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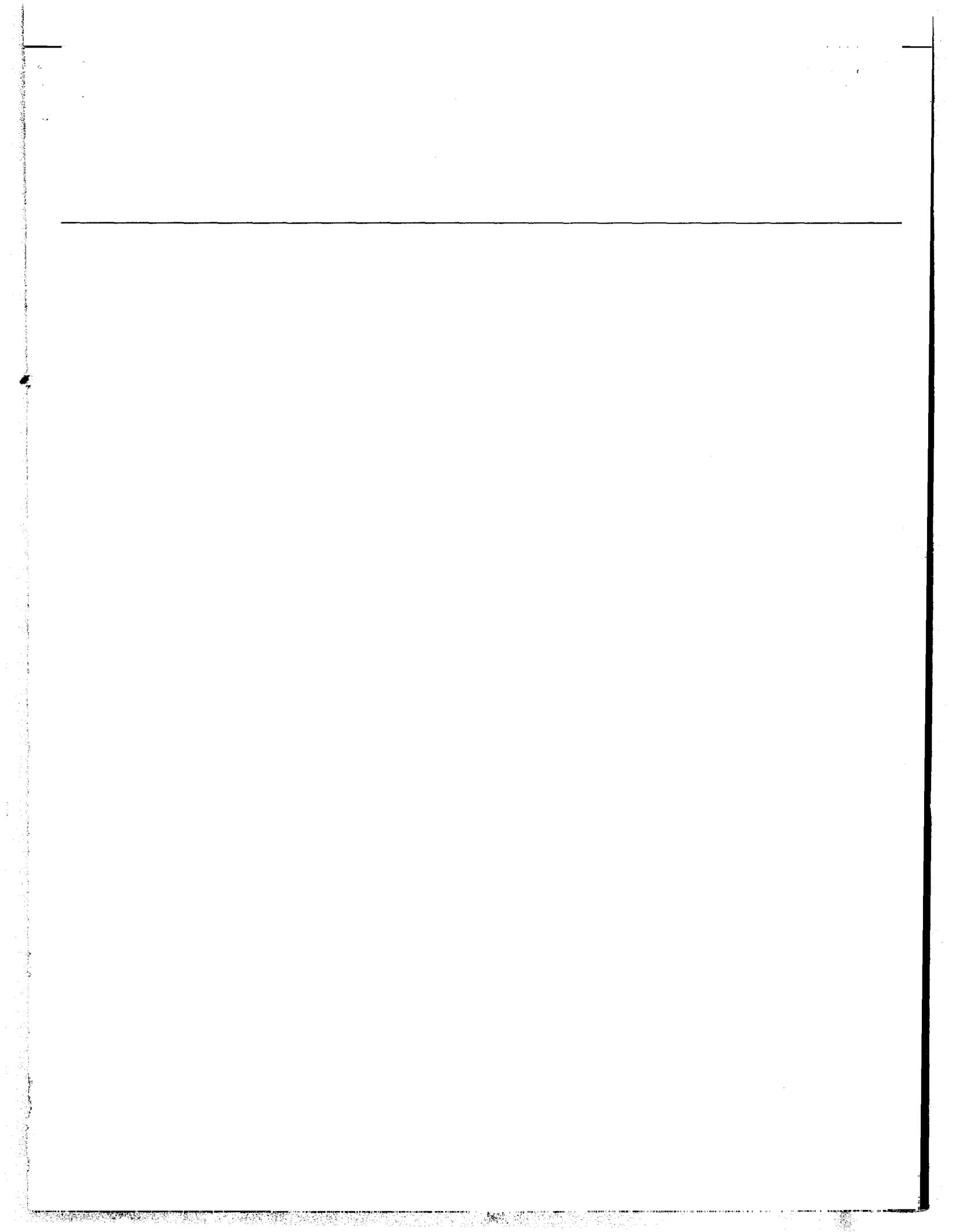
December 1988

NATO-WARSAW PACT

Conventional Force
Balance: Papers for
U.S. And Soviet
Perspectives
Workshops



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Comptroller General
of the United States

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The Honorable Sam Nunn
Chairman, Committee on Armed Services
United States Senate

The Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives

When we sent you the Conventional Defense Study Group's report on the conventional forces of the North Atlantic Treaty Organization and the Warsaw Pact (GAO/NSIAD-89-23, December 1988), we indicated that two supplements would provide a more detailed description of the workshops that were convened to discuss the force balance issue and the papers we commissioned from workshop participants. This supplement contains the experts' papers used as the basis for the workshop discussions. Supplement A, issued under separate cover, contains information on the workshops.

A handwritten signature in cursive script that reads 'Charles A. Bowsher'.

Charles A. Bowsher
Comptroller General
of the United States

PREFACE

This volume supplements the information contained in the Conventional Defense Study Group's report entitled Assessment of the NATO-Warsaw Pact Conventional Forces Balance (GAO/NSIAD-89-23, December 1988). This supplement provides the papers commissioned for discussion during the U.S. and Soviet workshops.

The Conventional Defense Study Group was established by the Congress under the National Defense Authorization Act for Fiscal Years 1988 and 1989.¹ The Group was charged with providing a report to the Congress on the conventional forces of the North Atlantic Treaty Organization (NATO) and the Warsaw Pact, with emphasis on the forces within the Central Region. Section 1212(b) of the act states, in part:

"The Comptroller General of the United States shall convene and chair a Conventional Defense Study Group composed of representatives of the Library of Congress, the Office of Technology Assessment, and the Congressional Budget Office. The study group shall assess the balance of conventional forces in Europe between the forces of the North Atlantic Treaty Organization and forces of the Warsaw Pact and shall submit a report on such assessment to the Secretary of Defense and the Committees on Armed Services of the Senate and House of Representatives. The report shall...provide--

- (1) the study group's assessment of that balance of forces; and
- (2) recommendations on improving that balance so as to provide for a more adequate conventional defense for NATO."

To address this legislative requirement, the Study Group convened two separate panels of experts to obtain their views on the force balance issue from both U.S. and Soviet perspectives. The first workshop, sponsored by GAO on April 12, 1988, addressed experts' views of the U.S. perspective of the balance. The second workshop, sponsored by the Office of Technology Assessment (OTA) on April 22, 1988, addressed experts' views of the Soviet perspective of the balance.

As Chairman of the Study Group, the Comptroller General directed the overall effort resulting in this report and participated in the selection of workshop participants, research topics, and the general framework for the discussions. The views and opinions in this report and the supplements reflect those expressed by the participants during the workshops and in their papers written in support of specified force balance topics. These views and opinions, therefore, do not necessarily represent those of GAO or other participating offices.

¹Public Law 100-180, Section 1212, December 4, 1987.

Following the workshops, copies of the report drafts were sent to the respective participants for comments. Participants were also given the opportunity to revise their papers based on the workshops discussions.

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**SECURITY AND STABILITY IN CONVENTIONAL FORCES:
DIFFERING PERCEPTIONS OF THE BALANCE**

by
Leonard Sullivan, Jr. et al

SECURITY AND STABILITY IN CONVENTIONAL FORCES:
DIFFERING PERCEPTIONS OF THE BALANCE

(excerpted from a draft Occasional Paper
for the Atlantic Council of the United States)

In the fall of 1987, the Atlantic Council of the United States commissioned a paper to deal with reasons for, and implications of, various perceptions of the balance of conventional forces. A consultation draft, some 90 pages long, was prepared by the end of the year. Consultations were then held in London, Paris, Bonn, Munich, Rome, and Brussels in February of this year. The gist of the very extensive comments has been woven into a draft which will shortly go for preliminary publication.

For the purpose of the Workshop Discussion by the Comptroller General's Conventional Defense Study Group, drafts of the two final chapters have been accelerated and are provided here with the table of contents. The summary and conclusions are presented in Chapter VIII, and the resulting implications for arms control negotiations in Chapter IX. Together these adequately represent the essence of the work. The full and final draft can be made available later if the Study Group so desires.

The Atlantic Council has begun a series of annual meetings with a cross-section of Soviet officials. This paper is intended to be among those discussed later this year in Moscow. It is our hope that it will evoke lively and constructive dialogue, and result in a revised version including Soviet views.

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VIII. SUMMARY AND CONCLUSIONS- The Strategic Context

This paper suggests that, even with a fixed set of nations and forces, there is no single "balance" of conventional forces--only differing perceptions of such a balance, particularly among and between two culturally diverse superpower alliances with distinctly different historical biases. The paper also suggests that the attainment of such a theoretical balance would have little meaning, and possibly little lasting deterrent value. Instead, the best that can be sought is a stable equilibrium at each level of confrontation, involving force levels, compositions, and postures that: (a) eliminate the potential for surprise attack; (b) have little, if any, "invasion capability"; and (c) are affordable to the collective participants. A high degree of stability should reduce the likelihood that a major conventional war would be started or could be successfully fought in Europe. Nevertheless, the defender must retain the capability to contain any conventional conflicts which may arise and to repel the aggressor without sustaining unacceptable losses (either locally, regionally, or worldwide).

These differing and uncertain perceptions--and objectives--greatly complicate efforts to achieve coordinated, consistent, and efficient treatment of related policy problems such as: levels of defense spending, arms control negotiations, force modernization, mobilization planning, strategic planning, alliance burden-sharing, and more. In fact, these varying assessment purposes themselves tend to color the relevant perception.

Alliance conventional and theater nuclear forces may confront each other at both operational and tactical levels--not just "strategically" as in the case of the superpowers' central nuclear weapon systems. Yet it seems unwise at best to focus on the existing force relationships in only one region when there are multiple alliances and two competing superpowers with worldwide forces, worldwide interests, and potential worldwide allies and client states. Both sides perceive significant threats not directly involving the other that require the maintenance of significant--and different--conventional forces. In fact each side does have other legitimate security needs. For instance, the U.S. has a continuing need for forces related to the Caribbean and Latin America, and the Soviet Union has a continuing requirement to station forces facing Asia and South Asia.

Nevertheless, the vast bulk of the world's conventional ground and air forces confront each other in the relatively small area of Central Europe. Nowhere in the world is the achievement of a fully stable equilibrium more important. Despite this concentration of forces, the ability to achieve a meaningful, lasting, and beneficial "victory" through the use of conventional

military force in the European context seems to be increasingly in question, and the consequence of an ambiguous military outcome seem less than attractive. The existence of uncertainty in the military outcome would appear to greatly diminish the dubious rewards of adventurism. This alone may make conventional arms reduction efforts more fruitful.

Furthermore, if a conventional conflict does not escalate to the use of nuclear weapons, it is almost certain to have a less than conclusive ending. There will be no more conventional "wars to end all wars" (WWI) and neither superpower alliance has sufficient conventional forces to ever assure "unconditional surrender" again (WWII). The costs and benefits from "horizontal escalation" (to other theaters) must also be considered. Conversely, the war that decides the fate of Europe will not necessarily begin (or end) in Europe. It makes far better sense to wage the war from Europe elsewhere--with the goal of capturing the prize with its social structure and economy intact!

Equally serious in the realm of conventional weapons is the potential for slipping inadvertently into some initially limited conflict, which then grows out of control. This is clearly more likely to occur through the clash of client/proxy forces elsewhere in the world, or via competitive intervention in some remote location. The Iran/Iraq war, coupled with the "militarization" of the Persian Gulf, is clearly the highest risk scenario at the moment. Others are possible virtually anywhere in the world where superpower forces are used to patrol or to influence Third World events. Increasingly capable forces of both alliances need to exercise particular care in this regard. Nevertheless, the forces which could trigger the conflict--irrational as it may seem to outsiders either at the time or in retrospect--may well not be part of the balance or equilibrium calculations!

Consistent with these vast uncertainties in the overall conventional balance, and in the "stability" of adjacent conventional forces, it is clear that some nuclear weapons will remain indefinitely to underscore deterrence. Most Europeans are still convinced that the nuclear deterrent has worked and remains credible. In fact, it is that still intact nuclear umbrella which, to them, makes conventional force reductions even "thinkable." Deep cuts in nuclear forces would require greater, not less, confidence in the capabilities, survivability, reliability and controllability of remaining forces. Reductions would also enhance the risks associated with changing the conventional posture, particularly during the transition phase. These uncertainties are likely to help perpetuate the retention of some central--and regional--nuclear weapons, even though it is becoming increasingly difficult to define a clear and credible role for them in a strategically stable superpower relationship.

The Role of Assessments

In the next several years, both the difficulty of narrowing differences in perceptions of conventional military relationships and the consequences of such differences seem likely to grow. In the contemplated "less nuclear world", it will be more important to be sure of one's assessment; the nuclear-conditioned tolerance for relatively large residual uncertainties--even about what forces exist--may well diminish. The quest for a single analytical answer concerning a regional balance seems inappropriate. More realistic roles for such analyses may be to help:

- a. illuminate the extent of the uncertainties, the preferred scope of included forces and the primary contributors to misperceptions;
- b. define the marginal benefits associated with various contemplated changes in military posture--hopefully from a face-to-face standpoint and not simply side-by-side;
- c. highlight the major contributors to "invasion capability" and assess the value of various arms control proposals;
- d. identify the major sources and remedies for local and regional instabilities;
- e. explore the conditions required for developing and maintaining a more "stable equilibrium" of forces; and
- f. help inform and thereby generate responsible public opinion --which is essential to constructive Western security efforts.

Current NATO assessments of the force balance, with their various origins and different purposes, and need for universal internal political acceptability, do not meet any of these more objective criteria. Serious assessments appear to be getting underway in NATO, and it is evident that our major allies must be accepted as full partners in these analyses. Somewhere, somehow, the West needs to greatly improve its methods and depoliticize the results of its assessments. These assessments need to include regional and local estimates of stability and identify dissenting opinions rather than seek the lowest common denominator. In considering the major factors that cause balance assessments to differ, it may be helpful to consider how assessments for different purposes--defense capability or stability--will, of necessity, focus on different factors.

