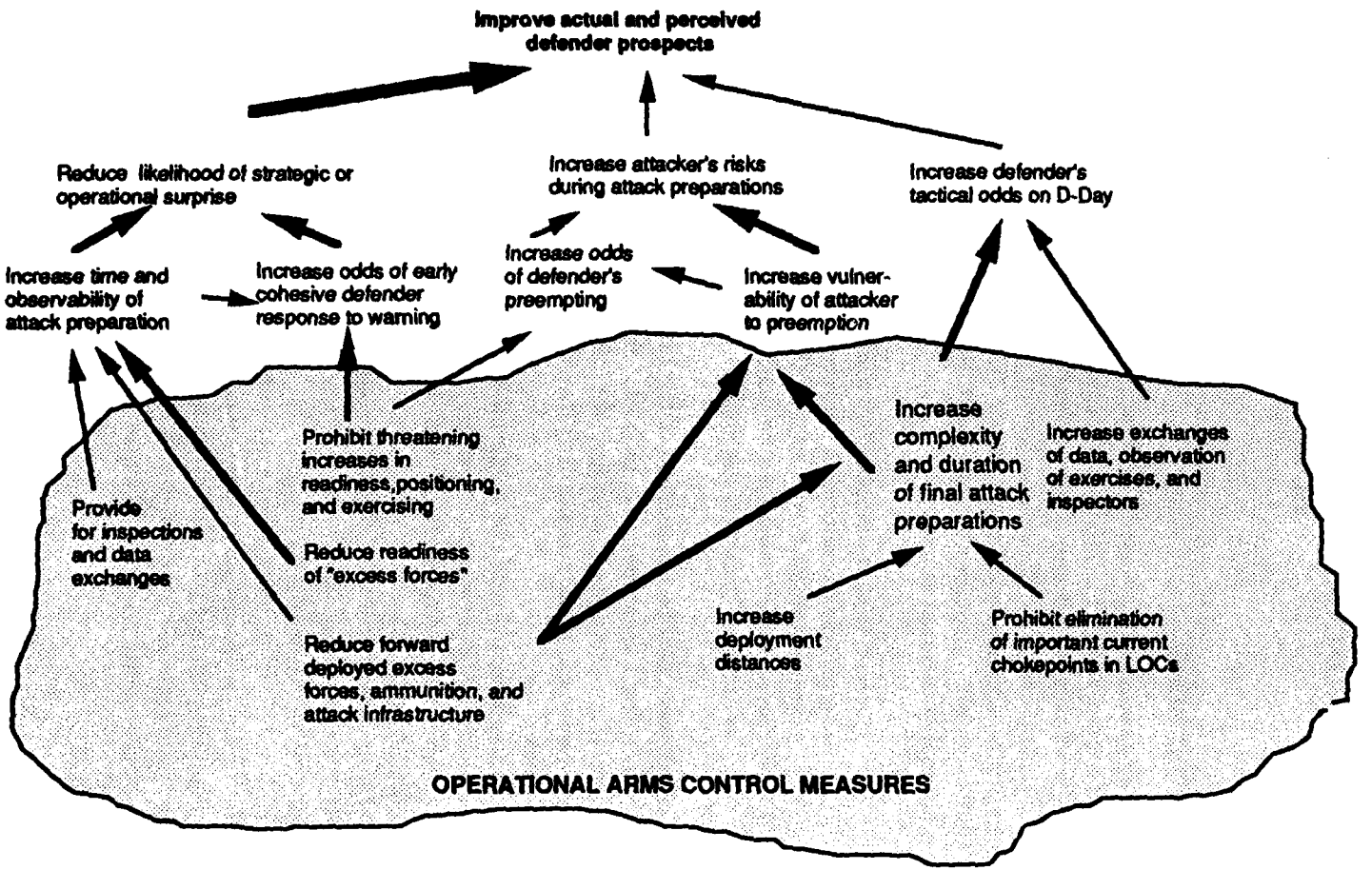


Fig. 6—*Potential role* of operational arms control in improving defender prospects

IV. AVOIDING STRATEGIC AND OPERATIONAL SURPRISE

DEFINITIONS

Before identifying ways to avoid it through arms control, we need a definition of surprise. In practice, people have highly varied notions about what it entails and about its feasibility in the modern world.

Strategic surprise is surprise having a major effect at the strategic level (i.e., a theaterwide effect rather than an effect on more localized battles only). Surprise may consist of the defender being unprepared and unable to adapt quickly to:

- The fact, time, or target of an attack;
- The attacker's concept of operations (e.g., choice of attack corridors and main-thrust axes at the operational level); and
- The attacker's weapons or methods of attack (e.g., chemical weapons or blitzkrieg methods).

The surprise may be the product of the attacker's cleverness or skills, the defender's incompetence, or both. Arms control could decrease (or, in some instances, increase) the likelihood of both. The focus here, however, is on making it difficult for the attacker to achieve surprise.

Strategic surprise can be achieved even if the defender has warning and heeds it. What matters is whether, by the time the attack begins, the defender is prepared to cope with it. A superbly adaptable defender may not suffer strategic surprise under conditions where another defender would. Thus, surprise as a variable is intertwined with the two sides' operational virtuosity, making it sometimes troublesome to discuss analytically.

This definition combines as strategic surprise what some authors distinguish as political, strategic, and operational surprise. Roughly speaking, political surprise consists of being surprised that war occurs; strategic surprise of being surprised at when or where it occurs; and operational surprise of being surprised about the nature of the

attack (scheme of maneuver, weapons, and operational-level methods).[1]

HISTORICAL EXAMPLES

Operational and tactical surprise have always been a significant factor in warfare, but it can be argued that strategic surprise came into its own only in the last century. As the result of improvements in communication, transportation, and weapons, it became possible to achieve decisive effects on the war quickly through attacks, the nature of which could be concealed until shortly before war began (Knorr and Morgan, 1983, p. 2). Examples of strategic surprise are:

- The Austrian-Prussian war of 1866;
- The French-Prussian war of 1870;
- Early German operations in World War I;
- The German invasion of Norway and Denmark in 1940;
- The 1940 German blitzkrieg against France and the Low Countries;
- The German invasion of Russia in 1941;
- The Japanese attack on Russia's Port Arthur in 1904;
- The Japanese attack on America's Pearl Harbor (and, in subsequent days, on the Philippines) in 1941;
- The German attack in the Battle of the Bulge in 1944;
- The Russian invasion of Manchuria in 1945;
- U.S. use of the atomic bomb against Japan in 1945;
- The U.S. landing against North Korea at Inchon in 1950;
- The Israeli preemptive attack, particularly on Egyptian air forces, in the Six Day war of 1967;
- The Viet Cong's Tet Offensive in 1968; and
- The Egyptian invasion of Israel in 1973 (the Yom Kippur war).

These events demonstrate the importance of strategic surprise, but the *nature* of the surprise varied enormously. By no means were all

[1]Excellent references on surprise-attack issues are Knorr and Morgan (1983), Betts (1982), and Vigor (1983). Knorr and Morgan define strategic surprise as the subset of military surprise affected strongly by the attacker's grand strategy, and hence by the attacker's political leaders.

of the attacks unanticipated. Nor did they all occur at the beginning of war. Nor was the nature of the surprise always a matter of stealthy maneuver. Following Betts (1982) and Betts' chapter in Knorr and Morgan (1983), one could characterize the dimensions of surprise as: whether, when, where, and how? To illustrate some of the complexity here, consider that Egypt's surprise invasion of Israel in 1973 occurred after months of feints that had worn down Israel's capacity to respond promptly to strategic warning. So also did the North Korean invasion of the South follow a long period of warnings that proved false. As another example, consider the Nazi blitzkriegs of World War II. The fact of the attack on France was hardly a surprise, but the *nature* of the attack most certainly was.[2] Here the surprise involved a new military doctrine. Earlier, at the outset of World War I, the Germans also achieved strategic surprise—even though the French planners were aware of the Schlieffen plan in the abstract. Had the plan not been compromised by the "younger Moltke's" weakening the forces required for the critical sweep through Belgium, it might have led to a quick strategic victory because the French were surprised by the pace and ferocity of the attack, something made possible by quick mobilization, meticulous planning of deployments, and both tactical and operational mobility.

ON THE SIGNIFICANCE OF SURPRISE

There is a tendency among analysts focused on the balance of total available resources to denigrate the role of surprise (and maneuver). Often, their arguments amount to the apparently reasonable assertion that the task of defense planning is to provide the military with resources adequate to the task—*assuming* military competence to use those resources well. The task of assuring such competence is deemed to be a "different problem," and one not worth emphasizing in discussions of the balance.

The historical examples cited above indicate that it would be more appropriate to consider avoiding strategic surprise as a *top-priority* issue in military (and related arms control) analysis and planning. This view finds strong support in any review of history or of Soviet

[2]Jacobsen, Levine, and Schwabe (1985) describe in some detail both sides' concepts, plans, and shortcomings before World War II.

military doctrine. In the words of American military historian T. N. Dupuy (1987, p. 6):

> Surprise has proven to be the greatest of all combat multipliers. It may be the most important of the Principles of War; it is at least as important as Mass and Maneuver.

For a Soviet view, consider Savkin (1972, p. 230):

> Surprise consists of the attempt to begin and resolutely conduct military operations unexpectedly for the enemy with the most expedient grouping of fully combat effective troops against the weakest or the strongest but poorly trained enemy groupings on that axis and at that time when they least expect it, by virtue of which they are incapable of offering organized resistance and are forced to fight in a situation extremely unfavorable for them.
>
> This principle stems from the aforementioned first and second laws of war and the first and second laws of armed conflict. It is closely connected with the principle of combat activeness, mobility, and interworking.[3]

Vigor (1983) provides a wealth of research on Soviet thinking, and includes in his preface the following 1974 quotation from General Ivanov, which Vigor considers characteristic of Soviet military thinking. Referring to experience from the Great Patriotic War to draw lessons for the present, Ivanov states:

> Those states which failed to concentrate and deploy their main forces in peacetime found themselves in a very serious position. They proved unable to oppose the enemy in the first days of the war on the main axes of his advance with sufficiently powerful forces, nor could they beat off his massed surprise attacks from the air delivered at the war's outset, nor could they prevent the deep penetration of his ground forces into their own territory. This made it extraordinarily difficult for them to complete the strategic deployment of their own armed forces, because this had to be done simultaneously with the waging of difficult defensive battles.

[3] Readers interested in the "meaning" of surprise may find the entire section entitled "Surprise" especially illuminating (Savkin, 1972, pp. 230-240).

To such professional military men, surprise is neither a cliche nor a bugaboo, but rather something at the heart of military art and science.

THE MODERN RELEVANCE OF STRATEGIC SURPRISE

A major reason for the relative lack in defense planning of measures to prevent strategically significant surprise attacks is probably the belief by many that modern technology has rendered surprise attacks a subject for historians only. Could NATO really fail to observe and act upon Pact preparations for invasion, and could NATO's military commanders really be fooled about such matters as the main thrust sectors in a region with fairly few natural invasion corridors—especially in this era of technological wizardry?

Scholarly studies on surprise generally conclude that strategic surprise is very much possible in the future. The techniques will change, but the basic elements will remain constant. As discussed in Knorr and Morgan (1983, Chapter 8), the feasibility of surprise depends on the capabilities of the attacker and the vulnerability of the defender. It is useful to identify components as follows:

Capabilities of the attacker to surprise:

- *Informational* (e.g., can vulnerabilities be detected and assessed?);
- *Political/organizational* (e.g., can aggressive surprise plans be laid out and maintained secret?);
- *Military* (e.g., can a surprise plan be supported by available forces, readiness levels, mobilization capabilities, transportation systems, doctrine, and personnel?); and
- *Capacity for secrecy and deception* (e.g., is it feasible to conduct two-track peace-seeking and attack-planning activities; is it feasible to assure plan security, or to confuse the opponent?).

Vulnerability of the defender to surprise:

- *Informational* (e.g., can the defender collect and process warning information correctly, even in the presence of

considerable "noise" generated by both the situation and deliberate deception?);
- *Cognitive* (e.g., will the defender's political and military leaders accept strategic warning when received, or will they reject the information because of prior beliefs?);
- *Informational* (e.g., will the defender's organizations be able to pull together, interpret, and respond to information?); and
- *Political* (e.g., will the defender be able to generate political support for the preparation measures necessary?).