What to Count

Counting uniformed personnel is simply not indicative of conventional arms firepower potential. First line forces no longer equip their men: they man their equipment. Surviving equipment

is more likely to determine the progress and outcome of battles. No single set of equal numerical counts can reflect a lasting parity, nor develop significant symmetry between the opposing forces. For stability assessments it may be sufficient to measure only military equipment with a substantial "invasion capability" into the opponent's territory. In Europe, this will surely involve side-by-side comparisons of tanks, mobile artillery, rockets, and long-range missiles, and possibly infantry fighting vehicles, fixed and rotary wing attack aircraft, and airmobile divisions and their lift. It may also be sufficient to count only equipments that can be committed to combat within some relatively short period--say, 10 to 30 days--including forward-stored equipments whose operators can "marry up" with them quickly. Rapidly mobilizable reserves and forces capable of rapid deployment from outside the control area would also be included. More important for local and regional assessments, all of these "counts" must be placed into the context of their relevant operating units, doctrine, "space" and terrain.

For assessing the defender's capability to defeat aggression, these counts must be compared with their face-to-face counterparts, thus also covering the gamut of defensive equipments--and installations. Equipments and formations with both offensive and defensive capabilities are likely to be categorized as aggressive by arms negotiators, thereby possibly limiting defensive potential. The thesis in the nuclear domain that outlawing defenses would make nuclear war less likely does not spill over into the conventional domain. In fact conventional arms control efforts must clearly provide incentives for improving non-threatening defenses (i.e., denial systems) and for being able to mobilize additional defensive forces as a safeguard for compliance.

For net assessments of capability, the entire range of reserve forces and war reserve stocks must be considered, plus the ability to draw existing assets from the civil sector and add new assets from a converted industrial base. Force sustainability, maintainability, interoperability and reconstitutability are key to deterring--or defeating--a non-escalatory conventional war. So are personnel proficiency, command and control effectiveness, trainability, and combat replacement techniques. None of these are likely to be featured in the arms control process.

Equipments and other valuable assets counted in negotiations will certainly be assumed to be fully upgraded and efficiently operated. Soviet negotiators would be unlikely to accept, for instance, that the West would not fully upgrade its M60 tanks, nor have the ability to communicate between adjacent Allied forces. The West is equally unlikely to accept that the Soviets would to go war without enough ammunition to fight indefinitely, or without the full cooperation of their Warsaw Pact allies. In fact, self-induced weaknesses (such as inadequate sustainability) lead to instabilities which cannot readily be resolved through negotiations.

Finally, special attention needs to be paid to the ambiguities and limited credibility implicit in "dual-capable" aircraft (nuclear weapon) delivery systems. In most cases these systems really contribute little to defense or denial when considered face-to-face with their nuclear counterparts. The longer ranges ones are primarily "punishment" systems with intended political (if not military) links to the superpower central nuclear systems--whose applicability and punishment value also needs to be assessed from a face-to-face (rather than unilateral) standpoint. Clearly, these longer range dual-capable systems are a major focus of Soviet negotiation. This may prove awkward to NATO commanders who have for years placed high priority on tactical aircraft in a purely conventional role to counterbalance Soviet "invasion capabilities."

How to Weigh What Is Counted

In judging conventional forces, acknowledging quantity but not quality would be thoroughly unrealistic. Many experienced observers doubt that quality considerations can be included in negotiations at all, directly or by proxy. We agree with West German analysts (and possibly the Soviets themselves) that developing some method for weighing forces and capabilities may be one of the most critical aspects for assessments whether for war planning, budget development, arms negotiations, or technology trade-offs. It applies not only to the military hardware but to the "software" implicit in the personnel that operate it. These weighting factors could be the most contentious aspect of assessing defense capabilities within a single government, across an alliance, or between two basically untrusting superpower blocs. Most qualitative factors involve not just facts but judgments which depend on many intangible cultural/psychological factors. Nevertheless, assessors will be forced to judge the relative worth of, say, an ancient Polish T54 tank relative to brand new British Tornado aircraft. In fact, the Soviets have proposed to trade off their tanks against our aircraft at a ratio between 20:1 and 40:1. What should that ratio be?

Quantity/quality relationships also depend considerably on the skill with which forces are employed, both tactically and strategically. How much better, if any, are Western pilots, sailors, and soldiers than those of the opposing alliance?

There is no accepted methodology within NATO for applying such weighting systems. For forthcoming conventional arms talks, a major international effort would be useful to in some way catalogue the major weapon systems by their quality (at least, say, categories A, B, and C for new, mature, or obsolete), and by their operators (at least, say, by primary and secondary military powers). A "six-bin value system" (such as just mentioned) would be much better than a simple count of several disparate weapon classes.

Whose Forces to Count--and What Portion of Them

When making capability assessments each alliance will want to take into account all of the other's conventional forces and assume that those forces will be used in the most threatening way. Strategic and tactical lift for redeploying forces is an essential part of that assessment as forces that can be redeployed rapidly pose additional problems. Naval forces also present a complex problem because their relative speed and freedom of movement give them the capability to project power ashore in various places as well as the ability to attack or defend the sea lines of communication. Both sides' long-range air forces, as well as some rail or road mobile forces, will surely obfuscate the conventional balance--and the confines of any regional assessment.

For arms control purposes, it will doubtless be necessary to focus on some geographic region and assess the balance of offensive conventional force there under some acceptable set of criteria. Long-range forces (such as bombers) and fully mobile forces (navies) cannot be ignored, but the central focus should be on those in-place forces that could initiate the conflict, invade and seize territory and people. This in turn requires special attention to the issues of "force-to-space" relationships which in many circumstances will be more important than the regional or local "force balance." These considerations may well place a lower limit on achievable force reductions and thereby increase the emphasis on limiting the force levels to be stationed in other countries. This would be consistent with the basic objective of lowering the potential for starting a war--not just waging and terminating it.

Both superpowers have allies, friends, and "client states" with military forces and other valuable assets (e.g., bases and overflight rights) that must be included in any thorough assessment. While some analysts argue that some forces are unreliable and unlikely to fight, or fight well, no forces committed to either alliance should be ignored. The forces of third parties--states belonging to neither alliance--may also acquire considerable significance. For capability assessments these other states must be considered. For stability assessments, they will almost certainly be excluded from official "counts" and weightings, but their existence as well as their influence on both stability and our perceptions cannot--and should not--be ignored.

Achieving Greater Conventional Force Stability

Of most immediate interest, of course, is the new focus on the overall "Force Stability Talks" covering the general region "from the Atlantic to the Urals." The expansion of the Eurasian region of interest beyond that of the previous MBFR talks may present some added difficulties. Nevertheless, the Alliance has begun to discuss differing perceptions of conventional force relationships with an intensity and seriousness not seen since its earliest years

--and a great deal more discussion will necessarily precede successful negotiations with the Warsaw Pact. Weapons reductions alone, whatever the forces involved, will not necessarily lead to a more stable or secure East-West strategic relationship. Weapons remain the symptoms, not the cause, of superpower tensions and international rivalries. While changes in forces and postures can diminish certain military risks, they cannot per se end the threat of nuclear warfare, make up for inferior conventional forces, or compensate for poor crisis management. Nor can arms reductions eliminate continuing conflicts of values, interests, and policies around the world. As General Secretary Gorbachev has repeatedly noted, the Warsaw Pact and NATO continue to have "opposed social systems." Nevertheless, based on the evident desire to lower the level of hostility and the increased flexibility which have characterized the INF agreements, it no longer seems implausible to consider substantial changes in East/West conventional forces.

Force Levels

A credible balance of forces conducive to both security and stability can be achieved at widely varying levels of forces--and hence funding. The question of balance should not be divorced from questions of the level--both of forces and of resources--at which that balance is sought. It would be an important addition to current concepts of stability and security to seek a military balance at a stable and affordable level of resource investment. To the extent that either side threatens the other's ability to meet its defense needs, there will be renewed pressure to restore military-strategic balance through major weapons innovations or other forms of strategic-technical surprise. As a practical matter, resource constraints make it ever more important to meet our needs for security and stability through a careful combination of investment, operational effectiveness, and negotiation.

Force Posture

In any premeditated invasion, minimizing the defender's knowledge and preparedness greatly enhances the probability of success. Achievement of tactical surprise may be so destabilizing that limiting the aggressor's capability for secretive offensive build-up may be essential. Limiting the aggressor's evident military superiority at the outset puts in question his ability to achieve more than limited objectives. Denying surprise aggression and raising uncertainty of both the level and consequences of success appear to be valid routes to deterring any major conventional conflict.

It may be as important--and as feasible--to regulate the relative postures of forces on the two sides as to try to limit or "equalize" their numbers. These steps could include (a) the defining and disbanding of major units with an unambiguous "invasion capability"; (b) the relocation of any remaining

"offensively configured" forces further from common borders-- particularly where "force-to-space ratios are perceived to be particularly unfavorable to the defender; (c) the partial separation of those forces from their primary equipments and sustainment; (d) the deactivation of key elements or command components; (e) the greater reliance on reserve units and use of evidently under-strength active forces; (f) the limiting of modernization and upgrading of forward-deployed, "offensively configured" forces; (g) eliminating the mobility of the tactical C3I structure; (h) rear-basing of non-host nation reinforcements and their equipments; and (i) using of verification-enhancement techniques to assure unambiguous surveillance of these postures.

IX. IMPLICATIONS FOR NEGOTIATIONS

This report paints a picture of complexities and uncertainties that cannot help but cast doubts on the ability of both alliances to reliably assess the capabilities of opposing conventional forces or to efficiently begin the arduous process of reducing their awesome size, their threatening posture, and their enormous direct and indirect costs. Such is not the intent. To the contrary, it may suggest the need for bolder and more creative approaches. Traditional formal negotiations which tend to be rigid and very protracted are not the only route to a less dangerous world, and tentative and initial steps need not be irreversible if the climate changes or hopes disappear. This final chapter, then, introduces the possibility of alternatives to the usual negotiations and hedges against mistaken initiatives. They are the unpredicted consequences of the conclusions reached in the body of the report.

Confidence-Building Measures

The negotiations in Stockholm at the Conference on Security and Cooperation in Europe have for some years dealt with measures to build confidence that surprise attack is a low-order possibility, that differing perceptions of various military events are minimized, and that accidents can be contained. Potential differences in views of the same "facts", of the various aspects of quality, or even of the meaning of certain common terminology also justify extensive dialogue and consultations both within and between the superpower alliances to eliminate needless sources of instabilities. Confidence-building measures (CBM) deserve prominence in coming efforts to negotiate in the Atlantic-to-the-Urals framework--in parallel if not as precursors.

Perhaps the most important issue in creating a more stable equilibrium between opposing conventional forces is the need for both sides to be able to confidently manage and control time during a rising crisis. This would be a major objective of force reconfiguring, reposturing and redeployment. Whether this is a subject for stability talks or CBM talks--or both--makes little difference. Both sides need to be assured of the opportunity to

correctly interpret both political and tactical warning signs. There must be sufficient time to consult objectively with allies, to deliberately plan response, and to demonstrate political will and alliance solidarity. The possibility of preemption is clearly destabilizing and tends to generate forces in a spring-loaded, trigger-happy and accident-prone posture. If both sides can convincingly eliminate the in-place ability to invade the other, then assuring that time is available for prudent defensive reactions will breed both confidence and stability.

The Role of Conventional Arms Negotiations

The current relations between the superpowers and among the members of each alliance present a climate in which substantial changes in conventional force levels and or posture can be plausibly contemplated. There are substantial economic, political, and demographic pressures within both alliances to make substantive long-range changes. In fact, the question may not be so much whether to make them but how to make them. The prospect of bargaining for each other's conventional military cutbacks is, to say the least, interesting. In this regard, what has become the traditional "negotiating route" may not actually offer the most productive approach. Negotiations in the past have stretched out interminably, with endless bickering over superfluous statistics. Prompt, crisp, and coherent decisions by multinational organizations are virtually impossible. Imagine seeking agreement on various aspects of force quality--or even force posture! In-progress negotiations can too easily be used to postpone or avoid badly needed national and alliance force changes.

Negotiations often bring an aura of legalism and mistrust that can be easily misinterpreted across the superpower and alliance cultural separations. For some there develops a strong (macho?) challenge to "win big in court." Negotiated settlements also bring a connotation of contractual finality which may be totally inappropriate in a politically and technologically shifting world. Some well-intentioned actions could turn out to be virtually irreversible even if subsequent developments warranted reversion. The risk of European over-reaction and "psychological disarmament" also cannot be overlooked. Moreover, agreements made in good faith can become outdated and generate convoluted and politically and technically expensive devices for circumvention. Dramatic steps in reaction to real or perceived breaches of agreements can in themselves be destabilizing both within and between countries and alliances.

For the purposes of arms control negotiations, the assessment--and reconfiguration--of conventional forces may have to be limited and simplified well beyond the point of oversimplification. Many of the considerations implicit in assessing--and preserving--one's own defense capability are simply not conducive to negotiation. The "gut issues" are more basic, and will require substantial understanding--and tolerance--of each other's

perceptions. These issues include the needs to: discriminate between basically offensive and basically defensive postures; reduce the readiness, proximity, and "surprise potential" of forces clearly perceived by either side to constitute a credible "invasion capability"; use some simple measure for estimating the varying quality of conventional arms--and their owners; accept cuts which cannot conceivably be numerically equal, symmetrical in types, or involve only one or two weapon types; and constrain modernization through verifiable production limits. By the same token the notion that absolute security must be strengthened at the same time that stability is improved may well prove unrealistic.

Finally, successful conventional arms control negotiations directed at enhancing stability and lowering the chances of accidental conflict will not, per se, guarantee and adequate deterrent capability. These measures do not assure the ability to successfully prosecute and terminate a war. Negotiated terms may actually introduce some unwanted rigidities and reduce some desired ambiguities. They certainly do not guarantee that the resulting military posture is achieved at an economically sustainable level of resources. The notion that both stability and security are weakened at inherently unaffordable spending levels is a relatively new and untested hypothesis. Furthermore, negotiations will not be made any easier if the underlying purposes of the two sides are also asymmetric--such as NATO seeking lower defense costs while the Pact seeks to "de-nuclearize" Europe.

Alternatives to Negotiations

If the "negotiations route" appears to be too long, too legalistic, and too irreversible, what are the alternatives in achieving a more stable and affordable conventional force posture? The answer appears to lie in the pursuit of "reciprocal unilateral" actions in which one side takes a tentative, reversible step in the expectation that the other side will make some equivalently relevant step within some reasonable time. The process is repeated as long as both sides find it beneficial. At some later time, the new positions might be codified and made irreversible through more formal post facto agreement.

The practicality of such unilateral alternatives depends on several considerations. First, there needs to be objective convergence of intentions to draw down, not build up, the proximate warfighting potential on both sides. This opportunity may be reinforced by the fact that the leading force elements contributing to the currently perceived instabilities belong to the superpowers themselves and are stationed outside their own countries. Second, the moves must be undertaken in an atmosphere of security, self-confidence and understanding of each other's perceptions. The covert pursuit of unilateral advantage would rapidly doom this approach. Third, the current balance and stability must be seen as sufficiently robust so that the chances of premeditated or accidental conflict in the

foreseeable future are remote or vanishingly small. Fourth, the changes in posture should be accomplishable without jeopardizing the security and political stability of any particular nation of either alliance. Fifth, the need for cooperative verification needs to be accepted and implemented without reservation. The encouraging Reykjavik and INF experiences suggest that these conditions could conceivably be met.

There are, however, more difficult conditions which may lack nobility but not realism. American forces forward deployed in Western Europe are widely accepted by Europeans as guaranteeing the linkage to US central nuclear systems, thus obviating NATO's need for a robust indigenous conventional denial capability. Any changes in American force posture (325,000 military, 110,000 civilians, and 321,000 dependents!) might be seen as weakening that perceived linkage and could presumably reduce the present political stability of the Western alliance--even though the ultimate objective is to reduce the perceived Soviet "invasion capability." On the other hand, the presence of Soviet forces in Eastern Europe is also largely perceived as guaranteeing the present stability of the Warsaw Pact. Nevertheless, both superpowers can almost certainly make substantial changes in forward deployed force levels and posture without destroying their alliances--and might in fact strengthen the long-term resilience of their alliances in the process.

Assuming that these preconditions can be met and maintained, then any number of sequential moves could be made to test the sincerity of the superpowers in enhancing conventional stability. The U.S. could "dual base" some of its F-111 squadrons back to the U.S. and temporarily reduce their state of readiness for redeployment. The Soviets could then disband some of their invasion-oriented OMs, and/or retire a substantial number of tanks to some low-readiness, clearly photogenic tank park. Some forward deployed units on both sides might then have key components reduced to cadre or reserve status and their equipment stored under surveillance, say, by neutral countries. Some "invasion-capable" units might then be redeployed further from the common borders. And so on. Each step would be clearly understood to be "visibly reversible," and each step would be reciprocated according to some agreed and independently monitored schedule. Improved verification and CBMs could proceed apace. Such an approach may not be very ritualistic, but it might accomplish its aims.

Inevitability of Uncertainty, Hedges Against Error

Whether or not any conventional force reductions are made, and whether or not they are negotiated or reciprocated moves, the ability to judge the adequacy, sufficiency, or stability of a given local or regional conventional force posture will be limited at best and may become even more so. Such a perceived equilibrium, even if now perfect, can be substantially weakened if a significant period of warning time is exercised by either or both sides

allowing military/industrial mobilization. High-confidence assessments also become more difficult the longer we remain at peace, the more all forces are composed of unproven equipment, and the less all military leaders have demonstrated their capacity for strategic thinking, command of large engaged forces, or combat leadership. In general, common perceptions of uncertainty may be stabilizing even though differing perceptions of both economic, political and military strength can be destabilizing.

The military balance is influenced to some degree by present and shifting political and ideological considerations, and to a greater degree by the strength, versatility, and dynamism of the civil sector. Still more complications will follow from emerging technologies for more vigorous military use of space and for certain so-called "force multiplier" purposes. Chemical warfare capabilities--and the speed with which these can be regenerated even after a negotiated ban--likewise pose enduring problems for perceptions of conventional force relationships.

The possibility of sustained conventional combat concluded without resort to nuclear weapons drastically alters the perspective within which such issues must be addressed, whether our allies wish to face it or not. For instance, more diverse and less tangible aspects of overall national wealth and power can come into play in the absence of early and extensive use of nuclear weapons.

Safeguarding Uncertainty

Restructuring, reorienting, and/or gradually reducing conventional force levels presents some inevitable risks both during the transition and possibly in the resulting configuration. Stability and security are not synonymous. Furthermore, there are valid arguments that it is impossible to achieve a conventional deterrent that would match the robustness of good, old fashioned nuclear dominance. Unfortunately, the Europeans--and many Americans--fail to acknowledge that perfect nuclear stability will also eliminate central nuclear weapons as a credible guarantor of conventional insufficiencies. The conventional-nuclear linkage is simply no longer related to how many Americans and their dependents are held vulnerable in Europe. American casualties suffered through our own tolerance of European negligence of their own security simple will not justify the ultimate reciprocal holocaust.

Instead, changes and reductions in the Western conventional posture in the European region should be accompanied by a set of hedges specifically designed to offset potential errors in both assessments of and perceptions of conventional equilibrium. Such hedges might seek to assure that:

- a. the chances of being dragged accidentally into a major conventional conflict are reduced to the full extent possible:

- by fully supporting and expanding Confidence Building Measures, perhaps as a prerequisite to further conventional force drawdowns; and
 - by resisting the temptation to "chase sides" unnecessarily in the awkward political maturation process of developing nations.
- b. valuable political and "ambiguous" warning time is exploited:
- by devising streamlined procedures for initiating graduated political, industrial and military reactions to uncertain indicators, including limited call-ups for key mobilization personnel;
 - by developing enhanced "real-time" surveillance systems to monitor increased tactical and operational "invasion capability" in marginally stable areas of the front; and
 - by improving the sharing of needed intelligence information on a regular basis with our most vulnerable allies.
- c. substantial victory in a conventional war cannot be assumed:
- by shifting the focus of conventional defense expenditures to enhanced non-provocative defensive capabilities; and
 - by conferring special emphasis on defeating the initial invasion.
- d. the threat of defeat does not require premature escalation to nuclear weapons:
- by designing innovative initial defense efforts that exploit unfavorable "force-to-space" ratios and do not needlessly consume primary counterattack forces;
 - by assuring adequate on-hand conventional war-fighting sustainability (munitions and spares) and, whenever possible, common logistics for committed forces; and
 - by assuring Alliance-wide survivable command and control capabilities.
- e. the capacity to rapidly improve national military posture is preserved and enhanced:
- by enlarging, modernizing, and improving the training of reserve forces;

- by expanding war reserve stocks and by retaining withdrawn equipment for possible force reconstitution;
 - by outlawing completely the use of chemical and biological weapons;
 - by establishing a robust modern national military and industrial mobilization capability throughout the Alliance; and
 - by thorough planning to make maximum use of existing civil assets that can be rapidly adapted to military use (including such valuable functions as delay, deception, confusion, decoys, etc.).
- f. other threats to the vital national interests of the superpowers and their allies can be approached on a cooperative rather than competitive basis
- g. Western exercise of political and economic freedoms cannot be misconstrued as disunity inviting aggression or intimidation:
- by greater superpower dialogue both within and between alliances; and
 - by encouraging cooperation, unity and independent policy development through support of voluntary regional political and economic organizations.

Such hedges, and others along the same lines, over time should be able to assure a sound and stable equilibrium which could be maintained at decreasing force levels--and expense--for both sides. The marginal resources freed up thereby can be used to good advantage to enhance the world's economic security and future prosperity.

READINESS AND PERSONNEL QUALITY

by
Charles Robert Roll, Jr.

PREFACE

A draft of this paper was prepared for discussion at a workshop held by the Conventional Defense Study Group on April 12, 1988. The paper has been revised to reflect the discussion and comments made at the workshop.

The views expressed in this paper are those of the author. They do not reflect the views of the RAND Corporation or its research sponsors.

I. INTRODUCTION

The purpose of this paper is to address, from a methodological point of view, the issue of personnel quality and how such quality relates to the "readiness" of our military forces. This endeavor is intended to support a workshop discussion of net assessments of the conventional balance in Europe.

I first turn to the fact that the public debate over readiness has been confused with the notion of military capability, a broader measurement question. I define readiness, as most analysts do, as a much narrower point probability. A unit is more or less "ready" depending upon how well it can carry out its initial assigned tasks with little or no notice. Relative to what is expected or required of a unit, large or small, what percentage of that expectation can it perform. In other words, the old question often posed, "Ready to do what?", is asked again, but is limited to initial assignments and has no sustainability considerations attached. Focusing on personnel, but indicating that the situation is much more complex--tradeoffs are available that can substitute for high personnel readiness--is a somewhat unsatisfying partial equilibrium approach, therefore. However, it appears useful in this context.

The notion I stress in evaluating the effects of personnel quality on relative degrees of readiness is one of measuring, as best we can, how various activities and personnel characteristics enhance personnel productivity. How is labor more productive, or how does labor become more productive? In raising these questions I essentially focus on human capital and its formation with the characteristics brought to military service and the training received in formal training and on the job. In considering these attributes I emphasize the implications of high flow conscript forces as compared to low flow volunteer forces for producing active duty effective labor units. Low flow volunteer forces have high experience mixes and high quality inputs. Such forces are more productive per man. I also raise the implications of such different structures for the reserve forces. A high flow environment is more conducive to building effective reserve forces. In this context I also raise the notion that one needs to evaluate reserve forces in a manner different from the active forces. What needs to be evaluated in the reserve context is the "planned" readiness level of a unit when it is to be deployed, not on the little or no notice measures applied to active duty units. Indeed, with long warning times, the whole question of readiness measurement tends to become this planning issue.

II. FRAMEWORK

Before proceeding to the discussion of the relevant factors that must be considered in assessing the implications of personnel quality for readiness, the frame of reference for such a discussion needs to be constructed. Specifically, there has always been significant confusion over exactly what readiness means. Indeed, most of the popular discussion of "readiness" levels of our military forces is actually more focused on capabilities. For the purposes of this paper the term "readiness" is to be understood in the context of the "four pillars" used by Department of Defense. That is, defense capabilities are produced by the interaction of four major components: (1) force structure, (2) modernization, (3) readiness, and (4) sustainability.

Force structure is the quantity of our forces. Modernization usually refers to the technological "quality" of those forces. Readiness usually refers to what can be done by military forces prior to the outbreak of hostilities at a given point in time. It is akin to measuring an instantaneous point probability, that is, measurement of what can be achieved relative to some ideal or expected capability. Finally, sustainability refers to how our forces can produce capability over time.¹ One can see in this formulation, therefore, that "readiness" can be traded for, say, "force structure," without (necessarily) reducing overall military capability. For example, one might argue that a single unit at 100 percent "readiness" is equal in capability to two units at 50 percent "readiness."

The Department of Defense goes further breaking down readiness. Readiness is defined as having two components: materiel readiness and personnel readiness.² Materiel readiness includes the quality and condition of materiel on hand at the beginning of combat. Personnel readiness includes "personnel inventories, which are assessed using both quantity and quality measures."³ On the quantity axis these data are comprised of items like "personnel fill," for example. Personnel fill is the number of personnel assigned to a unit relative to those "required" in the unit. On the quality axis items included would be those complementary

¹These items are discussed by Deputy Secretary of Defense Taft in "Hearings before the SASC," 1987. His testimony is probably the best available discussion of the four pillars and the relation of readiness to military capability.

²"Hearings before the SASC," 1987. Statement by Deputy Secretary Taft.

³Ibid., p. 663.

measures such as recruit quality (measured by test scores and educational attainment) and experience levels. The other item associated with personnel readiness consists of various measures of the amounts of unit or collective training accomplished. For example, such measures have typically included flying hours, steaming days, vehicle miles driven, etc. In sum, the Department defines readiness as only one of the items that produces overall military capability.

A more complex version of the above definition is the one used in the following pages, although the formulation of this approach is entirely consistent with the one used by the Defense Department. In this approach military capability is viewed as a function of the "four pillars," but the pillars themselves are decomposed and defined somewhat more precisely.

The Defense Department's general formulation is one which takes force structure as a level of inputs, modernization as the quality of its capital inputs, and readiness as the ability to get off the dime at a particular time. Sustainability is the capacity to maintain output over time. In this structure, what is not considered explicitly is the effect of personnel attributes on the level of manpower inputs. In particular, it is not only collective training that produces effective units, but the amount of "effective" labor that is available as an intermediate input into all the processes that produce military capability. In addition, exercises, unit training, collective training are all pointed at enhancing the way all military units interact to produce capability. These activities have multiple products which include testing and refining organizational structures, testing methods and suggesting alternative ways of carrying out missions, training and testing personnel, and testing equipment. All of these items involve some aspect of adding to the capabilities of the force, most acting through the labor side of the equation, and all associated with increasing the effective labor input to the force structure and its ability to carry out its assigned missions. This, I think, is the key to analyzing readiness. One must consider the fundamental fact that actions that enhance labor inputs increase readiness. The size of a personnel structure can differ significantly from its quantity of effective labor. In the next sections I take the question of measurement of effective labor as the essential point in assessing the effects of personnel quality on readiness and its resultant consequences for any net assessment of the conventional balance. In particular, the discussion focuses on the attributes of personnel (including its embedded "human capital") as an assessment tool.