As examples of each type of defender vulnerability we might consider Pearl Harbor (warning lost in the noise of information), Stalin's refusal to *believe* warning in 1941 (cognitive bias), the Japanese surprise of U.S. air forces in the Philippines the day *after* Pearl Harbor (organizational failure of information processing), or the Yom Kippur war (political inability to heed ambiguous warning), respectively.

Components of Possible Surprise Attack in the Central Region

Let us next consider concrete examples of the problems NATO might face. If the Soviet Union were plotting invasion of Western Europe, it would probably consider some or all of the following surprise-related measures:

- Diplomatic efforts to express what would be represented as fear and alarm on the part of the Soviet Union about events in the West, while seeking ways allegedly to reduce tensions generally and discourage "provocative military measures" in crisis, and to explain as routine or defensive preparatory actions by the Pact;
- Unanticipated aspects of operational military strategy such as a major fast-moving thrust through the Austrian corridor (something long recognized as possible, but too often given short shrift because of rationalizations such as Austria's neutrality or the existence of potential blocking positions);
- Surprisingly "risky" operational strategy such as a very short-mobilization attack in which forces arrayed against NATO's strong Central Army Group would be reduced to a bare mini-

mum such as 0.7 to 1 to provide high force ratios against NATO's Northern Army Group (i.e., the Dutch, Belgian, U.K., and German I Corps sectors). Strategy would contemplate a quick and decisive initial phase leaving much of NATO's forces unscathed, but poorly positioned for counteroffensives and cut off from planned sources of reinforcement and resupply;

- Surprise use of particular weapons (e.g., chemicals); and
- Surprisingly *effective* operations exploiting "new" doctrinal concepts (e.g., use of operational maneuver groups or use of massed helicopters for both fire support and direct attack; or even straightforward but surprisingly effective operations consistent with well known Soviet doctrine (e.g., effective execution of concentration, breakthrough, and exploitation concepts—execution depending on mass and unswerving fast movement, even in the face of high initial casualties).[4]

By no means does the author wish to suggest that the Soviet Union would necessarily succeed with any or all of these measures. The success or failure of surprise depends on details at the time, but NATO should put priority on preventing such surprise attacks from being or appearing feasible—not only to reasonably conservative Soviet planners, but to the types of risk-taking leaders that *might* exist in the future, however out of character they would be with past Soviet leaders.

The Significance of Surprise in a Central Region Campaign

Previous work has explored the potential significance of strategic and operational surprise by varying assumptions in analytic war games and simulations. Some of the results are reflected in Figs. 3 and 5, which highlight such potential problems as holes in the forward defense resulting from maldeployment, ragged mobilization, or

[4]One virtue of detailed human war gaming with realistic Red play is that Blue commanders often internalize for the first time the potential pace of events and the heavy price the defender pays for being in a "responsive" mode. Even if the Soviet attack is "by the book," the Blue commander may be surprised by his inability to adapt his plans and act quickly enough to avert disaster. The Western attitude favoring ad hoc creative actions can, in such circumstances, be disastrous.

inadequate defense preparations in some sectors. A major conclusion of that work has been that:

- NATO's principal military problems are due even less to the adverse nature of the quantitative balance than to the vulnerability to Soviet-style breakthrough operations caused by NATO's maldeployment, its decisionmaking procedures in crisis, and its politically constrained political-military strategy, doctrine, adaptability, and theater-level training. Especially in short-mobilization scenarios (i.e., the most obvious type of surprise attack), NATO's forward defense might be breached quickly and the Pact might achieve a decisive victory in a matter of two to three weeks.[5]

This conclusion is contentious in some circles for a variety of reasons:

- When analysts use sufficiently conservative assumptions, NATO "always loses," in which case surprise attacks are merely one mechanism among many and the quantitative imbalance is seen as the culprit. This is especially common when dealing with future force structures.[6]

Judgments based on current posture:

- Many believe that the Pact could not or would not be willing to take the risks of a short-mobilization attack.

[5]Procedural remedies for some of these problems are under study by colleague James Winnefeld in a project sponsored by OSD (Policy).

[6]*Some* DoD-derived estimates suggest that Pact forces will gain substantially in capability per division over the next five years, whereas NATO's forces will not (until later in the 1990s when new-generation weapons may be fielded in significant numbers). The estimates are not unreasonable given the production rate of Soviet weapon systems in recent years, but they are also open to question and some analysts estimate that both the Pact and NATO will continue to modernize at the rate of about 3 percent per year when one accounts for weapon-system improvements as well as the introduction of altogether new equipment.

Analytic methodology:

- Most models do not even *permit*, by virtue of their underlying analytic structure, breakthrough phenomena of the type focused upon in Soviet military doctrine.[7]
- There is excessive emphasis on attrition warfare, due in significant part to NATO's doctrine and in part to the preferences of quantitative analysts who have traditionally disliked the "soft" aspects of operational art (e.g., dealing with issues such as surprise and quality).
- Most analysis includes implicit assumptions about efficient defender command-control, assumptions that often break down in games and simulations with imperfect information and delays.

Possibly wishful thinking:

- Many seem to believe that NATO could react very quickly to contain a short-warning attack (i.e., within two to three days),[8] despite the absence of *any* empirical evidence, and despite the common-sense truism that nothing complex ever works the first time. The attacker would also have problems, but would have the advantage of following a precise plan rather than having to adapt to ambiguous information about enemy behavior.

[7]Typical theater-level models assume that the defender can maintain an elastic and cohesive forward line of own troops (FLOT) indefinitely. Reports relying on such models use the term "breakthrough" to mean, variously, times at which the defender in a given sector has no operational reserves and force ratios go beyond some analytic limit (e.g., 6:1 or 10:1), or times at which the defender in a given sector is pushed out of his defenses into battles that are only marginally if at all favorable to the defense. In actual combat, forces can not be stretched indefinitely, even for relatively modest force ratios such as 2:1. Instead, the attacker penetrates the defender's line and exploits this with breakthrough operations pouring forces through the hole as quickly and deeply as possible. The defender's collapse can therefore be sooner and more decisive than usually modeled. The defender may also collapse under circumstances where usual models would indicate little problem. Davis (1988) and Bennett, Jones, Bullock, and Davis (1988) describe RAND efforts to do better on these matters, although none of the current models are altogether adequate.

[8]Some of the debate about such matters within NATO is described in Betts (1982), Chapters 6 and 7.

If one accepts the author's conclusions on these matters, or even if one accepts that their plausibility is *fairly* high, then the potential significance of operational arms control affecting Soviet capabilities for surprise attack assumes major importance.

PACT DIFFICULTIES IN ACHIEVING STRATEGIC AND OPERATIONAL SURPRISE

Achieving strategic surprise would not be straightforward for the Warsaw Pact, primarily because the Pact's forces are by no means ready to mount a short-warning invasion without running substantial risks: Even first-echelon forces are at less than full readiness, most second-echelon forces are at very low states of readiness, and there has been no recent war experience that would allow the Pact to go to war confidently without substantial preparations. Historically, the Soviet Union has emphasized preparations because of the risks of not doing so.

Analytic war gaming can demonstrate readily some of the risks a prudent Soviet commander would worry about. It is notable, for example, that a short-mobilization invasion from today's force posture (e.g., an attack after a week's preparations) could leave the Pact commander with minimal or incompetent operational reserves for a period of weeks. If the first echelon failed for any reason, the entire campaign could fail as well. In simulations, precisely this happens when, for example, it is assumed that Pact forces are somewhat less capable on a man-for-man tank-for-tank basis than in the "best estimate" case.[9] Depending on other assumptions, the results can be striking—changing outcomes from a quick and decisive Pact victory to

[9]As discussed in Davis (1988), OSD (PA&E) has for some years argued that analysis may be overestimating the relative strength of Pact and NATO forces, since NATO forces have superior support structures. In PA&E analysis conducted in the late 1970s, Richard Kugler proposed adjusting NATO's scores upward. The author agrees with doing so in excursions (or with decrementing Pact capabilities)—especially since there are other reasons to doubt that Pact forces would be as qualitatively effective as NATO's (e.g., the non-Soviet forces would have few incentives, the NATO defenders would be defending treasured territory, and Pact forces are apparently less proficient at some standard operations than NATO forces). However, the author also has doubts about whether NATO's additional support structure really does pay its way, and has further concerns that the various analytic models include a number of pro-defense biases by virtue of ignoring stochastic factors and assuming instant proficiency of D-Day forces. Posen (1988) argues for giving NATO forces scores as much as 50 percent higher than their nominal values to account for support structure.

a clear-cut Pact defeat with no loss of NATO territory at the end of the campaign. Thus, to a prudent Pact commander, having early-available reserves might seem very important unless he could see no alternatives to a standing-start attack and could convince himself that NATO forces would be significantly less prepared than his own—so much so as to compensate for his lack of reserves.[10]

It seems likely that the hypothetical Soviet commander planning an invasion would regard significant preparations as essential. Preparations, however, provide strategic warning indicators for the opponent to see, and NATO would almost surely see the Pact preparing for war. *It is this tension, between the desire to prepare one's own forces on the one hand, and the desire to achieve surprise on the other, that operational arms control can exploit.*

It is appropriate to be skeptical about operational arms control given the many problems of definition, negotiation, quids pro quo, and verification (many of them discussed in a later section), but the following may clarify the matter by noting the price of having *no* arms control. Consider the implications of the current lack of constraints on Pact operations. How might a Soviet commander plan an invasion? There are two especially plausible approaches:

- Improve the capabilities of the forward-deployed forces to permit a higher confidence *standing start attack* dependent on success of the first echelon forces, primarily those in the GSFG.
- Slowly and with ambiguity increase readiness of both first- and second-echelon forces in peacetime (*premobilization preparations*) to permit a short-mobilization attack with early reinforcement.

A number of authors have long been concerned about the first threat,[11] and their concerns have in some respects been heightened in recent years as the result of Soviet modernization, which has preferentially increased the capabilities of Soviet first-echelon forces. As the result of new-generation weapons such as the T-80, organizational

[10]Vigor (1983) describes a short-warning strategy consistent with such reasoning, one that would exploit holidays and time-of-year considerations.

[11]See, for example, the discussion of Karber (1988) and Nerlich and Thomson (1988). Karber has written extensively on the short-warning threat for a decade or more.

changes increasing the combat power of tank armies with additional armored forces and regiments of attack helicopters, doctrinal changes such as those emphasizing operational maneuver groups, and command-control improvements permitting a rapid transition to war, the physical capability for a standing-start or very short-warning attack has been increased.[12] This has been offset to some degree by readiness gaps (e.g., incomplete manning) and, more importantly perhaps, by NATO's force improvements. Nonetheless, some authors believe that the standing-start or very short-warning attack is a serious possibility and simulations support this concern for the 1993 time frame if Soviet modernization continues at its current pace. A first echelon with unusual *density* of modern firepower might burn through NATO's defenses quickly.

The second approach, although seldom discussed and often not even recognized as a possibility, is the one the author considers most likely given Soviet aversion to risk taking and his judgment that war, if it came, would be preceded by a long period of tension. In this, the Soviets would make extensive preparations over a long period of time—quite possibly a year or more. During that time they would raise the readiness levels of as many second-echelon units as the commander felt would be needed early in the war. They would do this with a combination of overt and covert activities, perhaps providing cover by making announcements about restructuring or about improving unacceptable long-standing levels of sloth and incompetence. All of this would be permissible under existing agreements.

The Soviets could confuse the issue further for NATO watchers by simultaneously *reducing* overall force structure, perhaps significantly (e.g., by discarding older tanks that are now obsolete and that may in some cases be neither operable nor maintainable). They might also disband some divisions, but plan to use the personnel from those divisions to fill out other low-readiness divisions.

NATO would presumably learn of many of these activities—not only with national technical means, but also from human-source accounts that are difficult to predict or count upon, but common nonetheless—especially when hundreds of thousands of individuals

[12]See DoD (1988) and Hamilton-Eddy (1988) for threat information on such matters. The Hamilton-Eddy article describes British assessments.

are involved and must be pulled out of the civilian economy for special training and exercises.