III. PERSONNEL QUALITY AND READINESS

With a focus on "effective" labor, there are various ways in which one can explore systematically the effects of personnel quality on readiness. The following pages lay out one way to approach the subject. All discussion is related to the U.S. enlisted force except where explicit mention is made of other segments of the force structure.

The simple arithmetic behind the notion of "available manpower" is probably one of the most important items to tackle in any assessment of readiness. How many manpower inputs are available out of a given force structure? Here there is a fundamental difference on the active duty side between high flow conscript forces and low flow forces supported by the All-Volunteer Force (AVF) concept. Indeed, the comparison between U.S. and Soviet forces is one of the most startling on this very point. As Senator Levin has noted, conscript troops are introduced into Soviet units for basic training purposes twice yearly. This implies that at such times fully 25 percent of the personnel in Soviet ground forces in Eastern Europe could be considered completely untrained.⁴ In contrast, all U.S. forces in Europe have undergone (at least) basic training before assignment to Europe.⁵ A review of available manpower would note this factor, but would also consider other aspects of availability.

The important determinants of available manpower are the flow characteristics of the force structure supported by the force's personnel policies. A high turnover force, one with low retention and consequent high accession requirements to maintain a force of a given size, will have many more of its people "in the pipeline." That is, the higher the turnover the higher will be the percentage of the active duty force that is, for example, processing in or out, moving to fill an assignment recently vacated, or in some form of individual training. Such high turnover characteristics are generally associated with a conscript force. Thus, U.S. sustainment of the AVF implies more available labor per person employed on active duty. A well-managed AVF is much more efficient per person. There are fewer people in the pipeline, and fewer people in individual training.

A second element of the degree of turnover that is more subtle and generally not measured at all in the net assessment game where quantitative models are employed is that, in active duty forces, other things equal, lower turnover implies high experience levels--high turnover implies low experience levels. The relationship

⁴Levin, p. 24.

⁵Ibid.

between experience and job performance on an individual or unit basis is not yet at a stage where we can say with confidence what the precise relations are numerically.⁶ We can say, however, that for most occupations with a technical content an individual's job performance tends to increase with experience with, of course, the fastest learning going on in the first few years on the job.⁷ Since the military services have required increased numbers of maintenance and other technicians over time, the experience mix of the force has taken on added significance. In particular, an assessment of readiness must take this aspect of personnel quality into account. Indeed, an experienced force has more "productive" labor per available person in most occupations than does an inexperienced force. Of course, higher experience levels in low skilled occupations probably lose any significance after a certain level of experience is reached. Nevertheless, this productive labor has at least two positive effects on readiness. The first relates to the ability to do the job on call. The second, however, relates to what one might call intermediate output. That is, the other axis of readiness, materiel readiness, is influenced (in part) by ongoing peace time activities such as maintenance, whether in the field or in the depot. It is the interaction of productive maintenance labor with the requisite spare parts, test equipment, etc., that leads to high materiel readiness rates on most front line combat equipment like aircraft and tanks. Other intermediate outputs such as command, control and communications activities have also become an increasingly important part of our ability to produce military capability.⁸

As a barometer of these "productive" aspects of active duty enlisted personnel, the Defense Department monitors its accessions for "quality" characteristics. Accession standards are broken down into three categories: mental, medical and moral. The latter two are floors which must be crossed before consideration is given to an individual's enlistment. Mental standards have a floor as well, but experience has shown that people scoring well on the mental tests given before entry do better at completing training. Similarly, people who have graduated from high school tend to have

⁶A summary of the available data can be found in "Setting Personnel Strength Levels: Experience and Productivity in the Military," CBO, 1987.

⁷"Setting Personnel Strength Levels: Experience and Productivity in the Military," CBO, 1987.

⁸See, for example, Epstein's testimony before the SASC Subcommittee on Conventional Forces and Alliance Defense (1988), p. 221. The complexity of interactions among support and combat is stressed in Rich, et. al., 1987.

lower attrition rates than those who have not graduated from high school. In addition, productivity on the job seems to grow faster for those with higher aptitude test scores.⁹ As a consequence, and as a deliberate management tool, the Defense Department attempts to enter onto active duty high school diploma graduates who score well on the mental tests. This strategy is intended to be cost-effective by minimizing losses from training-related and other forms of attrition. In addition, the strategy is intended to provide a situation where new recruits can become productive at rapid rates. This is why, for example, that the Department has rather proudly reported that its accessions in FY87 were 94.7 percent high school graduates and 96.4 percent scored above average on the entry aptitude tests.¹⁰

On the unit or collective training axis, as distinct from measurement of productive inputs, measures of activity rates such as flying hours, steaming days, tank miles driven, rotations through the National Training Center, are all used as proxies to indicate the level and intensity of operations that have, as a major component, training. There is no doubt that U.S. and NATO activity rates are much higher than those of the Warsaw Pact. In addition, these activities are generally agreed to be much more complex than those of the Warsaw Pact.¹¹ These collective activities stress the unit, the interaction of capital equipment, other materiel and personnel in simulating tasks and missions thought to be important in the event of the outbreak of hostilities. Performed well, these activities also have a deterrent value. Performed badly and they provide lessons learned. Fundamentally, such activities enhance the ability of our active duty forces to perform on short notice by building the human capital of the operators and others who must perform well for mission success. How much collective training is enough is still a matter of judgement. Indeed, there is still a good deal of uncertainty surrounding the use of simulators as substitutes for engaging in live exercises. Nevertheless, any net assessment should tote up the relative levels of these sorts of training exercises and analyze their character for both active duty units and reserves because, of some note, the U.S. and its NATO allies includes some reserves in its live training and exercises. For example, some Army Reserve and National Guard units deploy to Europe on various exercises. Simulated air-to-air combat training, called Red Flag in the U.S. Air Force, is also implemented in

⁹See, for example, "Setting Personnel Strength Levels: Experience and Productivity in the Military," CBO, 1987.

¹⁰Annual Report to Congress, Fiscal Year 1989, p. 152.

¹¹See, for example, Levin, p. 26.

Reserve and National Guard Tactical Air Units. These units also compete with active duty units in various "meets" to test proficiency throughout the year.

Aside from the previous paragraph's remarks, our discussion of readiness and personnel quality has focused on active duty enlisted personnel, and officers where involved in collecting training. The reserves pose different analytic problems. First consider the remarks I offered about the implications of a "high" versus "low" flow for productive personnel. The situation may, depending on circumstances, be reversed when assessing productive labor in the reserves.¹² Because an AVF is a low flow, highly experienced force, the pool of individuals with prior military experience available to serve in reserve units is much smaller than the pool produced by a high flow system like many of the European conscript systems. In fact, one can argue that high flow conscript systems produce a good reserve system, but that the active duty forces of such systems are more of a training establishment than a standing set of military forces. I think this is a uniquely Army problem, because, as is well known, the Army is the only branch of the military that increases significantly when mobilization occurs. The Dutch RIM system is an example of using conscript flows to build reserve units that are well trained and immediately able to be called up. The troops serve on active duty together in one unit, and then transition into reserve status in the same unit.

The low flow AVF poses a unique problem, but largely only to the Army, since that is the branch that needs to grow significantly in size as soon as mobilization occurs. It is not necessarily an insurmountable problem, however, but one must look for different indicators of productive labor. In evaluating the readiness of reserve units in an AVF context more emphasis should be placed on individual training for non-prior service reservists and on collective or unit training accomplishment, rather than on personnel fill indicators. For example, I do not think much weight should be given to rank or grade, but rather should be placed on items such as cumulative experience in particular jobs. Educational levels and aptitude scores should also be examined. Civilian occupation match with reserve occupation should be of interest for specialties such as medic. On the training side, increased emphasis should be placed on unit performance in various tests, syllabus completion, unit maneuvers, etc.

One important feature of the reserve personnel readiness spectrum that is not relevant to the active duty forces is deployment schedule. In particular, the later the reserved units is to deploy the less one is interested in its current readiness status, and the more one is interested in evaluating whatever plan exists to get

¹²An excellent survey of the U.S. reserve issues may be found in "Improving the Army Reserves," CBO, 1985.

ready to make the unit ready to deploy. Plans to augment reserve units with active duty personnel, rapid training updates, etc., all would change a current unit's status if the plan were viewed as implementable.

Such thinking can be seen in the context of those studies that have examined the "readiness" of early deploying units. The metric used for such examinations has been the UNITREP system, now somewhat changed and called SORTS (Status of Resources and Training System).¹³ The reason for changing UNITREP was an inherent problem of the UNITREP system, it did not measure readiness for combat, as its C-rating system asserted. Instead, it simply measured equipment and personnel on hand in the unit against its authorized levels. In addition, the commander of the unit was allowed to regrade the unit (up or down) if he or she felt that the unit was better or worse than implied by the count of resources against a table of "authorized." As one can infer, this was simply a checklist system modified by subjective judgement. Various aggregations of these individual unit reports then led to various statements about "combat readiness" that were highly questionable. Probably the worst feature of UNITREP, however, was that the "goal posts" could change suddenly. That is, if "required" resources changed, then the unit suddenly changed status, despite no change in its fundamental character! This absurd situation gradually led to the redefinition of UNITREP as SORTS, a checklist of resources and training that made no inference about combat readiness or capability. In addition, substitutions were allowed against "required" equipment and personnel so that sudden changes in the goal posts could not cause immediate changes in status. But, to return to the issue of Reserve readiness, it seems clear that one could evaluate a plan to achieve a given SORTS rating at the time of deployment rather than giving weight to the SORTS rating in real time as a serious measure of unit readiness.

IV. SUMMARY

The problem with UNITREP, now SORTS, still poses concern for our readiness measurement systems. Recent testimony before the Readiness, Sustainability and Support Subcommittee of the Senate Armed Services Committee all stressed the importance of manpower quality.¹⁴ However, the arguments were largely qualitative. Good measurement systems that can attack the manpower quality issue still need to be developed. General Richards, Deputy CINC of EUCOM, testified as follows: "While the U.S. has made substantial

¹³See "Improving the Army Reserves," CBO, 1985, for an examination of early deploying units and the use of UNITREP.

¹⁴See the statements of Patte, Richards and Stackpole, March 23, 1988.

progress during the past several years in improving the readiness and sustainability of its forces, many have asked why this progress is not always reflected in the various reports generated with the Defense community.... Our current systems are tools for military commanders to manage and monitor the present status of their forces and assess how well subordinate commanders have utilized their resources. Although current systems are useful management tools... they do not lend themselves to historic trend comparisons seeking to portray warfighting capability changes over time.... These limitations with the reporting systems are well recognized within the Defense community, and laudable steps are currently underway to expand and improve the manner in which we assess and report theater readiness and sustainability levels."¹⁵ On the personnel quality dimension I have pointed out the fundamental question of human capital augmentation. Until our measurement systems can ascertain with reasonable precision the relation between various personnel characteristics and military capability we must rely on the empirically demonstrated relations among mental ability, high school graduation and experience on the level of availability and effectiveness of military personnel. It is important to remember that the AVF context we support provides the sustaining environment for a very productive active duty labor force. In the reserve context, or with long warning assumptions, the problem of measurement very much slides to one of evaluating plans to make units "ready."

Finally, General Richards' point mentioned above is a key analytic insight. For measures of "readiness" (and capability) to be useful in a scorecard net assessment they must measure trends over time. For this reason unit free percentages of "readiness" are of little value for one doesn't know if the denominator or the numerator has changed. This argues for an approach that first does a "gross" assessment of capability changes relative to a constant threat, a constant set of requirements, etc. Once this is accomplished one can change the threat, requirements, etc., to undertake the net assessment. This identifies changes in both the numerator and the denominator.

There is no doubt that an evaluation of Soviet and Warsaw Pact personnel would reveal that U.S. and NATO Allied personnel far exceed their adversaries along the quality dimensions listed above. What remains to be done is to integrate these quality dimensions into the required capability assessment.

¹⁵Statement of General Richards, March 23, 1988, pp. 12-14.

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MOBILIZATION AND GEOGRAPHIC LOCATION OF FORCES

by
Jonathan Dean

MOBILIZATION AND GEOGRAPHIC LOCATION OF FORCES

Given a military confrontation as large and as complex as that between NATO and the Warsaw Pact, involving millions of active duty military personnel and hundreds of thousands of weapons systems with mounting firepower, it is unwise to be dogmatic about any aspect of the interaction of the forces of the two alliances in actual conflict. That caveat emphatically applies to the following observations on mobilization and reinforcement.

These comments deal with three different situations:

1. Surprise attack or minimum-preparation attack, with attack by Warsaw Pact forces on M+4;
2. Short-preparation attack, with the Pact attack taking place on M+15, or with major reinforcement of surprise attack by that time;
3. Full mobilization, with the Pact attack taking place on M+30 - M+90.

In the overall Atlantic-to-the-Urals area, NATO appears to have somewhat more men in active duty and organized reserve units than the Warsaw Pact, although NATO figures are swollen by inclusion of forces like Spanish, Portuguese and Turkish forces which might have a role only if combat is extended. At the same time, despite Pact statements to the contrary, the fact of Warsaw Pact numerical preponderance in most major armaments and in organized units seems undeniable.

The central question is whether this Pact numerical preponderance can be converted into effectiveness in combat--in the present case, whether it can be brought to bear in time to be of maximum military value. History is rich in cases where numerical preponderance did not bring victory in battle: One dramatic example is the 1941 invasion of the Soviet Union by Nazi Germany, where the Wehrmacht invading force, equipped with something over 3,000 tanks, was able to penetrate to the gates of Moscow against a Soviet force equipped with at least three times as many tanks (eight times as many, according to some estimates).¹ My own doubts that the Warsaw Pact could convert its numerical superiority into combat effectiveness increased during eight years of almost daily comparison in the MBFR talks of the forces of both alliances.

This paper focusses on mobilization and force generation in Central Europe, the area of greatest force concentration and the key area

¹Lt. Colonel Wolfgang Samuel, concept issue paper, 80-01, January 1980, Doctrine, Deputy Directorate for Long-Range Planning (AF/XOXLD), p.9.

for both alliances in the context of the NATO-Warsaw Pact confrontation.

Attack With Minimum Preparation

From the outset of the NATO-Pact confrontation, surprise attack by the Warsaw Pact on NATO's Central Front has been the main preoccupation of NATO military commanders and political leaders. They have feared an armored blitz attack preceded by air and missile attack on NATO anti-aircraft sites, missile garrisons, airfields, ports and command centers, designed to achieve success before NATO could mobilize or move reinforcements and before NATO political leaders could decide on use of nuclear weapons. Surprise attack is once again referred to as the main danger in the NATO summit communique of early March 1988.

Although they would doubtless object, Pact military commanders could be ordered to attack from their present garrisons in East Germany and Czechoslovakia within 24 hours. But the usual Western scenario for minimum-preparation attack by Pact forces has been a brief period of four to five days to load ammunition and supplies and to ready armaments for combat use after M-day, the day on which the decision to attack is issued to the Pact forces which will carry it out. In repeated analyses, United States government agencies have expressed doubts as to the reality of the M+4 scenario. These analysts have argued that any Pact attack would be preceded by extensive political warning, that hasty initiation of hostilities does not conform with Soviet, or rather Russian, character or practice, and that the Soviet Union would need more time to take scores of visible preparatory actions, including actions to disperse their naval and strategic nuclear forces. These objections seem reasonable. Yet the worries of the NATO leadership remain, and the possibility of attack with minimum preparations must be analyzed.

For this type of attack, with four or five days' preparation at most, the Soviet Union would have immediately available only its Category I forces within the Western Theater of Military Operations. The Western Theater of Military Operations includes Soviet forces in East Germany, Poland, Czechoslovakia, and forces in the Western Military Districts of the USSR--Baltic, Byelorussian and Carpathian. Although the US is introducing a new, somewhat more refined system of classifying the readiness of Pact divisions, Western defense analysts assess Category I Soviet Warsaw Pact divisions as the most ready of Warsaw Pact ground force divisions--these divisions are generally considered fully combat-ready with 4-5 days of preparation.

Most analysts credit the Soviet Union with about 30 Category I divisions in this TVD--26 in Eastern Europe, plus two ground force and two airborne divisions in the Western Military Districts. But of these Category I Soviet forces, those in the Soviet Union would be of little practical utility for a minimum preparation attack,

except perhaps for the two airborne divisions in the Baltic Military District which could be assigned special missions in the attack. (Soviet forces in the Leningrad Military District and the more southerly Odessa Military District have missions directed at the NATO flank states in the North and South, and they could not be moved in time in any event.) The two Category I ground force divisions (one armored, one mechanized) in the Byelorussian and Carpathian Military Districts, though committed to the Central Front, would be too far away for a blitz attack.² This is also true of the four Soviet divisions in Hungary, generally considered subordinate to the Southern TVD. Their movement toward the Central Front would take over a week and would give unambiguous warning of pending attack. The two Soviet divisions in Poland would be needed to guard land communications to the Soviet Union and might well have to be reinforced if conflict continued.

So the Soviet Union would have available for such an attack only its 19 divisions in East Germany and the Westernmost of its five divisions in Czechoslovakia, perhaps with two airborne divisions from the Western Districts for behind-the-lines attacks, in all, a force of perhaps 21 - 23 divisions.

What about non-Soviet Warsaw Pact forces? It is unclear both whether the Soviets would want to use these questionable Eastern European units for a standing-start attack on the West or whether they could be organized to participate within a four- to five-day period. But we will count some of them for a worst-case hypothesis. Whether or not East Germany's Category I divisions could be used in such an attack is questionable, in view of their doubtful loyalty when in contact with fellow Germans in the West. But let us assume that four of six East German Category I divisions are used. Perhaps four of the eight Polish Category I divisions might make a weak push at Federal German and Danish forces in Schleswig-Holstein and Denmark to try to open the Baltic for the Soviet Navy, moving along the southern coast of the Baltic Sea and also making an amphibious attack on Denmark. Four of the six Czechoslovak Category I divisions might try to push into Bavaria to tie down German and US forces there. If we add these divisions to the 21 Soviet divisions already described, this would give us a Warsaw Pact force of about 33-plus divisions for a blitz attack on the Central Front.

Although the Soviet Category I divisions in the group are the most combat-ready of Soviet forces facing Europe, closer examination of their manning level in connection with the MBFR talks indicates that they are not manned at the 90-95% earlier assumed by NATO intelligence, but more probably at a level of about 80% and that it

²My own estimate, derived from many discussions. See also William Mako, United States Ground Forces and the Defense of Central Europe, Washington, DC, Brookings, 1985.

would take 10 - 14 days to bring in the specialists, including logistics troops, needed to bring them to maximum combat readiness. If they had to move into attack within 4 - 5 days, they could do so, but would be correspondingly less effective.

At the outset of a Pact attack with minimum preparation on the Central Front with 33 divisions, NATO would have about 21 active-duty divisions to meet them. This count of NATO forces includes four American divisions in place in Germany, plus two brigades from US-based divisions and two regiments of armored cavalry, the rough equivalent of a further division; the Federal German force would consist of twelve divisions plus six Home Defense Brigades to be filled up with reserve personnel within 72 hours, or a total of fourteen divisions; and three British divisions plus a Canadian brigade, for a total of about 21 divisions.

This worst-case count includes only Federal German, US, British, and Canadian forces in Germany. It excludes six German territorial mechanized brigades (which should within the next 4-5 years build up to the equivalent of two further FRG divisions), three French divisions already in Germany, one Danish division, and one Belgian and one Netherlands division normally stationed in their home countries with forward elements in Federal Germany. (The Belgian and Netherlands divisions are supposed to move to forward readiness positions in Federal Germany within 24 to 36 hours.) Crediting the 14 German division equivalents with 18,000 men each, which is low, and 5 US division equivalents with 18,000 each, and 3 British divisions with 10,000 each, for a total of 375,000-plus personnel in divisions, and 33 Warsaw Pact divisions at an average of 12,000 men each or 396,000, the forces are nearly equal in divisional manpower, with the qualitative superiority on the NATO side.

If they are ordered to move to readiness positions in time, NATO forces should be able to hold the attack, especially given the many qualitative weaknesses of Soviet and Pact forces.

Especially in this short-warning scenario, Western defense experts have been concerned about delays in NATO decision-making. Correctly so, because failure of NATO's units in the Federal Republic to move rapidly into their readiness positions could well mean success of this limited Pact force. But a decision to move into readiness positions is not dependent on formal agreement of the NATO Council. As our example indicates, it would suffice if the initial decision were taken by the US, UK, and Federal German authorities. Here, the decision of the Federal German leadership is the key factor.

The M+15 Situation

A central aspect of NATO analysis is that, over and beyond the forces in place, the Warsaw Pact could mobilize and bring to bear a larger number of units more rapidly than NATO and that the highest point of danger to NATO would come at about M+15. This could

happen either as conflict initiated by a standing start attack continued, or in a Warsaw Pact attack launched only after 10 to 15 days of preparation; either case posits a similar rate of Warsaw Pact buildup.

Many United States and NATO official estimates conclude that, by the end of 10 - 15 days, the Warsaw Pact could deploy up to 94 ground force divisions on the Central Front. Such estimates usually includes all 26 Soviet divisions in East Germany, Czechoslovakia and Poland, up to 31 non-Soviet divisions from these three countries, and about 37 Soviet divisions from the three Western Military Districts of the USSR, including all Category I, II and III divisions. Sometimes, the four Soviet divisions in Hungary and six fully mobilized Hungarian divisions are added to this total, although they clearly have a mission to the South.

In this M+15 time period, NATO, if it moved rapidly, in addition to the 21 divisions considered available to meet minimum-warning Pact attack, could bring to bear two Belgian divisions, two Netherlands divisions (both promised by M+2-3) one further Netherlands ready division, one UK division, one Danish division, seven French divisions (this figure includes three divisions in the Federal Republic and four in France -- French participation is at least as likely as that of the Eastern Europeans), and about six American reinforcement divisions, for an estimated total of 20 divisions in addition to the 21-odd NATO divisions already listed.³

The Federal German Territorial Army would expand from about 80,000 present active-duty strength to about 480,000 men within 72 hours of the order to mobilize. With the exception of the six Home Defense Brigades already mentioned, which would probably be committed to NATO command, this force consists of six motorized regiments, 15 Home Defense infantry regiments and 150 independent security companies and 300 security platoons for rear area security. Excluding the independent security companies and platoons, this is the rough equivalent of 4 to 5 divisions of organized personnel of a light infantry type without heavy weapons. Although some light infantry regiments might be used in forward position, most of these troops will have to protect rear area NATO installations against sabotage and armored raids designed to create disorder to the rear of the German and allied corps sectors.

This attack would give the Pact a roughly 2:1 advantage over NATO (according to some sources, also in Armored Division Equivalents, which try to give all Pact and NATO divisions a firepower score based on the US armored division as the norm). It would be aimed at defeating NATO quickly by making major breakthroughs of NATO forward defenses and then developing a fast moving penetrating

³Figures for both alliances from Congressional Research Service in an earlier version of the paper provided by John Collins.

attack by armored forces--first overpowering and then disrupting NATO defenses.

An authoritative United States assessment made in 1979 considered that, if NATO could maintain the integrity of its defense and block and channel the Pact's advance, it might control and eventually halt the forward advance, though NATO forces would then risk being worn down in sustained combat, with the outcome depending mainly on whether NATO could bring further reserves to bear.⁴

It is not the object of the present analysis to forecast who would prevail in such an enormous conflict, although what has been said already indicates that the outcome of Pact success is by no means certain. Instead, the present analysis aims to examine some of the assumptions behind the build-up of Pact forces described in this M+15 situation.

For many years, NATO has practiced an understandable deception vis-a-vis its own public opinion: NATO figures on NATO ready forces have usually presented only the combat-ready standing forces in Federal Germany and the Benelux countries, usually omitting all French forces and all NATO reserve units. At the same time, many NATO descriptions of Pact forces, like those given in various editions of Soviet Military Power in the '80s and in Bundeswehr White Books, make no distinction between combat-ready Warsaw Pact units and units of reserve character. Thus, in the M+15 scenario just described, it is assumed that Warsaw Pact reserve forces, even the most unready, can be present in the forward area, ready to fight, within 10 - 15 days.

This assumption deserves to be treated with deep skepticism.

Although, as noted, some United States intelligence agencies have developed a classification divided into more categories (A, B, C, D), readers of this paper will be familiar with the longer standing system of dividing Pact units into three categories as regards readiness:

1. Category I ground force units are those with 75 - 100% of their personnel and equipment on hand and considered combat ready.
2. Category II are units with 50 - 75% of their equipment on hand. These units have their weapons on hand but need to requisition some transport from the civilian economy.

⁴NATO Center Region Military Balance Study 1978-1984, Office of Assistant Secretary of Defense, Program Analysis and Evaluation, July 13, 1979, declassified, (henceforth called PA and E study).

3. Category III units are at 10 - 25% manning strength with incomplete combat equipment, mostly older models, and lacking much of their transport.⁵

Many NATO analyses assume that Category I Pact units would be able to move in combat in 24 hours; Category II in five days; and Category III in 15 days. (It is of interest that even the PA and E study at footnote 4, which shares this assumption, nevertheless estimates that by M+30, there would be equal manpower in combat formations on both sides. PA&E, page I-4.)

But we have already pointed out that even Category I Soviet units might take 10 - 14 days to fill in with important specialists, though they could move earlier in emergencies. Category I East German units might be ready in two to four days. It is improbable that Category I Czechoslovak or Polish units could be committed to combat in under 14 - 21 days without being undermanned, under-gunned and under-organized to the point of highly limited effectiveness and very high casualty rates. There are very few Category II divisions in the Eastern European armies. Poland is credited with two mechanized infantry, one airborne division, and one amphibious assault division, and Hungary with a mechanized infantry division, for a total of five. It stretches credibility to believe these units would be combat ready in under three weeks.

The Soviet Union is believed to have only five Category II units in the Western Military Districts at present; these might be ready to move in ten days.

The most serious assessment problem comes with East European and Soviet Category III units. While the M+15, 94-division Pact attack scenario includes these forces on the firing line, it is quite improbable that non-Soviet Warsaw Category III Pact divisions, which number 19 (Czechoslovak, Hungarian and Polish; there are no East German units in this category) could reach any serious level of combat efficiency in under sixty to ninety days if they indeed ever saw action. A minimum standard of analytical rigor would require deletion of these 19 divisions from the M+15 scenario.

What about the 28-29 Soviet Category III divisions in the Western Military Districts which are also counted in the M+15 scenario?