The problem, however, is that as a practical matter NATO might not be able to do very much. Even if NATO conducted a partial mobilization (quite plausible given that war would hardly come as a bolt from the blue, and in a cold-war environment there might be political support for increased readiness), it is unclear that it could be maintained politically in the absence of a more clear and present danger than that described above. Even Israel was unable to maintain mobilization or the capacity for early mobilization when confronted before the Yom Kippur war with months of false alarms.

With preparations of the type postulated here, the Soviet commander could conduct a short-mobilization attack with *far* fewer risks than at present. As an illustration of this, Fig. 7 shows simulated D+30 outcomes for one short-mobilization scenario as a function of the qualitative effectiveness assumed for Pact forces, relative to their nominal value. The Pact commander, after all, may judge his forces less capable than we do because of NATO's tactical air (roughly half of NATO's firepower), the much greater active support structure enjoyed by NATO's forces, and the fact that the NATO forces would be defending home territory and Pact forces would be invaders, and some of them not very enthusiastic ones. The Pact commander might also be less than sanguine about the quality of his weapons than U.S. intelligence estimates, especially with respect to second-echelon units. In any case, Fig. 7 illustrates how sensitive outcomes could be to this qualitative effectiveness and the degree to which the Pact commander could hedge by raising the readiness levels of some of his forces before M-Day—enough to provide adequate operational reserves to deal with adversity.[13]

Figure 8 shows a more NATO-conservative view. In this case, the scenario is actually one in which NATO might do well; it is assumed that NATO has had several weeks to mobilize and prepare its "M+10"

[13]The sensitivity is due in part to assumptions about the impact of loss rates on the effectiveness of forces conducting an assault. An attacking commander must decide whether to pull forces out or keep them fighting after they have suffered attrition, but he cannot dictate their effectiveness: That is not a volitional issue. Interesting historical analysis on such matters has recently been published but has not yet been assimilated by the analytic community (see Fain et al., 1988).

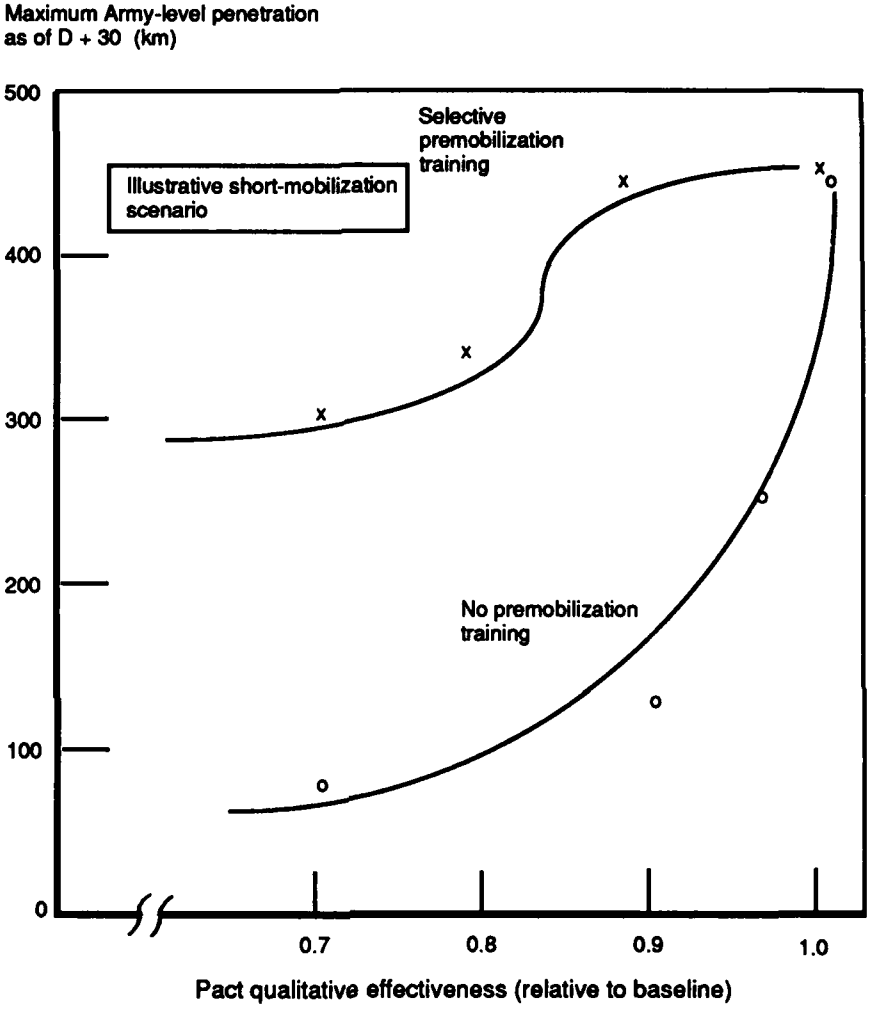


Fig. 7—Hedge value to Pact of premobilization training

forces. The sensitivity analysis here relates to two factors: the potential modernization of Pact forces and the training rate of their second-echelon units. Using nominal Pact capabilities and nominal training rates, NATO does well. However, if Pact capabilities grow significantly (e.g., 20 percent or so over the next five years), then results be

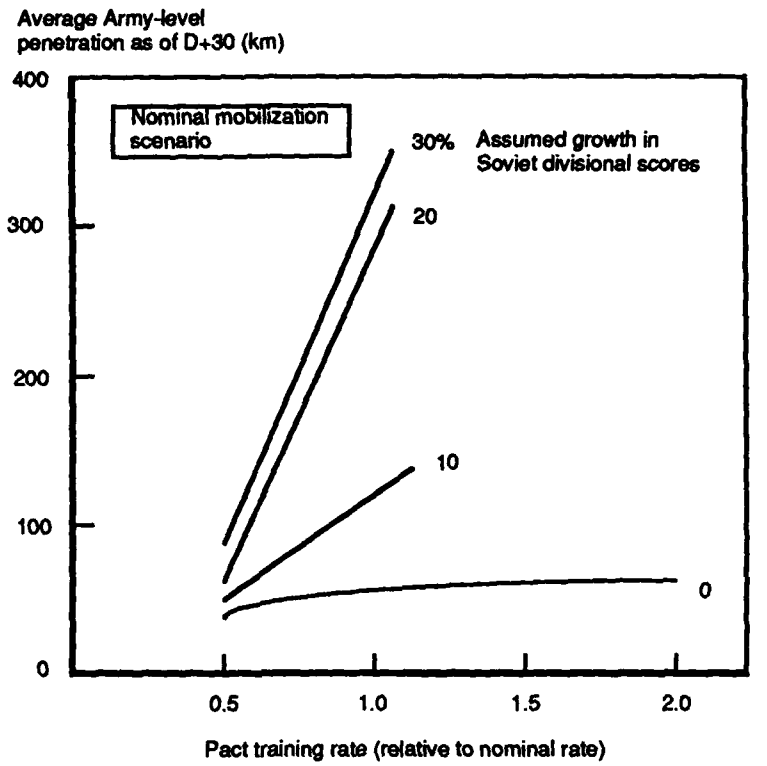


Fig. 8—Sensitivity of "good scenario" D+30 outcomes to potential growth in Soviet divisional scores and Pact training rates

come sensitive to the training-rate assumptions. Indeed, if the Pact training rate is only half that currently assumed (requiring twice as much time to prepare for deployment *or* requiring higher initial readiness levels), then NATO's problem would be much ameliorated.[14]

Figures 9 and 10 show simulation results in terms of FLOT traces for D+20 and D+30. In both figures it is assumed that Soviet forces are 30 percent more capable than they are assumed to be today, but in Fig. 10 the additional assumption is made that the training of low-

[14]In some cases in which D+30 results are favorable for NATO, longer-term results would be more adverse. In other cases, NATO's prospects at D+30 appear favorable in the simulations—if one puts aside issues of sustainability.

Fig. 9—D+30 results for nominal-mobilization scenario if Soviet divisional scores increase 30%

readiness forces would be only half as rapid as nominally assumed. As of D+20 the theater status is comparable for the two cases, but in the first case Soviet second-echelon forces are available and NATO's defenses are overwhelmed. In the second case, the second-echelon forces are delayed and NATO is able to hold as shown. Because additional NATO forces are arriving, it is not merely a matter of deferring the defense's collapse (although sustainability problems might prove to be the limiting factor and the Soviets might use more forces than expected).

Since the Pact presumably knows its own training rates better than we do, we might expect it to determine its mobilization time accordingly. Again, however, if arms control prohibited the training, then NATO would have earlier and more unambiguous indicators to which to react.[15]

[15]The simulation results shown here are sensitive to many details not provided here to avoid classification—details such as the precise duration of NATO's mobilization before D-Day, the role of French forces, NATO's command-control decisions, the Pact's initial main-thrust axes and adaptations, the air-to-ground effectiveness of tactical air, the effectiveness of attack helicopters, the size of the Pact threat, and so on. It is not possible to invert the results shown here to infer classified input data. Furthermore,

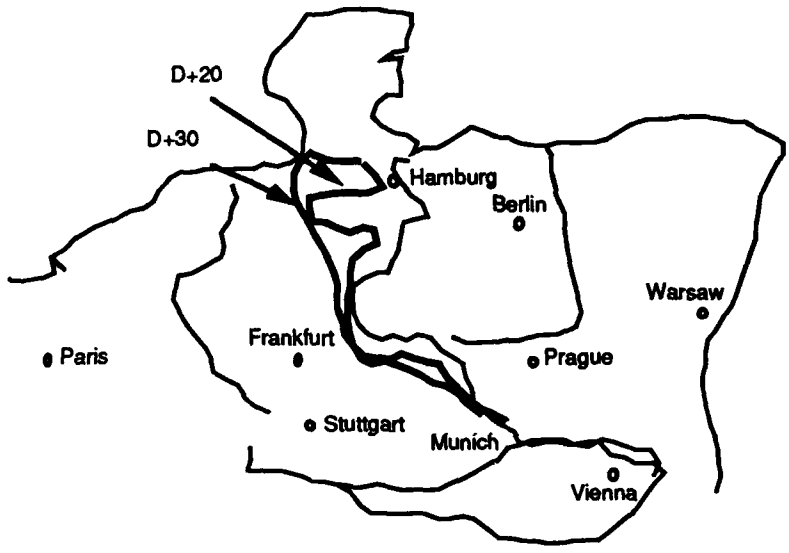


Fig. 10—D+30 results for nominal-mobilization scenario if Soviet divisional scores increase 30% but Pact training rates are 50% *slower than nominally assumed*

In summary, in the absence of arms control constraints on readiness and war preparations, the Soviets could shift the war fighting balance substantially through premobilization measures that would be altogether permissible today and that might be very difficult if not impossible for NATO to counter—especially in the presence of confusing diplomatic signals, economic and demographic problems, and so on. It follows, then, that operational arms control measures making such scenarios more difficult could be extremely important. Since such scenarios are among the most plausible of any invasion scenarios, to argue otherwise is almost to argue that there is no threat at all. The challenge is to develop and negotiate such measures without in the process undercutting NATO's defensive capabilites in other respects.

Ironically, some argue that deterrence is strong and NATO is doing well today, so why should we seek arms control? The other side of

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because results are so sensitive to many variables, the reader should not infer that the results shown are necessarily "representative" or "best estimates."

that coin is that today's environment, in which the prospect of war seems very low, is the ideal time to negotiate limitations that could prove very important in a different and more dangerous era. Today, the Soviet Union may well be interested in peace, stability, and good relations, and may not consider various limitations as troublesome. In the future, however, a more bellicose Soviet Union might see those same limitations as dangerously limiting capabilities for coercion or aggression.