Here, it would be argued that to assume that these divisions could be filled with personnel and equipment, organized, equipped with transport from the civilian economy, and moved forward to the

⁵The categories, developed in 1973 by US analysts from Soviet models, are described in many places. See for example, William Kaufmann, "Non-Nuclear Deterrence" in John Steinbrunner and Leon Sigal, eds., Alliance Security: NATO and the No First Use Question, Washington, DC, The Brookings Institution, 1983.

combat area in under thirty days, is to assume a highly improbable standard of performance by the Soviets. Such estimates argue for a degree of management and organizational capability which the Soviets have seldom shown. In distinction to inclusion of non-Soviet Warsaw Pact Category III Divisions in Pact combat forces at M+15, which seems unsustainable, there can be reasonable argument about the issue of readiness of Soviet Category III units. Experience of the 1968 Soviet invasion of Czechoslovakia, the 1979 invasion of Afghanistan, and the menacing exercises around Poland in 1981 are cited on both sides of the argument. The bulk of evidence seems to suggest that the Soviets have taken 60 to 120 days to ready their Category III units to move and that, even so, with no time to train or exercise, they randomly assign reservists who have had no military training since their original conscript service, and that they would not be able to meet a 30-day deadline.

Thus, it is strongly doubted that Soviet organizational capacity and the Soviet transport system can move these Category III Soviet divisions to arrive in the Central Front combat area by M+15. Perhaps some would arrive, as some ununiformed, bewildered Soviets reservists arrived in Prague after only 2 - 3 weeks from being called up. If so, by any standards, the combat value of such divisions, measured by firepower scores or other measurement, should be sharply cut in Western evaluations.

Thus, around 48 Pact Category III divisions of the total of 94 Pact divisions at M+15 we have listed here should either be subtracted from the M+15 total or downgraded in a more realistic assessment. With reports of more reserve exercises in Soviet Category III units, this situation may be changing. If so, the change will be slow; it would probably take many years of fairly active training to bring Soviet Category III units to a point where they could be at the inner-German border at M+15.

Earlier in the present paper, it was pointed out that 400,000 Federal German reservists, the manpower equivalent of over 20 heavily-manned German divisions, were committed to maintain security and order in rear areas of the Federal Republic and not included in the total of NATO units. Moreover, the Netherlands has 11 infantry, 1 commando and 2 artillery battalions, and Belgium 20 infantry and 12 reconnaissance battalions in their territorial forces. These reserve units would be used mainly for behind-the-lines security and are usually not counted, i.e., they are deducted from the NATO total force.

On the other hand, NATO's M+15 scenario assumes that all Warsaw Pact Category I, II, and III units will be committed to combat. No units are deducted for securing against sabotage by NATO or Eastern Europeans or guarding the line of communication into the Soviet Union. True, the Pact has more heavily-armed police units which could perform this function than NATO. Nonetheless, many Pact, especially Soviet divisions, would in all probability be held back for this purpose in the large Warsaw Pact area back to the Urals,

probably a minimum of 4 - 8 Soviet divisions, as well as a similar number of non-Soviet Warsaw Pact divisions. These divisions too should be deducted from Pact totals in a more realistic M+15 assessment.

Also not included in most estimates of the M+15 situation is the fact that the NATO program of prepositioning the equipment of the six United States divisions supposed to arrive within ten days of the NATO order to mobilize is now nearly complete and that the United States airlift capacity has also expanded in recent years; both actions increase the possibility of timely arrival of United States reinforcements. Also relevant to discussion of the situation at M+15 is the reinforcement practice of many NATO allies, especially the FRG and the US. They put in replacements as individuals--indeed, German divisions have big manpower pools of individual replacements. The Pact, on the other hand, operates on the unit replacement system. Instead of replacing individual casualties, they plan to withdraw the high casualty unit and replace it with a whole new unit. NATO analysts count the Pact's replacement divisions, but no NATO individual replacements.⁶

Mobilization rates naturally also affect the availability for combat of major armaments. Arrival as planned of American reinforcements by M+15 and breaking their stored tanks out of POMCUS will improve the NATO-Pact tank ratio, as will use of NATO war reserve stocks for individual tank replacement. Unterseher and Graham make a detailed case that this ratio would not be worse than 1:1.4 at M10.⁷

At the same time, it is possible that, if Soviet forces on the Northern or Southern flanks are not fully committed, the Soviet command might be able to commit a few additional divisions from these districts to the Western TVD in an all-out conflict.

It seems probable that both alliances would run out of ammunition and POL after M+30.

⁶See David M. Shilling, "Europe's Conventional Defenses", Survival, March/April, 1988.

⁷See Malcolm Chambers and Lutz Unterseher, Is There a Tank Gap?, Peace Research Report #19, University of Bradford.

Air Forces and Geography

Discussion here has thus far focussed on ground forces. William Kaufmann⁸ argues that, if the Pact launches a concentrated air offensive on NATO's nuclear launchers, airfields, and LOC at the outset of a ground forces attack, there is still a better than 50% probability that NATO would gain command of the air over Central Europe despite the density of Pact air defenses. Kaufmann argues that, at a minimum, NATO air defense would obtain relative immunity for NATO's rear areas and logistic system. The authors of the 1979 PA and E Central Region study already cited point out that at M+5, NATO would be weaker than the Pact with about 3,000 aircraft (these estimates count French aircraft) to the Pact's roughly 4,000. An additional 1,000 United States aircraft are programmed to arrive by M+30 and there is a further pool of uncommitted US aircraft. (No account is taken of carrier aircraft.)

With the high mobility of aircraft, NATO's total of fixed wing combat aircraft would build to numerical equality with the Pact at about 4,200 by M+30 or earlier. NATO seems to be retaining the qualitative edge over the Pact, though with difficulty, and has a relative preponderance in ground attack aircraft while the Pact has a larger proportion of air defense aircraft, rather well illustrating the main concerns of each alliance. The authors of the PA and E study are less expansive than Professor Kaufmann about NATO's air strength, but they do believe that NATO will be able to prevent Pact control over NATO airspace and that NATO will be able to maintain "selective control" of airspace over the battle area to give close air support to NATO forces. (PA and E, page II-2, 5, 6.) But control over NATO's airspace is essential for the success of any Pact attack and even this conservative estimate believes NATO can bring enough airpower to bear with the first days of conflict and continuing on to prevent this--and thus probably to frustrate Pact attack.

Geographical Location

Reinforcements generated by both sides are open to interdiction. Air forces are open to destruction or damaging of their landing fields and support facilities, US ground forces to destruction of the ships and aircraft carrying them, as well as destruction or damaging of their reception ports and airfields. US forces have a minimum of 3,000 miles to move, Soviet forces in the Soviet Union have a much shorter distance of only 400 - 600 miles on land routes. Even so, their forward movement, usually road or rail bound, is open to interdiction attacks at transport choke points, bridges and rail gauge transfer points from the USSR.

⁸William Kaufmann, "Who is Conning the Alliance?", paper for the Aspen Strategy Group.

However, reinforcements by European members of both alliances have less distance to travel and are less subject to interdiction. A major point is that Federal Germany has the least difficulties of time and space to call up its 700,000 reservists within three days: If the order comes, they will be on hand long before Pact reinforcements can arrive in East Germany or Czechoslovakia, no matter how rapidly the Soviet Union can call in, equip and move forward its Category III divisions.

The question of terrain should be mentioned under geographic location. NATO forces as defenders will have the benefit of known positions and relatively favorable terrain. As defenders, they can do something which is impossible for the attacker--prepare the terrain with counter-mobility measures ranging from rapidly emplaceable obstacles to prepared bunkers. This point is not merely of theoretical significance. During the past decade, there has been not only talk, but cumulative effort in this field which has added to the defensive capability of NATO forces, but which is usually not factored into NATO estimates.

The M+90 Situation

If Pact attack follows after full mobilization for a period of 90 days or more, then NATO could have on hand a total of about 64 divisions. The main NATO reinforcements not already noted in the description of the M+15 situation would be the addition of up to 17 further US divisions, mainly National Guard units which receive a good deal more training than Soviet Category III divisions, and 8 French divisions. In a 90-day period, the Pact would mobilize most of its Category III divisions for a total of about 104 divisions for the Western TVD (counting forces in Hungary). NATO would have been in its readiness positions for months preparing the terrain. A tremendous war of attrition would ensue. Some conventional wisdom gives the Pact the upper hand--NATO forces are sufficient to block the Pact's forward thrust but could be eventually worn down. However, a reasonable case can be made for the view that NATO forces, at last equipped with operational reserves and with adequate time to prepare the terrain, could well stalemate the Pact attack, and that this fact would be clear enough to Soviet commanders to deter a decision to commence hostilities.

But this scenario, where both alliances build steadily up to their maximum potential, both conventional and nuclear, for three to four months and the Pact attacks only then, is implausible in any event. In an age of nuclear weapons, it does not seem probable that a buildup will proceed uneventfully marked by the absence of all hostilities anywhere until the Soviet leader gives the signal to attack. The scenario is implausible for another reason: Owing to our focus on the Central Front, we leave out of account that what we are discussing is a world-wide war in which Western naval preponderance would play a role, as would the possibility of hostilities elsewhere on the Soviet periphery. There is the possibility of involvement of Japan and even of China. And there

would be the beginnings of serious war production, pitting the three leading industrial powers of the world, the US, the European Community and Japan, against the fourth ranking, the Soviet Union. Not far in the background in a huge clash of this kind is the high probability of escalation to use of nuclear weapons. It is very difficult to believe that Soviet leaders would deliberately move toward land attack in Europe against this background.

Conclusions:

1. From the viewpoint of the force balance as well as other factors, a Soviet attack with minimum preparation on the Central Front has a high possibility of failure.
2. This paper has given reasons why M+15 mobilization rates often ascribed to Pact forces by M+15 are unrealistic and why the outcome there could also be a stalemate.
3. A Soviet attack on Western Europe might have more success if it were based on full mobilization of Soviet military assets in an M+90 situation. At the same time, such an attack raises the prospect of a confrontation so vast that it threatens the continuation of the Soviet system whether it remains conventional or goes nuclear.

Today, we consider the Soviet leadership rational enough to make the calculus that, in a situation of continuing nuclear parity with the United States, strategic nuclear war should be avoided because it might well bring destruction of the Soviet system. Why should Soviet leaders not be rational enough to make the same calculation as regards the consequences of Soviet conventional attack on Western Europe? We may have succeeded better than we know.

MOBILIZATION AND RELATED GEOGRAPHY

by
Joseph M. Heiser, Jr.

MOBILIZATION AND RELATED GEOGRAPHY

ASSUMPTIONS Continued political pressure from within and without allied (NATO) nations, especially the United States, will cause critical negotiation for agreement (U.S.-U.S.S.R.) on arms control and arms reduction.

- The greater success of such negotiations regarding nuclear weaponry, the more crucial becomes the U.S. and NATO relative weaknesses in conventional capability.
- Economic environments in all NATO nations will limit allocations of resources to defense needs, the greater the cuts, the less the "defense dollar," the greater the risk of lowered deterrence and increased Warsaw Pact aggressiveness.
- The basic asymmetry in the ability of the United States and the Soviets to project power along the immediate Warsaw Pact periphery will continue to exist.
- The greatly improved readiness and modernization will continue to be supported by the United States, albeit at more limited budget levels, with a slower pace, and corresponding increased risks to deterrence.
- France will continue its current NATO relationships because of political considerations.
- There will be no war between NATO and the Warsaw Pact within the next 5 years.
- Prior to any probability of war between the Warsaw Pact and NATO, the U.S.S.R-Warsaw Pact nations would attempt to mobilize covertly to maintain an element of surprise in any planned attack on NATO by the Warsaw Pact.
- The NATO Alliance is a defense organization, not an offensive one, and will continue to be so.

(No added comments are made on assumption reasoning because they are largely self-explanatory.)

This subject, Mobilization and Related Geography, deserves definition as it pertains to the balance of power in NATO-Warsaw Pact considerations and negotiations. Mobilization, including decisions by an alliance of democratic nations, includes reinforcements of allied forces which are limited in their vicinity to the probable combat areas of operation. Their capability of reinforcements and resupply of limited logistic war reserves becomes a most significant element of any negotiated balance of power. It is well to note that as a part of the current NATO conventional defense improvement program, NATO military commanders have identified nine specific areas of critical deficiency

requiring special emphasis. These deficiencies include: air defense; ground forces; mobilization; reinforcement; sustainability; follow-on attack, follow-on forces attack; electronic warfare and command and control; and naval submarine anti-air and amphibious capabilities. Note that logistics is significantly involved in all of these critical deficiency areas, and in this particular paper, mobilization reinforcement and sustainability are being especially emphasized.

This paper stresses the importance of logistic support. Logistics emphasis is justified by logic since most visible considerations revolve around combat forces; however, combat forces are limited in their effectiveness and capability to what logistic forces are able to support. These logistic forces can only sustain combat capabilities and effectiveness to the extent that war reserves accumulated in peacetime, and mobilization capabilities and effectiveness, can provide the sustained combat effort to deter/defend/win in case of war. Thus, sustainment = war reserves + product of mobilization. Of course, the preferred objective is to be sufficiently strong in readiness and sustainability to deter any potential enemy from initiating military action against our nation and its allies.

Before discussing the specific elements related to mobilization and its geography, one must give credit where credit is due to the NATO Alliance. Mobilization and related geography are not without limits as the following discussions illustrate.

First, it should be emphasized that since the establishment of the NATO Alliance, peace has existed between NATO and the Warsaw Pact Nations. How much of this is due directly to the NATO Alliance may be debatable, but the fact is that peace has been maintained. Thus, 16 nations stood side-by-side in maintaining peace for over 48 years. This establishes some kind of a world record. It should be emphasized that all member nations of NATO are democracies; all are jealous of sovereign rights; all must agree to NATO policy. Much progress has been made over time. When it appears the foundation of NATO has become tentative or shaky, some leadership emerges to accelerate actions necessary to improve the Alliance. An example is the long-term improvement program initiated in 1977 by President Carter, in which certain recommendations made to the heads of nations in 1978 were approved, which definitely strengthened NATO and its defensive capability.