V. OTHER WAYS TO IMPROVE DEFENDER PROSPECTS

D-DAY TACTICAL DEFENSE EFFECTIVENESS

As discussed above, some important potential failure modes for NATO's conventional defense do not necessarily involve strategic- or operational-level surprise. Instead, they involve the relative prowess of attacker and defender on D-Day as both sides begin the first full-scale conflict in many decades. Both sides would probably have severe operational problems even if there had been some months of preparations and training. The Pact would presumably have the advantage of the initiative initially, allowing its forces the luxury of following a plan without the delays and ambiguities of command-control trying to respond to the enemy. On the other hand, some of the defender's military operations would be relatively simpler to perform. How these conflicting effects would balance off is unclear. Making things even more complicated is the potential for tactical-level events to assume a higher-level importance because of NATO's dependence on holding forward, where it would have prepared defenses in depth and favorable terrain. If tactical-level events permitted the Pact to penetrate those defenses in even one or a few places, Pact forces would be as well prepared as possible by doctrine to turn those penetrations into large-scale breakthroughs. It follows, then, that NATO cannot afford to give ground while its forces "learn" the realities of modern combat. Its forces would need to be highly effective from H-Hour onward.[1]

How might operational arms control affect NATO's odds in this regard? It seems that there are at least two generic mechanisms: (1)

[1]This requirement is so stressful and inconsistent with historical experience as to cast in doubt the very nature of NATO's forward-defense strategy, which presently depends upon a formidable but brittle wall. This problem has been remarked upon for at least 15 years, and is the basis for continuing proposals to substitute high-technology killing systems like MLRS for front-line maneuver units, the maneuver units being then folded into a larger operational reserve capable of adapting better to the arguably inevitable breaches of the forward defense. It is possible that NATO's doctrine by the mid 1990s will be substantially different from today's, while remaining consistent with the more fundamental elements of forward-defense strategy. For interesting speculations about future combat see Simpkin (1985).

increasing the complexity (and thereby reducing the likely effectiveness) of the Pact's D-Day operations, and (2) improving the timeliness and quality of NATO's *tactical* warning so that its forces will be as ready to fight as possible (i.e., maneuvered appropriately and fully alert). The specific mechanisms might involve requiring major portions of the Pact forces (the excess forces) to move large distances before engaging, emplacing inspectors or surveillance equipment along possible lines of approach, and—most importantly perhaps—prohibiting many of the activities necessary in the final stages of preparation for attack and the movement into attack.

CASUS BELLI CONDITIONS

The value of such prohibitions would be minimal if they could be discarded in crisis or conflict without penalty. Do we really expect that a would-be aggressor would fail to move munitions, bridging equipment, support forces, and other elements of attack infrastructure forward because of a prohibition on doing so, or that he would fail to conduct large-scale exercises because of a treaty signed in a previous era? Probably not—unless doing so carried with it a large penalty. This, then, raises a conceptually important but delicate subject that cannot be avoided in a serious discussion of operational arms control—the subject of preemption.

It would be difficult for any military alliance to be more manifestly defensive than NATO, and one consequence of this is that preemptive options are seldom discussed and never taken seriously at the political-military level.[2] Instead of contemplating alternative preemptive techniques, NATO military planners must worry about not even having the authority to *respond* appropriately once the battle is joined. To NATO military planners, the prospect of long decision delays is real and worrisome.

Having said this, it is nonetheless important to talk about preemption, because NATO's principal objective is *deterrence,* and Pact military planners contemplating an invasion might be strongly deterred by the objective existence of options that NATO military planners

[2]By contrast, novelist Tom Clancy postulates a highly successful preemptive air attack by NATO's Stealth aircraft in the hours immediately before the Pact's intended H-Hour in *Red Storm Rising*.

could not take seriously under ordinary circumstances. To be sure, we should not count on such deterrence, but we should also not ignore it.

Consider, then, the implications of prohibitions on a whole class of activities associated with final attack preparations and the march to the front. If such activities could be distinguished from appropriate defensive activities, they could be defined explicitly or implicitly as *casus belli* conditions—conditions that would justify immediate preemption.[3] The potential significance of this grows when one realizes the intricate complexity of a large-scale offensive operation requiring hundreds of thousands of soldiers to converge on the battle area, especially if the movement must occur over relatively large distances endangering unit integrity and other command-control considerations. Ultimately, Pact doctrine depends on superbly coordinating the echeloned movement. If the forces are not all in place at or near the front when war begins, then this coordination depends on intricate "deconfliction" of unit movements and successful orchestration of unit linkups as they march toward battle.

A particularly important measure might be limiting forward-area stocks of ammunition, particularly for artillery. Such a limit could be based on defensive sufficiency. The stocks needed for this would be substantially less than that needed for an artillery-heavy assault on prepared defenses consistent with Soviet doctrine.[4]

AVOIDING THE TACTICAL SURPRISE OF NEW DOCTRINE OR WEAPONS

Yet another possibility suggests itself from the historical discussions of surprise mentioned above, the possibility that operational arms control might mitigate the tendency of defenders to underestimate the effectiveness of their opponent's forces or doctrine. Obviously, no would-be attacker would willingly reveal a secret superweapon during peacetime. However, history records a number of

[3]Technically, response to *casus belli* conditions would be "response," not "preemption." As a practical matter, however, it would be referred to as preemption, just as was the Israeli preemptive air strike in the Six Day war.

[4]Limits of this type have been emphasized as especially valuable by at least one very senior U.S. military officer intimately acquainted with ground-force issues in the Central Region. The sheer magnitude of the stocks necessary for a Soviet-style assault operation is the key issue here.

instances in which defenses failed because the defender had simply not internalized new realities, which the attacker had not really been "hiding" in its prewar doctrine and training. It is possible that informational exchanges and routine monitoring of both exercises and training could be more useful in this regard than cynics would expect.[5] Of course, all such measures are also subject to abuse in the negotiating process and follow-on implementation.

[5]See Cohen (1988) for discussion of one U.S. Army general's reaction to Pact exercises. On the one hand, he was pleased to see Pact massing creating a target-rich environment. On the other hand, he was sobered by the speed and momentum of the advance, and less sanguine as a result.

VI. PROBLEMS AND COMPLICATIONS FOR ARMS CONTROL

The previous sections have served primarily to demonstrate that operational arms control has the *potential* to benefit NATO's conventional defense effort. Unfortunately, there are many problems and difficulties in turning this potential into a reality.

NATO/PACT ASYMMETRIES

Well-intentioned proposals for operational arms control could *worsen* the military balance rather than improve it, in part because of strategic asymmetries, notably:

- NATO depends more heavily than the Pact on maintaining high readiness levels in its active and reserve forces. This is due to NATO's numerical inferiority in maneuver forces, its operational strategy requiring forward defense, and its long-standing doctrinal preferences. Arms control measures should not undercut this area of NATO strength unless there are fundamental changes in the overall balance.
- It has long been recognized that NATO needs additional operational reserves, and mechanisms have been identified for providing significant numbers of ready-reserve brigades within tolerable budget ceilings,[1] although no major new initiatives along these lines are currently under way. From time to time it is also observed that U.S. and other NATO

[1]Thomson and Gantz (1988) suggest that about ten additional divisions would be required to provide a stalwart conventional defense. Other authors have obtained similar results over the years, although the author has noted elsewhere that even a few divisions (or about ten brigades) would be quite valuable. Some of the proposals for creating additional units involve providing mechanized equipment to German reservists who are already available in the territorial reserve, and to other European reserve units who could not currently play much of a role in organized combat. As demonstrated analytically by Col. Karl Lowe of National Defense Universiy, such units could be especially valuable in specialized defensive missions specific to their nations' particular corps sectors. One possible source for mechanized equipment would be the U.S. prepositioned war reserves, the equipment that would probably never be used in a short (i.e., 30 day) Central Region conflict.

allies might be able to increase the rate at which late-deploying reserves would be available for combat. Operational arms control should not preclude NATO from making such force improvements (e.g., by prohibiting improvements in reserve-force readiness). Having such additional capability would be more useful than a comparable decrease in Pact capabilities.

- Because NATO lacks strategic depth, because it takes many days to develop prepared defenses in depth, and because a would-be invader could move armored forces through a tank-free zone of 50 km or so in a matter of hours, some apparently even-handed "disengagement measures" designed to provide tactical warning could undercut efforts to use strategic warning.[2]

At first glance it may appear that the tone of argument is leading either to the conclusion that NATO should seek "unfair" provisions that would limit the Pact but not limit NATO, or to the conclusion that operational arms control should be eschewed as too dangerous. To the contrary, it is argued here that operational arms control limitations should be actively sought, but that a *key feature in designing such limitations should be the hard-headed recognition that neither the military balance nor the relevant strategic geography is symmetric, and that limitations will therefore need to be asymmetric to avoid exacerbating NATO's security problems.*

GEOGRAPHY, OCCUPATION FORCES, AND BUFFERS

At first glance, it may appear to many people that the withdrawal of forces from the Central Region would be equitable. Some far-reaching proposals have indeed been made in this connection (e.g., see Brzezinski, 1988). There are, however, some fundamental asymmetries at work, the most notable of which is that the U.S. pres-

[2]Others, however, might avoid this problem while encouraging NATO to build up an operational reserve of armored units (e.g., measures leaving in place large concentrations of infantry and prepared defenses, but causing some of the armored battalions to be moved to rear areas). Such concepts may become increasingly feasible as the composition of divisions changes (e.g., as NATO acquires more MLRS and more lethal munitions for it, perhaps permitting the pullback of some tanks without hindering initial defense.)

ence in West Germany is small as a percentage of NATO forces and is the result of strongly felt preferences by West Germany and other Europeans. By contrast, the Soviet presence in Eastern Europe is large as a percentage of Pact forces and is the result of Soviet aggression forty-some years ago. If the non-Soviet Pact nations had their choice, Soviet occupation forces would be evicted post-haste. Eastern Europe is a buffer for the Soviet Union; Western Europe is a buffer for no one, but a kind of near superpower of its own.

Another problem is that if the two superpowers pulled their forces back to their homelands—or if, following Brzezinski, the two alliances made the Central Region a separation zone for tanks—the Pact would probably have distinct advantages in reestablishing maneuver forces in the Central Region: centralized control, interior lines of communication (as distinct from the United States and the United Kingdom in particular), and simplified decision processes.

All of this has implications of principle for conceiving and evaluating arms-control proposals. In particular, we should not visualize the inner-German border and Germany as being the "center" of the problem, an imagery that might suggest making Germany into a neutralized buffer zone. Instead, imagery should probably focus on "normalizing" Europe, which would not involve complete disarmament of any nation, nor artificial constructs such as the total withdrawal of armor, but rather would begin with the withdrawal to their homelands of most superpower forces, and with the elimination of considerable equipment. And, as has been emphasized elsewhere, the imagery should focus on equality of endpoint, which would imply strongly asymmetric reductions. The proposal of Senator Nunn that the United States and the Soviet Union withdraw 2 and 13 divisions, respectively, has much to recommend it as a starting point (see the discussion of Nunn's original proposal and an elaboration of what it might mean in Karber, 1988), although there would be significant negative aspects as well, especially if it were an outcome rather than a starting point. In particular, unless the equipment of those divisions were destroyed, one would expect the Soviets to have the advantage in being able to reintroduce forces quickly. Also, such measures could have immediate political decoupling effects working to the net detriment of the NATO alliance.

THE VERIFICATION PROBLEM

One of the most controversial and difficult aspects of operational arms control will be dealing with verification issues. In recent years the United States has established increasingly high standards of verifiability, so high that some political observers doubt that any conventional arms control treaty could be both negotiated and then ratified. There is also concern about the price we are paying for the verification-related provisions of INF (e.g., exposure to Soviet intelligence, the expense of a new inspection bureaucracy, and the necessity of using Russian speakers in short supply for inspections of dubious value). As discussed by Blackwill (1988), conventional arms control agreements will raise entirely new classes of problems. Furthermore, it is unlikely that on-site inspection and other intrusive measures will prove to be a panacea (indeed, they may prove counterproductive). At the same time, there are some grounds for optimism. Most important, perhaps, is the matter of *scale*: Armies require hundreds of thousands of people. Violations of some agreements would require the participation of very large numbers of ordinary people drawn from the regular economy. Calling them in for more intensive training would probably seem very risky to the Soviets.

Some inspection measures might also prove quite useful. It should be possible, for example, to monitor the degree to which equipment has been operated, although novel techniques for doing so might need to be devised. Inspection measures could, in principle, be geared to what is discovered. For example, detecting even one apparent violation (e.g., a division with higher-than-nominal activity levels) could trigger the right to insist on a larger number of short-notification inspections. If technically sensible inspection procedures could be negotiated, it would not be necessary to have large numbers of inspections to verify the absence of large-scale violations.

Some of the complications here include the Soviet approach to training, which involves using special training equipment rather than the equipment that would be used in war. Verifying that a given division's equipment had not been used recently would not mean that the division's personnel had not been training.

In examining verification issues, which are undeniably complex, it is useful to remember the importance of comparing the net benefits of

having arms control constraints that can be verified only with some difficulty, with not having those constraints at all (in which case the actions that would otherwise be limited are explicitly *permitted* and may or may not be likely *now or in times of tension*).[3] Verifiability should not be considered an absolute criterion, but rather as *one* of the important criteria for judging the desirability of a given provision.

[3]Not everyone agrees with this formulation, some arguing that the tradeoff is between a no-constraint regime of more or less known risks and a constraint regime with new and complicated risks.

VII. TENTATIVE PRINCIPLES

APPROACH

The purpose of this section is to begin moving toward principles that could guide the development of operational arms control, and to give tangible examples. Operational arms control could be a very large subject indeed, so the scope of the discussion here is deliberately limited. We shall discuss possible limitations on the readiness of forces, other aspects of readiness for attack, and force positioning. We shall then discuss the issue of stability—what it is, how one might measure it, and what improves it.

LIMITING THE READINESS OF FORCES

It is evident from earlier discussion that a prime candidate for operational arms control is the limitation of force readiness. There are several questions, however:

- What do we mean by "readiness?"
- *Which forces* should have their readiness limited (front-line forces, early-arriving reinforcements, or later-arriving reinforcements)?
- What *type* of limitations would be appropriate?
- What are the *relationships to force structure* and structural arms control?
- What can be said about *negotiability*?

Readiness

Ultimately, a unit's readiness is measured by how quickly the unit could be employed effectively in combat, given the equipment available and manpower assigned. High-readiness units would reach nominal effectiveness in a matter of hours. Low-readiness units might require days, weeks, or even months of preparation.

The factors determining a unit's readiness include:

- *Manning level* (e.g., full strength down to a minimum cadre);
- *Previous training levels* achieved by its personnel, and the time since that level had applied (i.e., how stale have the personnel become?);
- The *nature of continuing reservist training* (e.g., regular meetings and drills of reservists for a given unit compared with occasional drills on an individual basis); and
- *Mission* of unit; and
- *Availability of equipment* for training and war.

Figures 11 and 12 illustrate on a notional basis how a unit's effectiveness might depend on training time and mission starting from

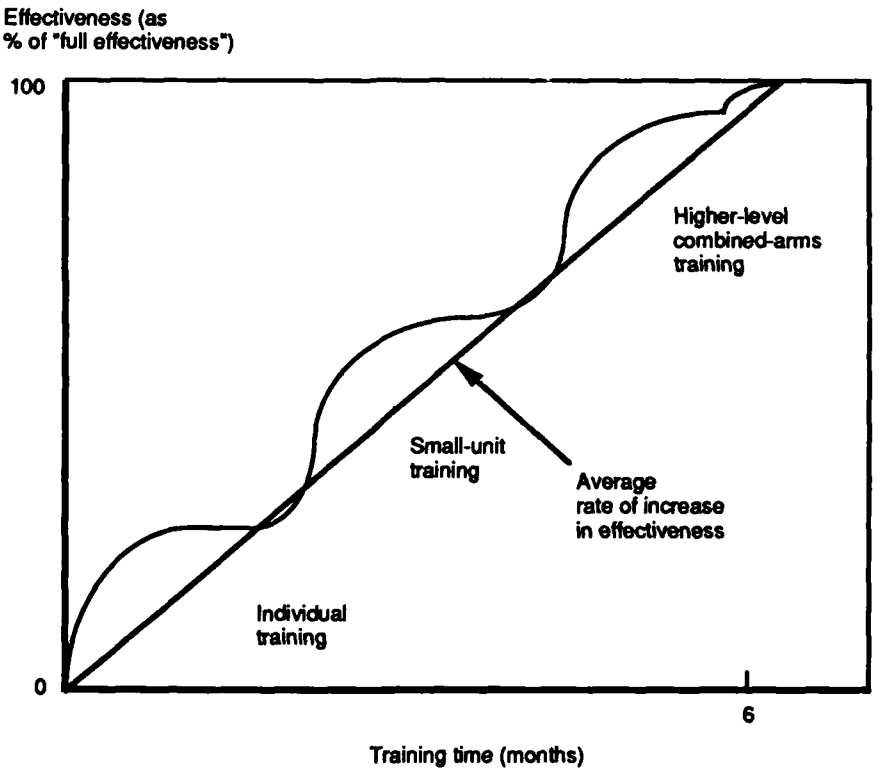

Fig. 11—Notional buildup of effectiveness with training (fresh recruits)

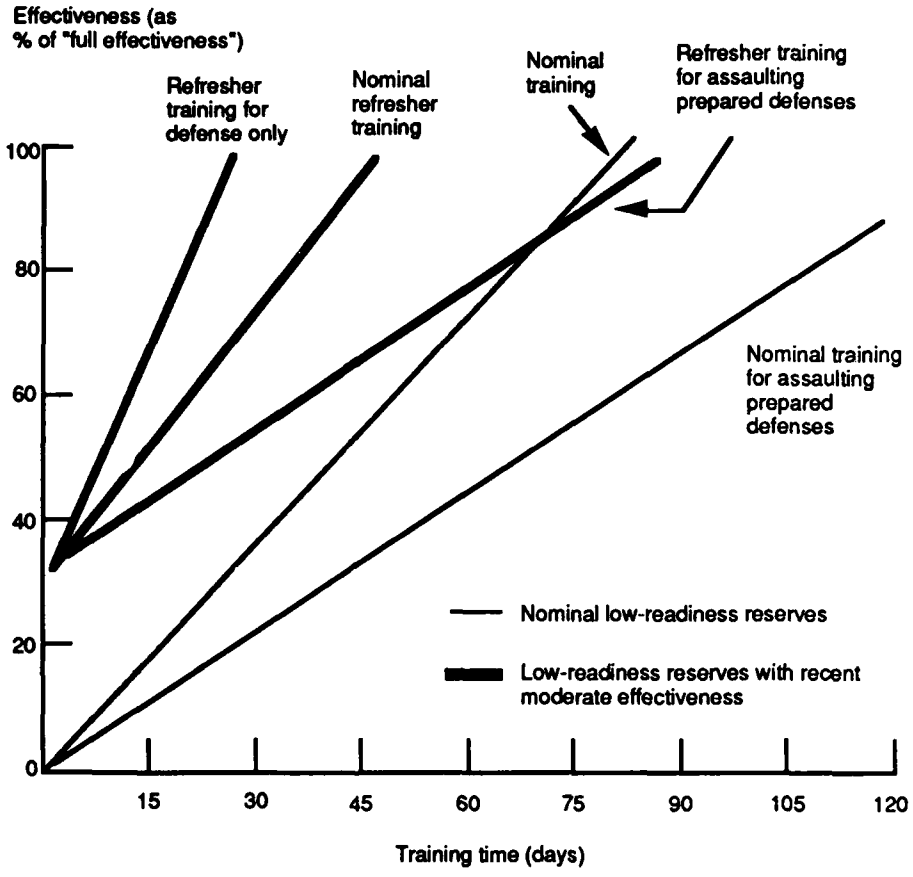

Fig. 12—Notional buildup of effectiveness with training for low-readiness reserves

different initial levels. In fact, the relationships are surely more complex and there are alternative concepts available for training that would translate into *families* of curves. Figure 12 illustrates some of the types of dependencies that probably exist. For example, it surely takes longer to train (or refresh) a unit for assault operations than for defensive operations. The top set of buildup curves (those in bold) pertain to reservists with relatively recent training to a high-effectiveness level. Such differentiations appear to be unexceptionable,

based on informal reactions to them by military officers reviewing this study in draft. Apparently, however, they have not previously been reflected in analysis and the author believes they go far in explaining the chronic discrepancies in the literature concerning the time required for the Soviets to prepare their second-echelon forces. During the Great Patriotic War the Soviets had to send troops with very little training to defend at the front (e.g., the outskirts of Moscow itself!), and it would hardly be surprising if they planned to do so again *if they were on the strategic defensive, as they reportedly are in their standard planning scenarios.* It would be quite another matter, however, for a Soviet commander to think about sending low-readiness reserves to *assault* NATO's forward defenses without substantial training (two to four months, depending on their previous proficiency and staleness). On the other hand, if these forces were merely required as exploitation forces following breakthroughs achieved by first-echelon troops, then a lesser level of proficiency would be adequate. The correct strategy for them to use would be highly situation dependent.

If a unit's readiness is measured by the time required to achieve adequate effectiveness *for its assigned mission*, then that time depends both on its initial effectiveness and the rate at which effectiveness can be increased by training ("training rate"). Figure 13 illustrates relationships for the simple case of linear buildups by showing tradeoff plots. Suppose, for example, that one wanted to employ a unit after 40 days of training. The figure indicates the intuitively obvious point that if initial effectiveness is high, training rate can be relatively slow and the goal can still be achieved. However, if initial effectiveness is low (e.g., because of low cadre levels and a low level of reservist activity), then training rates must be much higher. The training rate, in turn, depends on the age and prior experience of reservists, techniques used, degree of prior planning, and doctrinal concepts for employment.

Deciding Which Units' Readiness Levels to Limit

The do-no-harm principle is perhaps the first place to begin. As noted above, NATO depends heavily on the readiness of its front-line forces and early-arriving reinforcements, which must hold forward if

the entire strategy is not to fail. It follows that nothing should be done that would limit the D-Day readiness of such forces in any of the plausible scenarios, including scenarios that might provide only one

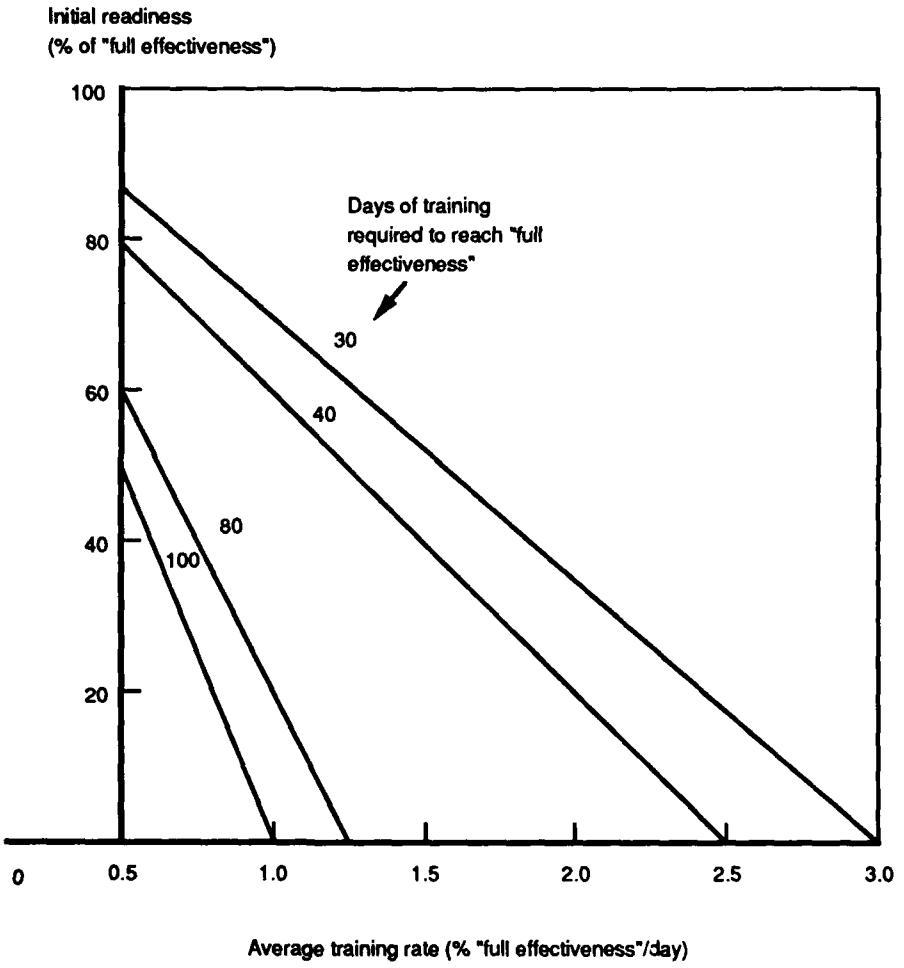

Fig. 13—Tradeoffs between initial readiness and training rate

to three days of preparation time before hostilities began. This, coupled with the fact that the attacker in such scenarios would probably have a head start in improving readiness, implies that *NATO should probably reject on first principles any limitation in the readiness of its front-line forces and early-arriving reinforcements.*[1] Other limitations may be desirable or acceptable (e.g., reductions), but readiness limitations on these forces are inherently suspicious, even if both sides had equal numbers of early-available forces.