In spite of this outstanding record, it must be recognized that sovereign nations are not anxious to give up or limit their sovereign rights in peacetime even when planning for deterrence, and, if necessary, war. This is neither illogical nor unexpected. It simply means that strong leadership is necessary to persuade each democratic nation to consider the limitation of sovereign rights and the provision of certain capabilities to the control of the Alliance under wartime conditions. Every nation cannot be expected to cooperate fully in every case nor in a short period of

time. Based on experience, pressure will have to be exerted to convince the nations to be willing to plan on limitation of their sovereign rights in time of war in favor of an integrated approach to defend against any Warsaw Pact attack.

Thus, mobilization must be planned in peacetime in order to be effective and efficient in any transition to war. Without optimum peacetime planning to cover the actions necessary in time of transition to war and war itself, chaos in and among the warring Alliance nations will certainly take place. Even with the best plans, there will be indecision, delays, questionable actions, unexpected problems, etc. Even the issue of intent of the opposing nations in the Warsaw Pact will be subject to considerable question. This will be of crucial importance to NATO, since Alliance planning assumes there will be a period of warning. This is one of the most crucial points in any democratic alliance such as NATO. Agreement must be reached in order to declare a warning, which will start the phasing of the various alerts involved. Any delay in making this determination by the NATO Alliance will be most costly and may lead even to defeat of the NATO defense objectives.

Time and space (geographical) factors are critical to an effective and efficient mobilization. Such time and space factors must be measured and weighted to provide a fundamental basis for determining an appropriate balance of power needed in negotiation with the U.S.S.R.-Warsaw Pact.

Within this focus on mobilization and its related geographic logistics, the following key elements, as they pertain to the NATO Warsaw Pact negotiations, will be emphasized (these, needless to say, are not all inclusive but are the least visible and most significant). Time and space are key to the effectiveness of each of the following elements:

- Military command, control, communications, and logistic intelligence (C3I),
- Coalition logistics/coalition mobilization,
- Reserves - manpower and logistics,
- Strategic mobility,
- Host nation support,
- Transition to war from peacetime organization,
- The defense industrial base (including facilities),
- Availability of a French line of communication (LOC),
- War reserves available to include POMCUS, and

-- Economic capabilities.

Each element will be treated separately and then the summary of the interaction of each in terms of their total importance will be provided.

It should be noted that each of these logistic elements provides positive aspects in relationship to the agreements that may be reached. But the negative aspects attendant to each must be given appropriate consideration to avoid significant weaknesses in any agreements under consideration.

**MILITARY COMMAND, CONTROL, COMMUNICATIONS,
AND LOGISTIC INTELLIGENCE (C3I)**

Military C3I, in reality, depends completely upon the political C3I of the NATO Alliance. Rightly, the military depends upon the policies and directives of the political heads of NATO and the member countries. This, of course, is written clearly into the charter of the NATO Alliance.

It is particularly important to recognize that a warning of a probable attack by the Warsaw Pact must be initiated at the political level to allow the military command and control to begin their appropriate actions, particularly in a general mobilization of the Alliance. Of course, individual nations can take their own unilateral actions as they deem appropriate. In addition, bilateral actions between agreeing nations can also be initiated. However, the integrated effectiveness and efficiency of Alliance actions, essential to the achievement of NATO defense objectives, cannot be taken until the political heads of NATO make appropriate decisions and issue appropriate directives.

An important example is the decision pertaining to the warnings given indicating a probable attack by the Warsaw Pact. Individual nations can make their own determinations; but to begin emergency actions, the NATO hierarchy must determine a warning period has begun, setting in motion actions pertinent to specific alert status. Without this Alliance determination, the hands of the military command and control, SACEUR, and his subordinate commanders, are tied, and time most valuable can be wasted. Of course, in case of an attack by the Warsaw Pact on any NATO nation, at that time, the military authority must act to defend the Alliance.

Pertinent is the fact that the individual allied nations can be expected to be very reticent about ordering mobilization because to do so may be the sign which could initiate enemy action. Will the declaration of national mobilization create a crisis which will lead to war, which, if based upon a false situation, would not have occurred at this time?

Such important questions are leading to logical decisions by nations such as the United States in the development of mobilization programs to establish a graduated response to any early warning. Particular reference is made to a National Security Council memorandum dated 15 September 1987, subject "National Security Emergency Preparedness Priorities (NSEP)," which directs such graduated response planning.

The United States forces strengthened their C3I under the Reorganization Act of 1986 wherein the command and control of the Commanders in Chief of each Theater of Operation (in this case, the Commander in Chief of the European Theater) have been clarified and strengthened. However, the logistic command, control, communication, and intelligence within the Alliance organization is very limited in time of war. A publication by this writer, "The Long-Term Defense Programme: crucial to credible deterrence" published in Defense Management Journal, July-August 1979, emphasizes this problem. This article, especially the paragraph "Organizational Needs and U.S.-NATO Logistics Relationships" stresses the need for a greater command and control by the NATO Commanders in time of crisis/war. Because of the fallacious principle of NATO "logistics is a national responsibility," the NATO Commanders are responsible for the operation orders directing the defensive actions of all NATO allied troops immediately upon attack of any NATO nation by the U.S.S.R-Warsaw Pact. But the NATO Commanders have no authority and cannot prepare a logistic annex indicating who, how, what, and when logistic resources will be allocated in order to support the very operation that NATO Commanders has directed. It is essential, in my opinion, that the major subordinate commanders of NATO, such as the CINCCENT, need to have at their fingertips agreements with NATO allies in each nation so that the NATO Commander will already have negotiated provisions authorizing him to allocate certain national resources within predetermined limits. These agreements need to be perfected and tested in peacetime so that in event of a Warsaw Pact attack, they can be implemented immediately to support NATO troops.

In addition, recognition of the NATO Maintenance and Supply Agency as part of the command and control structure is particularly important. It should be utilized as a fundamental base for supporting standardization and interoperability aspects of NATO consumer logistics. Without this structure, there is no means other than bilateral to establish the know-how and follow-on action required for interoperability necessary throughout the Alliance. The less we have standardization (and we'll never achieve what we would like to see), the more we must concentrate on assuring the optimum interoperability among our nations in NATO. Lack of optimum standardization and interoperability is a big disadvantage when considering the Warsaw Pact capability.

As to logistic intelligence, I believe we need to gain far more logistic intelligence regarding the capability of the Warsaw Pact forces. There has not been sufficient emphasis given this in the

form of essential elements of information, etc., necessary to know what we are up against in our relationship with the Warsaw Pact logistics structure/capabilities. For example, the Pact may have war reserves, distributed forward to probable combat zones, that will sustain their forces beyond the NATO sustainment capability.

With reference to communications, experience has proven that most authorities think of communications as it pertains to strategy and tactics, and they devise systems to support those types of requirements. However, overlooked is the fact that a large part of the communications available in the field during war are consumed by logistics functions whether the communications system was designed to handle such logistic data, etc., or not. My experience indicates in three wars that logistic requirements for communication have either absorbed a large part of all communication modes available, or the logistic communication required for support has not been received by those needing to know what is required. Most tests and exercises record the same very limited communications results.

The United States defense forces have made considerable improvement in their communications capability within the modernization program. In fact, each other nation has likewise been making progress, but NATO itself, in terms of an integrated allied communications network to include that required for logistic support, still needs considerable improvement.

COALITION LOGISTICS/COALITION MOBILIZATION

There continues to be too much national logistics thinking and planning, especially pertaining to mobilization. Coalition thinking, planning, and policymaking to integrate the capabilities of all NATO nations utilizing their great resources for effective, efficient logistics support and mobilization implementation is desirable. The NATO countries, including those in Western Europe, the United States, and Canada, have together the greatest industrial mobilization capability in the world. However, as long as each nation plans its "own thing," the effective use of this industrial capability will never be achieved. While there are efforts being made, emphasizing gaining a greater integrated plan for the use of industrial capacities within NATO, this emphasis must accelerate to achieve the progress needed.

A valuable asset for coalition mobilization would be the previously discussed NAMSA for the coordination of NATO industrial mobilization agreements and operations in Western Europe.

Mobilization planning and action have been limited because of the concept that we would only have a short conventional war, moving to nuclear war within a matter of days or weeks, after any Warsaw Pact attack. However, more recently, this "short war concept" has been changing, recognizing that a conventional war is far more likely now in view of the INF and other possible agreements between the

Soviets and the United States which will have a direct effect upon the NATO and Warsaw Pact Alliances.

However, when war reserves of materiel, etc., are limited due to budget restraints, as they are today, it is absolutely essential that mobilization planning and action be taken to take up the slack present when war reserves are insufficient. This is certainly the NATO situation today. Thus, sustainability is dependent upon the combination of war reserves available and the length of time necessary to have an efficient mobilization.

Further, this ties in with the Alliance command and control situation. Mobilization action depends upon the initiative of each individual member of the Alliance until each and every member agrees that the situation is such that a NATO mobilization environment is essential for the conduct of defense of the nations in the Alliance. Any unilateral or even bilateral initiative to mobilize will be far less effective than one declared by the Alliance. In addition, it could be the direct cause of enemy action.

The discussion earlier on command and control brings to light many of the difficulties in achieving a coalition logistic situation when the Allied Nations individually are unwilling to commit their resources for wartime use in a peacetime environment. There has been progress; however, there is still much more progress required.

The perceived fallacious principle of "logistics is a national responsibility" should be supplanted by the true principle that "each nation is responsible for providing support for its own forces." This latter quote is covered by NATO documentation which supports allied nations integrating requirements and capabilities to achieve optimum Alliance posture. Article 3 of the North Atlantic Treaty states the parties separately and jointly by means of continuous and effective self help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack. Further, Ministerial Guidance of 1977 states "cooperation and collaboration are required for more efficient and economical use of logistic resources." Finally, the NATO Document MC 36/2 (Revised) of 18 May 1960 and the Council Resolution of 23 February 1952 both indicate "provision of logistic resources to meet NATO operational plans is a national responsibility." Determination of logistic requirements is a NATO responsibility and Military Committee Document 53 Series states that multinational logistics is a NATO responsibility. The Principles of NATO Logistics are found in Supplement B to Task Force 9 report of the "Long Term Defense Programme." A copy of this is attached. There was no exception taken to this supplement by any nation, and therefore it had the "silent" approval of all NATO nations. Actually, it stated nothing new; it simply provided in one document that which had been previously agreed to since the early days of the Alliance. Therefore, no approval was necessary or recommended.

RESERVES - MANPOWER AND LOGISTICS

The active combat service support structure had been significantly reduced with more dependence upon reserve units, especially in the combat service support category. This means greater readiness in the reserves is absolutely essential, including training of reserves individually and in units.

The mobilization of reserves, therefore, becomes far more important in view of this dependence for logistic support. The time and space factors involved in getting these reserves into action in support of combat forces engaged with the Warsaw Pact present a very significant problem. In fact, some of the reserve units have been assigned missions involving support for reinforcing combat units and yet the combat units have arrived before the reserve forces are in place to supply the required support.

The readiness of reserve units has been improved. They are beginning to gain the advantages of modernization with new equipment. However, this program has a long way to go. In fact, there is a significant dollar shortage of equipment required to bring the reserves up to a satisfactory readiness condition.

One particular area of fine progress with regard to reserve readiness is the program wherein reserve units were given the opportunity to train in the very mission and location to which they will be ordered in time of crisis. Thus, reserve units, which will serve in logistic support capacities in Western Europe, have been transported to such locations and have been involved in logistic missions for the period of their peacetime training tour. The NATO capabilities, however, must be measured against some reported Soviet capabilities which approximate between 9 million and 11 million men who can be mobilized within 48 hours of a mobilization order. Fortunately for NATO, however, such men are generally not ready to fight. However, this is just another example of the kind of consideration necessary when negotiating with the Soviet Union.

STRATEGIC MOBILITY

Since reinforcement of troops and resupply of logistic materiel is imperative to our deterrent and war fighting capability, it is essential that the United States can move such to the area necessary in the time available. If deterrence should fail, the mobilization for war and the reinforcing of our forces in forward defense would directly influence the outcome of any conflict.

Availability and operation of a strategic mobility plan to carry out the necessary movements of these reinforcements and resupply must be planned in peacetime.

There has been considerable study and planning, not only in the United States, but in NATO, to assure meeting this requirement.

This involves the use of not only U.S. resources, but NATO resources as well.

There is a NATO requirement for the United States to deploy 10 Army divisions, 60 reinforcing tactical fighter squadrons, and 1 marine amphibious brigade plus support detachments, within 10 days of a decision to mobilize. To meet that requirement, the United States has prepositioned quantities of equipment in Europe to reduce the amount of supplies to be moved upon mobilization. These prepositioned supplies are called POMCUS. The total requirement for these prepositions has not been completed, even though progress has been made yearly. The requirement of 66 million ton miles of equipment daily by air and a sealift requirement of transporting 1 million tons of unit equipment in a single voyage, cannot be met. However, on a positive note, approximately three-quarters of this requirement has been met.

Most experts think that a conflict in Western Europe will be after, or simultaneous, with U.S.S.R. (and/or any allies) attacks elsewhere. Such action by the potential enemy will greatly increase the U.S.-NATO problem of strategic mobility. Despite the progress, strategic lift shortfalls continue and are expected to become greater in the future due to a projected decline in commercial sealift capability. Support of allies continues to be essential in meeting our strategic lift.

Considering the fact that our planned deployment of forces is, in many cases, late before they get there, and the same applies to war reserves, it certainly is essential that the strategic mobility requirement be met, and to the degree possible, exceeded.