By contrast, for the reasons discussed in the previous section, there would be distinct advantage to NATO in prohibiting increases in the readiness of the Pact's low-readiness units. Such increases would worsen the defender's prospects (NATO's) and reduce risks for the attacker (the Pact). [2]

Choosing Types of Limitation

It is beyond the scope of this study to discuss in detail the limitations that might be constructed to affect cadre level, training time per year, and so on. Instead, let us assume here that the sides could agree that units fall into three categories of readiness: very high, high (enough to assure availability realistically within, say, three weeks, without premobilization preparations), and low ("not-ready" forces available only after many weeks or a few months of preparation) The idea would then be to limit the number of units in each category, or in the sum of certain categories. Figure 14 shows how this relates to one of the many unclassified depictions of force generation, this one adapted from estimates in Posen (1988). Roughly speaking, the Pact might generate on the order of 60 armored division equivalents within the first month for its first strategic echelon. The Pact could generate a second strategic echelon of 40 armored division equivalents or so, but only after a longer preparation period because the

[1]Here and in what follows the phrase "early-arriving reinforcements" is used. In this report that means reinforcements that could *realistically* be expected to arrive within about three weeks of mobilization in the absence of special premobilization preparations.

[2]If there were large-scale force reductions, including the destruction of equipment, the trained manpower from such units would be a potential base for quickly increasing the capability of the very low-readiness units.

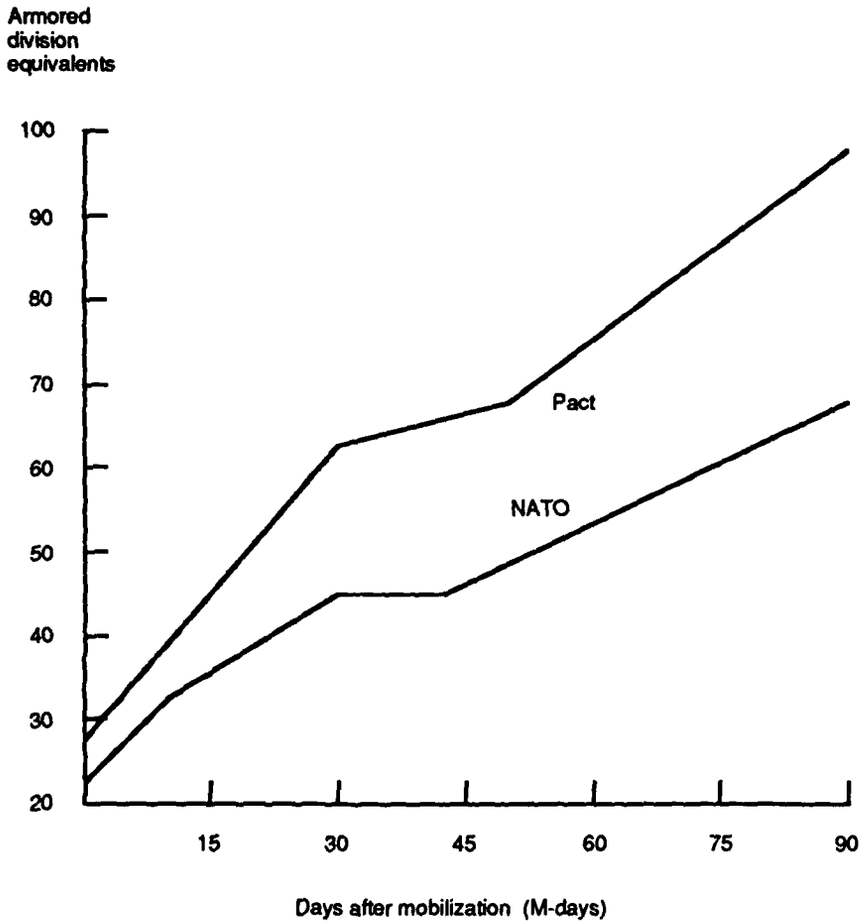

Fig. 14—Illustrative force-generation curves from the literature

forces in question (about half the relevant divisions) are at low states of readiness. As Posen observes and Fig. 12 assumes, the actual delay might be *much* longer than shown here (e.g., an extra month, or even more).

At the level of principle, the most important observation here is that such limitations on readiness should be combined with structural arms control and conceived in terms of *ceilings* (on units at a given

readiness level) not in terms of freezes. The current balance is not conducive to freezes for reasons discussed in the last section. Further, until and unless major reductions occur, the ceilings should be established at high enough levels so that NATO would have the right to *increase* the number of its early-available divisions if it decided to do so (and as military analysis indicates it *should*, if it seeks improved conventional defense). Cynics might claim that NATO would never do so, and that freezes would therefore be acceptable, but such arguments are seriously flawed in terms of the principles they represent. Furthermore, if the likelihood of war seemed higher than it does today, it is entirely plausible that NATO would then increase its force structure and, in particular, the number of early-available forces. Any arms-control agreement should allow for that case.

Figure 15 illustrates the type of limitations that might be sought. Figure 15a depicts the current balance. The reader should not take the precise numbers seriously, but the bar charts show qualitatively the capabilities represented by in-place forces, early reinforcements, and late-arriving reinforcements (counting only those forces usually ascribed to Central Region conflicts in studies). Figure 15b illustrates the possible result of mostly unilateral Pact changes in ground forces, changes reducing the number of in-place and quickly available forces. The idea here is that the first step is to eliminate the more egregious asymmetries, which in this case means withdrawing excess Soviet forces and reducing the number of Pact forces at relatively high levels of readiness.[3] Figure 15c shows the possible *outcome* of arms control negotiations. Here there are separate ceilings on the number of in-

[3]Soviet analysts have argued to the author and others that it would be necessary also to eliminate asymmetries favoring NATO, which they claim include most prominently an asymmetry in ground-attack aircraft. Whether in fact such an asymmetry exists depends on which aircraft are counted and what assumptions are made about reinforcements of the Central Region. One basis for Soviet claims is probably CBO (1988), which shows NATO having approximately twice as many fighter-bombers (which include A-10s) as the Pact ten days after mobilization. Some Soviet analysts argue that aircraft can be quite "offensive," as was demonstrated dramatically in Hitler's invasion of the Soviet Union where the German Air Force played a major role in the initial successes of Barbarossa. Soviet claims may also be influenced by Western unclassified publications treating NATO's current close-air-support aircraft and aircraft with future FOFA weapons as major sources of firepower used in simple combat models (see, for example, the referenced articles by Posen and Epstein as well as CBO, 1988). Aside from such analytical issues, it is likely that Soviet views are strongly influenced by a desire to reduce NATO's nuclear-capable strike aircraft, since those aircraft may play a dominant role in NATO's nuclear planning in the wake of the INF treaty.

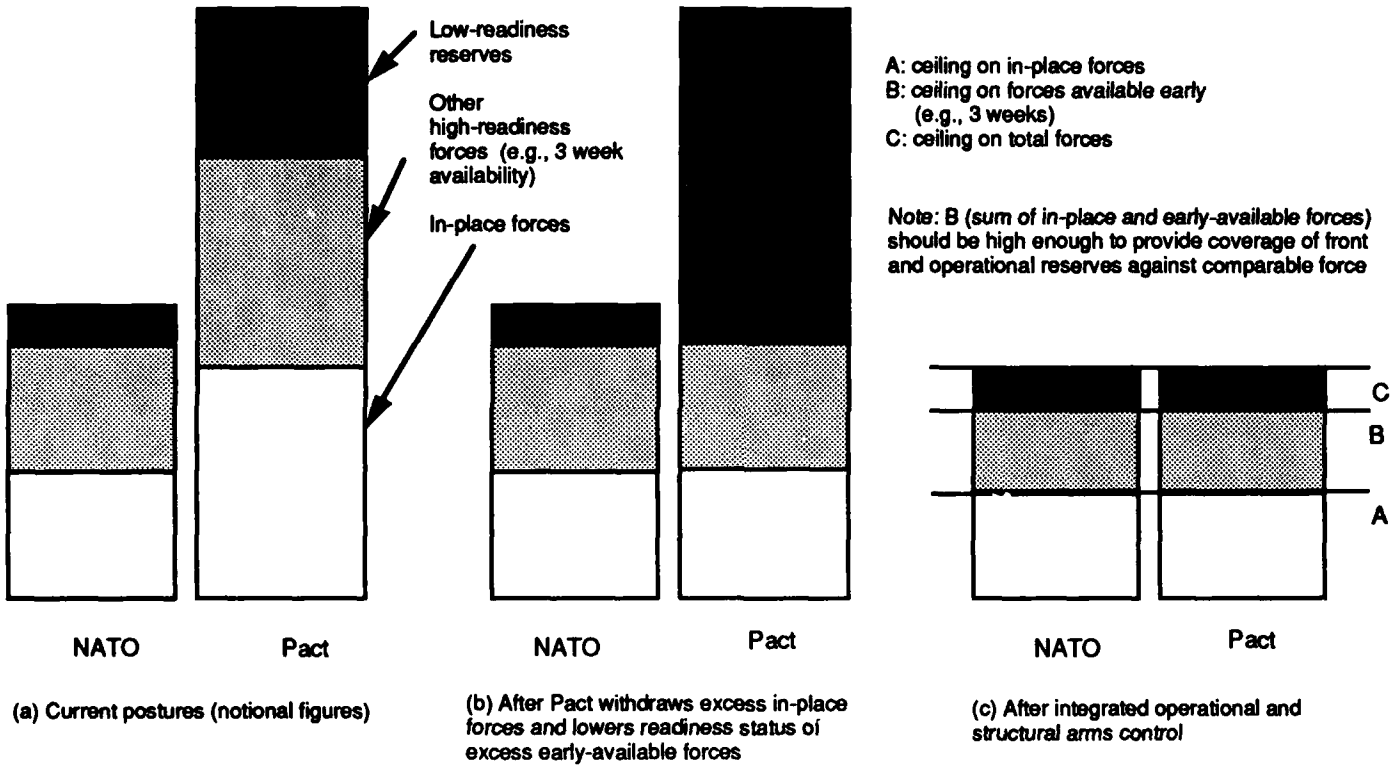

Fig. 15—A possible sequence of operational and structural arms control

place, in-place or quickly available, and total ground forces (measured in some version of equivalent divisions). This outcome assumes an integration of operational and structural arms control that includes destruction of considerable equipment. The outcome also leaves both sides with enough in-place or early-available forces to conduct a strong initial defense as discussed below.

Relationships to Force Structure

The principles being emphasized here are equality of ceilings and the protection of the sides' right to assure adequate numbers of forces for defense. As argued in earlier RAND work (e.g., Thomson and Gantz, 1987), the concept of such a minimum number of forces adequate to cover the border is important. Indeed, the author would argue that the numbers *required* are somewhat larger than many have assumed. In particular, since NATO must concern itself not only with the canonical Central Region boundary but also with the border with Austria, and since any defender should seek to have not only enough forces to cover the border but also to provide reserves for engaging penetrators, the "minimum" for defense may be estimated as in Fig. 16.

This study is not the place to discuss the factors in this equation precisely (details may arguably be classified), but if we took 550 km as the geographic frontage that would have to be covered well, after accounting for forests and the like, then if a standard NATO division can cover approximately 25 km, the requirement would then be 33 divisions. Although the numbers used here are only approximate, they suggest that NATO's *current* force structure is not *much* greater than the minimum force structure. A more detailed analysis would depend on the size of the threat, because the number of reserves needed depends more on that than on the size of one's own front-line forces. Further, it could be argued that against a weaker threat, a NATO division could cover more than 25 km of frontage. Nonetheless, until and unless the *nature* of the threat changes (i.e., the suitability of threat forces for attack missions), the number of divisions needed by NATO for minimum defense may be larger than some would estimate. An accurate appraisal of that issue is beyond the scope of this study

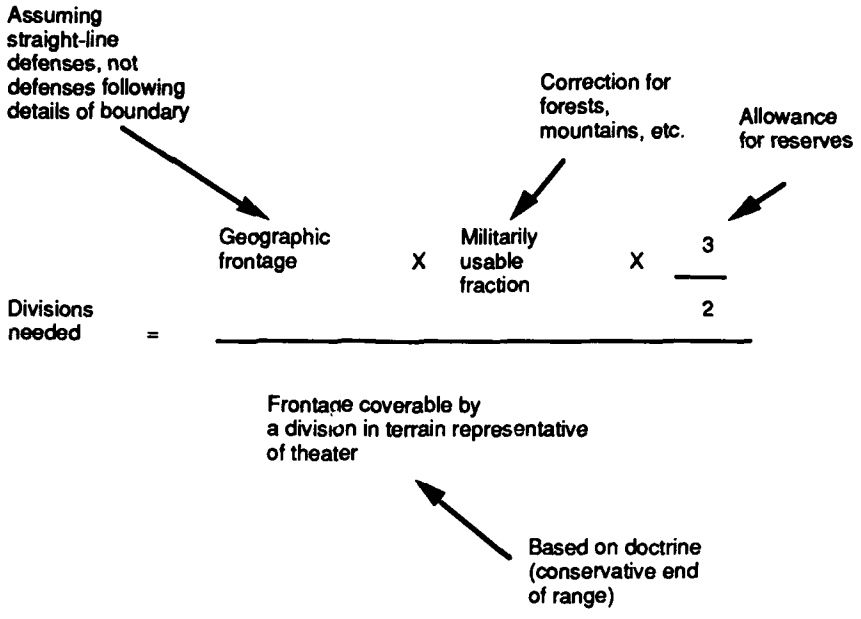

Fig. 16—Coverage requirements

and should be performed by theater commanders, but the author's current estimate is that defensive sufficiency involves about 25–35 equivalent divisions—assuming a threat of similar size and current force compositions.

Negotiability

This study is less concerned with negotiability than with establishing principles that "should" be agreeable to both sides if neither seeks unilateral advantage. So it is with the concept of equal ceilings. It is worth noting, however, that the negotiability of readiness limits such as those suggested in Fig. 15c may be better than one might think. The Soviet Union probably has no current hostile intentions, is interested in conveying a peaceloving image, is not interested in *raising* the number of readied forces but rather in reducing them for reasons of both economics and politics, and would in no sense sacrifice its own security by agreeing to such ceilings. Indeed, it could be argued that NATO should demand early formal agreement on such a ceiling as

one demonstration of seriousness in the principle of equal security. At the level of principle, again, NATO should not need to "pay" anything (except the negotiating energy involved) for such an agreement.

At the same time, we must expect Soviet hardliners, in the hope of obtaining a better bargain, to resist unilateral or highly asymmetric reductions—thereby raising the spectre of conventional arms control being an *obstacle* to progress by discouraging the Soviets from doing unilaterally what would probably be in their own best interests as well as in the interests of stability generally (i.e., reductions and withdrawals of excess forces as hypothesized in Fig. 15b).[4] Another possibility is that Soviet negotiators will seek agreements on operational measures only—reasoning that those would establish good will without requiring giving up force structure.

LIMITING OTHER ELEMENTS OF READINESS

Preparations for Attack

Having discussed readiness limits for forces, let us next consider briefly other elements of overall readiness for war that might be limited. The usual starting point for such discussions is to itemize the types of preparation that an attacker must make such as: moving up vast quantities of ammunition and bridging equipment; establishing wartime command-and-control networks; conducting large-scale exercises to rehearse operations with the actual participants; taking over control of civilian functions and infrastructure such as rail lines and airfields; evicting or limiting the activities of observers or other potential sources of intelligence for the defender; and so on. The Pact already has substantial in-place stocks, bridging equipment, and command-and-control systems, so some of these would be candidates for reversal.

There are several observations to be made about limiting such activities:

- The activities would probably come late in the preparation for war and provide little *additional* operational warning. This

[4]The author's concerns on this matter were reinforced by discussions with Soviet officials in conferences held during 1988 at The RAND Corporation in Santa Monica and in Moscow.

might not be the case, however, for extremely short-warning attacks dependent on in-place forces. In these instances, the "other" preparations might be the time-limiting factor for the attacker, and prohibiting such preparations might be a significant impediment.

- However, defenders would have to be conducting similar activities in many cases.
- It will be important to itemize the activities and establish whether distinctions can be drawn regarding attack vs defense. As a first cut at this, it appears as though moving bridging equipment forward would be an aggressive act; so also might be the conducting of certain large-scale exercises (larger than Reforger). And, as mentioned above, moving forward stocks of artillery ammunition in excess of defensive requirements would be similarly provocative.

The usefulness of bridging-related limitations would probably depend upon the quantity of organic bridging equipment available at division or army level. This suggests another straightforward linkage with structural arms control—removal of such equipment from the forward-deployed units.

Limiting certain types of large-scale exercises might be useful, but it should be recognized that the NATO commander anticipating war might wish to consider changes in operational strategy that would involve redeployments or echelon-above-corps maneuver. He might need field exercises of a type that have not previously been conducted, or even regarded as necessary, although this seems unlikely because large-scale maneuvers depend primarily on command-post exercises.

The Reserve Pool As an Indirect Source of Readiness

A *major* problem in any effort to verify compliance with limitations on the number of units in each level of readiness will be the large number of Soviet reservists produced by the universal conscription system. At any given time, the Soviet Union has a large number of recently trained reservists who could be called back into service and used to fill out low-readiness divisions with relatively little training time required. Although there could be severe negotiating problems

in doing so, NATO may wish to propose equal ceilings on the sum of draftees and enlistees for the nations and military districts relevant to the Central Region. As with many of the operational limitations one might consider, it would be difficult to develop reasonable proposals without doing so on a global basis.[5]

LIMITING FORCE POSITIONING AND MOVEMENT

Most discussion of reductions has also involved discussion of the peacetime location of forces. For example, many proposals would have the Soviet forces withdraw to beyond the Ural mountains, or the U.S. forces to the United States. The first point of principle to be made here is that withdrawals are not *structural* changes: They might relieve the in-place balance, but they would create a competition in redeployment capability that might well work to the Soviet advantage because of the interior lines of communication the Soviets would enjoy in a redeployment and the Pact's centralized command and control.[6]

In this study it is useful to think of repositioning not as a restructuring of forces, but rather as an operational measure[7] that would improve the defender's prospects if war occurred (by making surprise attacks more difficult and so on). In thinking about principles, the first observation is that once again the Pact has an excess of early-available forces. Thus, before any serious discussion of reductions, NATO could reasonably demand that the Pact *withdraw* a substantial number of forces to the Soviet Union. More importantly, NATO could reasonably demand that the Soviet Union agree formally not to redeploy those forces to the forward regions—in effect defining such rede-

[5]Reducing the number of Soviet conscriptees is a good example of a measure that might be impossible to negotiate but that might be undertaken unilaterally for reasons of self interest.

[6]Such issues are being analyzed in an Army-sponsored RAND project directed by colleague Kenneth Watman.

[7]This may seem confusing to some readers who think of withdrawal measures as part of the "structural arms control" to be discussed in the Conventional Stability Talks (CST). The point being made here, however, involves logical distinctions wthout regard to where certain measures happen currently to be under discussion or who "owns" those measures in terms of analysis or negotiations. To put it differently, it seems evident that the CST will surely consider operational measures and should probably consider a wide range of them rather than relegating them to a different negotiation process. That, however, is a matter for diplomats to judge, since coordinating two related negotiations is certainly feasible.

ployment as a *casus belli* condition. By agreeing to such measures the Soviet Union could greatly reduce the threat of a standing-start attack (i.e., the threat emphasized by Karber and Vigor). Moreover, failure to agree to such measures would be difficult to justify.

Some observers of Soviet behavior expect the Soviet Union to announce unilateral troop withdrawals from both the Central Region and Hungary in the relatively near future. Other observers believe that the Soviets have now decided against doing so—except for some possible smallish measures intended primarily for propaganda—and will instead attempt to negotiate reciprocal measures. From the viewpoint of principles, it would appear that NATO should get out ahead on this issue—establishing such withdrawals (along with the above-mentioned limitations on readiness) as *preconditions* for more ambitious arms control discussions.

The concept of separation zones has been raised by a number of observers. In one concept, there would be a tank-free zone throughout the bulk of the Central Region. In other concepts, the separation zone would be much smaller—perhaps 50–100 km deep. Because of the geographic asymmetries discussed in the previous section and the advantages the attacker would have in any redeployment, NATO should reject all such proposals until and unless force compositions change substantially enough to alter the nature of the problem.

CRISIS STABILITY

The subject of crisis stability will be explored in more depth in a future study, but it is appropriate to make some observations here.

Different Perspectives

There is considerable interest in confidence-building measures that would reduce misunderstandings and anxieties in crisis that could lead to an unintended war. Many of those interested in such measures think immediately of arms control prohibitions on a large variety of activities such as alerting, mobilizing, and deploying forces. They think also of various inspection measures intended to improve the quality of information. Some of those exploring such ideas would regard as potentially provocative and destabilizing a large fraction of the measures called for by NATO's defense plans (e.g., they would

view with alarm the movement toward the border of NATO's armored and mechanized forces and, with even more alarm, the dispersal of nuclear weapons from storage sites).

The alternative view, one held by the author and most individuals involved in military planning, operations, or analysis, is really *quite* different. In this view, there is relatively little risk of an unintended war (of which there are few historical examples), but a nonnegligible risk of invasion or coercion. The real danger, in this view, is that in times of crisis NATO would fail to take the preparatory measures that would in fact deter invasion and coercion. Arguably at least, the most important time for deterrence to work is in crisis.

A Synthesis of Views?

Is it possible to synthesize the two diverse viewpoints? Perhaps not completely, but there is at least some potential room for shared objectives. In particular, it can be argued that the military activities that should be considered most provocative, and that would therefore be crisis destabilizing, are the measures that go beyond deterring surprise attack by decreasing one's own vulnerability. The most tangible example of this would be a Pact mobilization of its low-readiness divisions. Given current in-place force levels strongly favoring the Pact, a mobilization of the Pact's "Category II" units should also be regarded as highly threatening by NATO: Such a mobilization would be difficult to justify in terms of defense (unless, perhaps, there were an ongoing or incipient revolution in Eastern Europe). It follows, then, that the operational arms control measures suggested above for the purposes of improving the defender's prospects if war occurred would also tend to improve crisis stability. They would prohibit the most frightening activities and would by implication legitimize lesser measures that would probably be necessary as part of a prudent alerting and preparation process.

The principles at work here are as follows:

- Steps taken in crisis that improve the defender's prospects without generating a credible offensive threat enhance deterrence (in crisis) and thereby enhance crisis stability—especially if both sides take such steps. That is, many steps

thought by some to be provocative would instead be stabilizing (if both sides understood the rules of the road here).

- By contrast, many other steps would suggest hostile intent even if no bad intentions existed. Avoiding such steps is therefore desirable, for both deterrence and crisis stability. Those steps tend to be precisely the steps that operational arms control should address for the sake of improving the defender's prospects.
- By formalizing steps to be avoided, and by creating postures in which more such steps would be necessary to initiate an attack, the sides could in effect define rules of the road for crisis behavior.
- If the Soviet Union agreed to withdraw some of its GSFG forces and to refrain from raising the readiness of its low-readiness units, then it would know in crisis that to reintroduce the forces or mobilize low-readiness units would be in violation of accords intended to prevail in crisis as well as peacetime, and that NATO might regard such actions as the justification for preemption. So understanding the rules of the road would deter what might otherwise appear to a risk-taking Soviet leader as prudent measures or acceptable "political" coercion.

Figures 17 and 18 summarize some of these ideas in the form of influence diagrams or what some would call cognitive maps—graphical depictions of how one can think about interrelated issues. Each subject in these figures (e.g., "Training time required for second-echelon forces") has a magnitude. If two subjects are connected by an arrow, then an increase in the first tends to cause an increase in the second—unless the arrow has a minus sign, in which an increase in the first tends to cause a decrease in the second. These figures also adopt a convention in which minus is "bad." Thus, we see in Fig. 17 that the two policy controllable inputs noted lead through various mechanisms to deterrence. In Fig. 18, however, we see that (in this viewpoint) constraints on the readiness of in-place and early-available forces could *reduce* both deterrence and crisis stability for the reasons indicated.

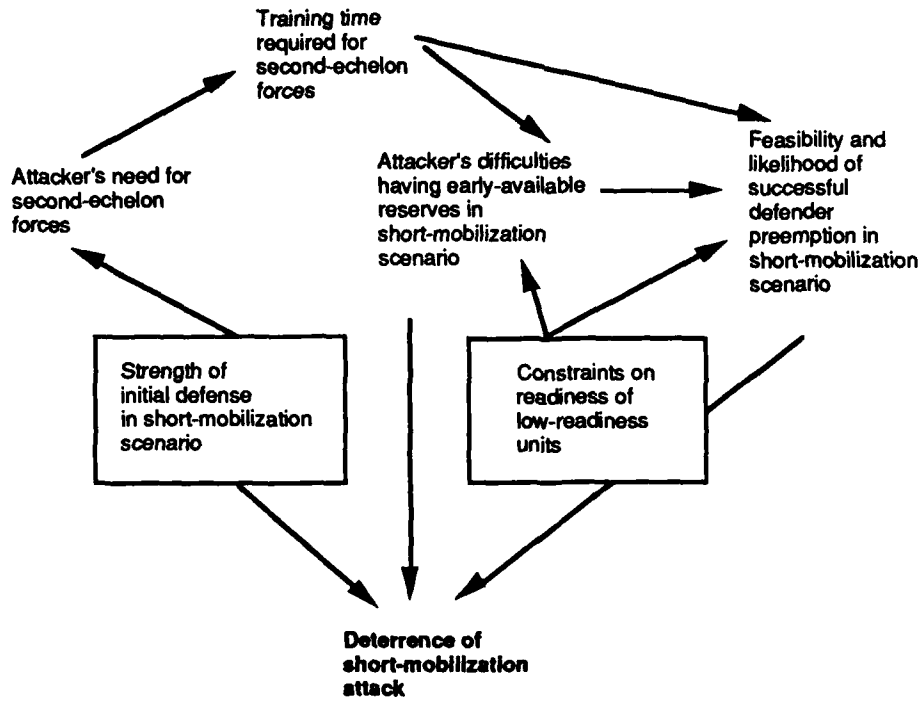

Fig. 17—An influence diagram for deterrence

Finally, in Fig. 18 we see a postulated influence of deep-strike weapons, which the Soviets argue are destabilizing. In the view represented in this figure, deep-strike weapons could *enhance* crisis stability, especially if taken in combination with constraints on mobilization and force postures in which the sides have enough effective in-place forces to defend against attacks by the opponent's in-place forces. Under other circumstances, however (e.g., inadequate in-place forces and no constraints on mobilization), deep-strike weapons could provide preemption incentives. This subject merits much more study.

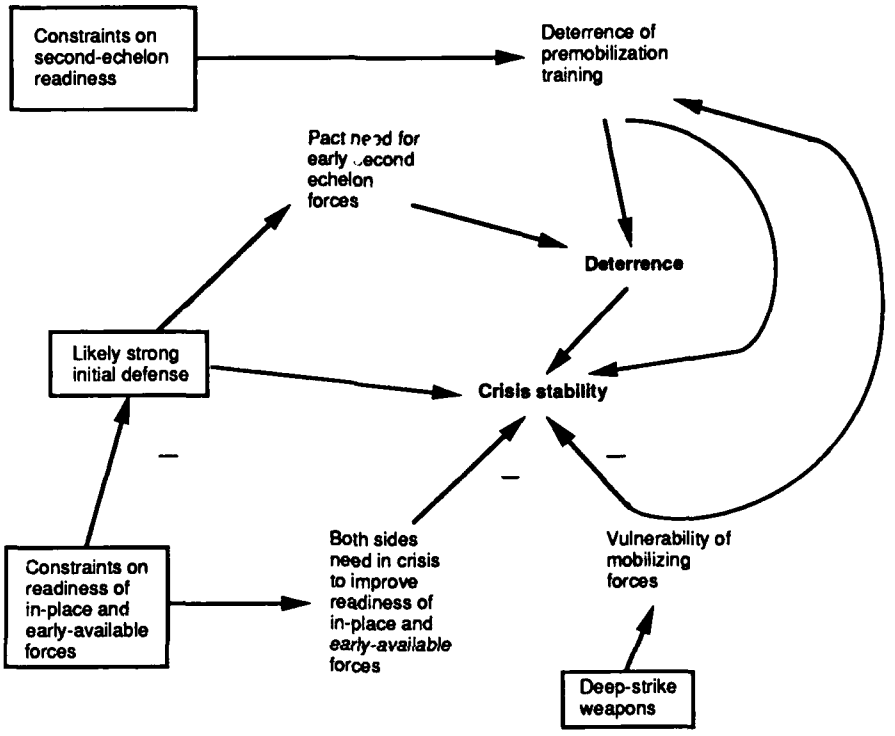

Fig. 18—An influence diagram for stability and deterrence

VIII. AN AGENDA FOR RESEARCH AND ANALYSIS

This study has attempted to move *toward* a framework for conceiving and evaluating operational arms control measures. Clearly, however, it represents only one step of a process. Because *ambitious* conventional arms control has not been studied much for a decade or more, there is need for a great deal of information gathering and analysis. In some instances, newly gathered facts will change rather fundamentally views of what should and should not be emphasized, and to what we can and cannot reasonably aspire. What follows is a list of priority subject areas.

A PRIMER ON READINESS ISSUES

Whether we are dealing with today's force balance or the types of balance envisioned dimly as the desired result of future reductions, we need to understand far better than we do today the process of force generation—for both the Warsaw Pact and NATO. Currently, there are major discrepancies in the assumptions about the two sides' ability to generate forces (e.g., training rates). There are also major disagreements among analysts regarding Pact force-generation capability, especially for forces that would be used to invade the Central Region.

Instead of the somewhat notional curves introduced here (Figs. 11–12), it should be possible to use comparable curves based on the best intelligence available, and insights from actual experience with U.S. and allied forces on which more information should be available.

Research is also needed on how best to *define* alternative readiness categories, and how one would assign a given unit to one or another readiness category on the basis of information that might be available with different degrees of data exchange, inspection, new national technical means, and other sources. In conducting this research it will be necessary to distinguish between current training and force-generation practices and those that might be used to overtly or covertly circumvent arms control limitations.

In summary, a *primer* is needed on the entire subject of force generation and how it might be affected by arms control.

AN INTEGRATED GLOBAL FRAMEWORK FOR STRUCTURAL AND OPERATIONAL ARMS CONTROL

As this study has indicated, it is artificial to continue the separation of operational and structural arms control. Furthermore, analysis should consider packages of options that would come into play over a period of perhaps 15 years or so, because measures that would not be desirable under current postures might become desirable if force levels and composition change. We should also expect that aircraft will be accounted for in one way or another, and that the Soviets will continue to argue that NATO will have to reduce an asymmetry they claim exists in ground-attack aircraft as the Pact reduces the asymmetry in ground forces. This study did not examine the tacair balance.

Another analytic challenge will be to consider conventional arms control on a global basis. It makes little sense to examine Central Region options in isolation, and indeed the ongoing negotiations are discussing much larger zones such as the Atlantic to the Urals. Among the problems in trying to restrict focus to the Central Region are:

- The level of Soviet forces "elsewhere" (more than a hundred divisions), many of which could be redeployed to the Western TVD over a period of weeks or months with little or no risk to the Soviet Union.[1]
- The near certainty that U.S. allies worldwide would be greatly troubled by arms control affecting only the threat to the Central Region. Just as the INF process was eventually broadened, so also would conventional arms control in the Central Region be broadened.

[1]It can be argued that the Soviet Union would not transfer many of the forces from Asia because of a perceived threat from the Chinese. Even that is debatable, but the invasion threat that the Soviets need to worry about from the Iranians, Turks, Norwegians, Swedes, and Danes is almost immeasurably small.

- In a bizarre way, and despite the NATO-adverse balance there, the continued military tension and level of mobilization in the Central Region may provide an "extended deterrent" to Soviet military activities elsewhere (e.g., in Southwest Asia or against Europe's Northern Region).

It is inevitable, of course, that Western efforts to broaden discussions will cause the Soviet Union to do likewise with demands that naval arms control be included in an overall package. Since the Soviet Union is distinctly inferior in the naval arena, reducing U.S. strength in this area of competitive U.S. advantage would have significant benefits. It is likely that the Soviets would be most concerned about reducing the threat to their strategic forces posed by maritime strategy's forward deployment of both SSNs and battle groups. In addition, however, the Soviets would probably seek to reduce American interventionism with projection forces.

REVIEWING VERIFICATION ISSUES

As noted in the previous section, verification promises to be an extremely difficult problem area for conventional arms control—in part because the principles developed, whether wisely or not, for strategic arms control probably do not apply well for conventional arms control. Fundamental work is needed in this area on every level: conceptual, technical, and analytic.

ANALYTIC WAR GAMING AND RELATED MODELING METHODOLOGY

It will be important to evaluate packages of arms control proposals with operationally sensitive war gaming and simulation, some of it global in scope. This work should include a wide range of test scenarios, including our best guess about the test scenarios that might be used by the Soviets for their own analysis. One reason for conducting such Soviet-style analyses will be to better understand the arguments that will implicitly underlie Soviet positions, and to better permit us to address and refute those arguments. It is likely, for example, that the Soviets emphasize scenarios in which NATO invades the Warsaw Pact. It may be easy enough for them to concoct such scenarios in the

absence of criticism, but it should also be relatively easy for us to demonstrate the manifest absurdity of "the NATO threat."

Another subject for new analytic war gaming should be the impact of new weapon systems and related doctrine. It is difficult currently to estimate with any confidence how much defensive force would be enough in a reductions regime, since the rules of thumb about how much frontage an equivalent division can cover need to be revisited. Also, if there actually were major compositional changes in divisions as some proponents of "defensive defenses" would prefer, the nature of combat would also change, requiring a new look at the underlying models.

MEASURES OF STABILITY

The subject of stability has been discussed only briefly in this study (at the end of the previous section), but it is a subject that deserves considerably more attention. Given experience with strategic-nuclear analysis in the United States and the interest in stability theory exhibited by European and Soviet defense analysts, a considerable investment of effort seems appropriate. This is especially so by virtue of the fact that the different participants in conventional stability talks have very different ingoing concepts of what constitutes stability. These differences in view trace back to asymmetries of posture and geography as well as to issues of theory. It is likely that stability arguments will play a major role in assessment of proposals involving constraints on high-technology deep-strike systems and the future composition of both ground forces and air forces.

RECIPROCAL UNILATERAL MEASURES

Many observers, including the author, doubt that conventional arms control agreements will prove feasible to negotiate without fundamental changes in the criteria applied. The problems of definition, verification, and measurement are monumental compared with the problems encountered in SALT and START. It is often noted that the trouble is in the details, and the details here are many and complex. Perhaps this pessimism will prove unwarranted, since there are many incentives for a successful negotiating process, but it is desirable that analysis also consider the types of reciprocal unilateral

measures that the sides might pursue without attempting to reach formally negotiated agreements. This is desirable if for no other reason than preparing for the contingency in which Gorbachev makes such offers at a head-of-state level to Western leaders. Such offers could combine serious intent with obvious opportunities for propaganda, and the NATO allies cannot afford to be without ideas on the matter.

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