HOST NATION SUPPORT

Another development is the continued progress in negotiating agreements bilaterally among reinforcing nations such as the United States and those nations which will be receiving such reinforcements under mobilization plans. The cooperation in this effort has been, in most cases, outstanding. However, the problem is that they are almost completely bilateral. At times, there has been hesitation to let the NATO authorities know what bilateral agreements are all about. In time of crisis, there will be competing priorities, both from within the individual nation itself, between civilian and military needs. Further, reinforcing nations will be competing with one another for the use of facilities, roads, airfields, etc. It must be recognized that in time of crisis there will be approximately 2 million men and women and 4 million tons of materiel competing for the resources available. If this is to be handled effectively, avoiding waste and more critical problems, someone has to be put in charge. This is the importance of the NATO Commander-national agreements relative to the authority and responsibility of the NATO Commander and the nation who owns the resources, in terms of how priorities

will be established, etc. Depending upon the effectiveness of command and control, this could be a time for serious consequences.

Bilateral agreements should be compatible with NATO command-national agreements - in fact, they should not only be compatible, they should be used as basis for determining what the NATO Commander might do involving integrated action in the use of a nation's resources.

In addition to the preceding, there is another problem that needs solution. Host nation support is certainly a great advantage to an individual nation wanting to avoid allocation of troop strength to tasks that could be done by agencies of the receiving nation. However, there is a minimum military requirement that must be provided in order to supplement this capability with host nation support. There is a current tendency to avoid allocation of logistic support by national military units and place the entire task upon host nation support, some of which would be other nation military, but most of which would be the civilian capability found in each host nation.

Some practical tests/exercises have been successful. Such tests as the annual Reforger Exercise, however, can be deceitful because even though the results may appear successful, only a small part of a total reinforcement is tested. Also, the resources of all concerned are allocated in the strength necessary to assure success. Whether this success can be attained in a full reinforcement in time of crisis, is highly questionable.

TRANSITION TO WAR FROM PEACETIME ORGANIZATION

The Reorganization Act of 1986 has certainly strengthened the command and control aspects of the Commanders in Chief of each theater of operation such as Commander-in-Chief Europe (CINCEUR). However, another aspect of that reorganization involves acquisition of new weapon systems, which is pointed more at peacetime effectiveness and efficiency than at crisis. As a result, in that aspect, the transition to war requires an immediate reorganization placing the professional strength, which has been moved under the Reorganization of 1986 to the Secretariat, back under the military staff of the Chief of Staff of the Armed Forces because the top priority in time of war is not so much the acquisition of new weapon systems as it is the support of troops and their materiel already in the hands of their units.

Further, time and retirement, etc., have erased the experience and knowledge of many of the members of the Armed Forces who served in past wars, especially those who served in Korea and in World War II, when logistic problems similar to those expected in a continental land mass Warsaw Pact-NATO engagement were experienced. Thus, the training provided to current forces should emphasize as effectively as practical, the transition to war, the environment of crisis, and the need for improvisation based upon

plans that have been laid down but which are likely to change as a result of wartime circumstances and environment.

THE DEFENSE INDUSTRIAL BASE (INCLUDING FACILITIES)

As indicated earlier, the short war concept, especially in Western Europe, has given a back seat to industrial mobilization planning. Only recently emphasis has been given to this aspect of our defense needs. Even today, there is a minimum of budgetary support for this very important matter.

However, there has been an increase in progressive planning and testing of plans, for example, the series of Proud - - - tests like Proud Scout 88 that have been carried out in recent years. These tests proved the inadequacy of our mobilization planning and those specific actions needed to make essential progress. A recent well-informed summary goes as follows: The President of the United States says the much-maligned military industrial complex is the "arsenal of democracy" in war. But experts in and outside the Defense Department ask whether the United States is prepared for the major rapid buildup - the surge - that would be needed. A strong high-tech base is essential, not only for making defense industries healthier, but also for making the entire economy more competitive.

There are some who say mobilization or the conversion of the civilian economy to wartime production is obsolete. The Defense Department indicates they know how to do it but they need (1) an inventory of long-lead-time parts and (2) equipment capable of multishift operation with special tooling and test equipment. However, funds for such requirements were not, and are not now, available except in very limited specific cases.

Another problem is the fact that many of our high-tech parts are made outside the United States. The mobilization question might be can we get all the high-tech parts we need, when we need them, if they are all manufactured outside the United States?

Another issue to be addressed is the quality control necessary to assure the quality of the item produced during mobilization meets wartime standards.

This past year, action was taken to resolve these problems and hopefully to gain congressional support for necessary funds, at least to the minimum required. For example, the United States and Canada have joined in an organization called the North American Defense Industrial Base Organization which will focus on mutual industrial base needs. Such an organization, if efficient, should help make the progress required.

This month the President is expected to announce his support for the National Security Emergency Preparedness Priorities to establish the objectives to be achieved in 1988. These objectives

include development of mobilization programs based upon "a graduated response to early warning" and development of a plan for an industrywide assessment of production capabilities of defense and essential civilian sectors. Hopefully, White House direction to all Government agencies will produce the specific planning necessary to make progress and with an acceptable program, perhaps the funding will be forthcoming.

Of course, a great deal depends upon the warning given for mobilization action. This presents not only a United States, but a NATO problem, because the decision for mobilization will depend upon recognition of warning indicators that all agree dictate immediate action.

The graduated mobilization response process is as close to normal day-to-day operation as possible. It was established by a working group recommending institutionalization take place under the auspices of the National Security Emergency Planning senior interagency group with the Federal Emergency Management Agency in a coordinating role. An important feature of the increasing control exercised by the Executive Agent is Graduated Mobilization Response (GMR): Stage 3, Planning and Preparation - independent actions and information exchange as appropriate; Stage 2, Crisis Management - progressively increasing coordination and National Security Council direction; Stage 1, National Emergency/War - National Security Council or other centralized control. Under this system, individual departments and agencies will develop standby emergency action papers setting forth the range of actions possible within each GMR stage. Such planning processes, if executed and supervised at the national level, could require the development of a badly needed mobilization plan.

At any rate, industrial mobilization cannot be allowed to require an average of 12 -18 months to reach a required production rate when war reserves will not last over 6 months. The "D-Day" to "Production Day" (D to P) must equate to that provided in war reserves so that sustainment becomes practical for a war of any length.

AVAILABILITY OF A FRENCH LINE OF COMMUNICATION (LOC)

The logistic line of communication (LOC) across the low countries of Western Europe is a very hazardous operation. It lies in the likely first objective area of the Warsaw Pact Forces protected by the most difficult defense for NATO. The elimination of this LOC by Warsaw Pact advances would spell defeat for the NATO effort.

Therefore, gaining the cooperation of France in the NATO defense is crucial. France provides a LOC, previously developed by the United States, that would, along with the LOC across the low countries, provide the optimum logistic support for NATO combat forces engaged in any NATO/Warsaw Pact conflict.

Today, the American-developed/French-operated POL pipeline continues to operate across France. Also, there is a network of airfields across France that is earmarked for use in time of emergency to greatly ease the hazards involved in the centralized air support provided in West Germany and in NATO countries to the north.

The LOC and airfields across France would be most valuable assets to NATO. Coupled with the "low-country" LOC, they would provide that value planned for NATO before the closure of the French LOC.

WAR RESERVES AVAILABLE TO INCLUDE POMCUS

Due to budget limitations, the war reserves available in each of the NATO countries are inadequate. This includes CBR materiel, ammunitions, and defensive materiel necessary for Warsaw Pact utilization of CBR weaponry. As emphasized earlier, we need sufficient war reserves to provide adequate logistic support between the outbreak of war and the ability to resupply the combat forces engaged. Lacking sufficient war reserves, we need a mobilization capability to make up that difference in the optimum period of time; for example, if we require 60 days' war reserve and we only have 30, then that 30-day deficit must be made up by an increased capability to mobilize and get that 30 day plus more to the troops before their supplies are depleted. This emphasizes the importance of mobilization planning and action to reduce the time required to get supplies into the hands of combat forces. This is the only way we will sustain those forces engaged with the enemy. However, to sustain, we must also move the product of mobilization and/or the reserves to the location required - thus, again the time and space impact.

Medical health care will be particularly critical. For example, there will be a deficit of 7,000 U.S. Army doctors and 31,000 nurses to handle the health care requirements estimated in time of conflict.

ECONOMIC CAPABILITIES

Realistic estimates of expenditures must be utilized in all negotiations so strengths (or weaknesses) will be recognized in all agreements. For example, if a critical level of buildup cannot be supported by the United States or its allied nations by a particular time period, any agreement must recognize this inability. For example, 1 day of United States Army war reserves costs approximately \$1 billion, 15 times that now provided. Modernization such as that of the last 5 years and that to be supported in the next 5, requires increased costs for items such as repair parts for obsolete, older equipment. Yet, most older equipment is not eliminated; new equipment is used along with the older equipment, not only the active forces, but the reserves as well.

The defense planning process...helps us determine what military capabilities are needed to protect U.S. interests. But it cannot tell us precisely how much is enough to be safe. Defense planning is not a precise calculus, and a nation can never be perfectly safe. In any case, the high cost of military forces, combined with our limited resources, usually means that we must accept some degree of risk - the gap between our defense capabilities and our best estimate of defense requirements. Our goal is to keep that risk at a prudent level.

The appropriate level of security risk for a nation must be decided with great care. While we would like to reduce the risks to our security interests to an absolute minimum, we must also recognize that we have entered a period of constrained resources that will see our military force structure shrink and our overall defense capabilities reduced. The result will be significantly greater risks to our ability to achieve our strategic goals. Thus we face difficult choices regarding our defenses. How well we make those choices and how well we manage their implementation will determine, to a great extent, whether or not we will preserve the gains of the past 7 years and build upon them to provide for a more secure America.

Economic considerations do have a significant bearing on the resources we devote to defense. Yet we must also remember that the defense efforts of our principal adversary, the Soviet Union, greatly affect the level of resources we require to maintain the degree of risk to our security at a prudent level. Chart I.A.2 highlights the disparity in defense investments between the United States and the Soviet Union by comparing U.S. and estimated Soviet costs over the past 20 years for military investment programs--the procurement, construction, and research and development activities that build a lasting stock of military assets. Although the United States has in recent years restored a level of investment approximating the Soviet level, the Soviet Union retains most of the equipment, facilities, and designs they acquired by their much greater cumulative investments since 1970.¹

¹Taken from The DoD Annual Report to the Congress, February 18, 1988.

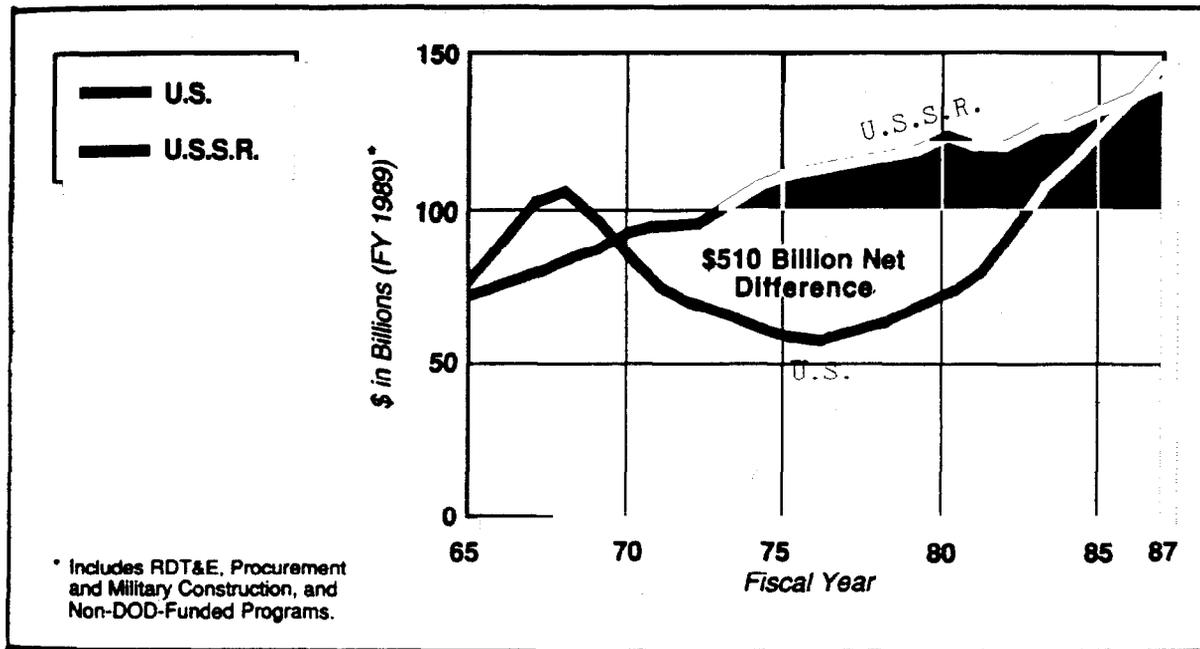


CHART I.A.2. A COMPARISON OF U.S. DEFENSE INVESTMENT EXPENDITURES WITH THE ESTIMATED DOLLAR COST OF SOVIET INVESTMENT EXPENDITURES

COSTS

The costs of some progressive action are low or no costs, others cost a reduction of sovereign power (and pride), while still others (like increased war reserves, support of mobilization actions, etc.) are of considerable cost. Considerable improvement can be made in planning in peacetime for some actions that may not be needed before a transition to war, with appropriate testing to assure practicality of plans and to train participants.

SUMMARY

Time and space factors must be given full consideration. The capability of the United States and NATO in comparison with the Warsaw Pact is most critical. We cannot allow a "bean count" of divisions, wings, tanks, artillery pieces, and missiles to too greatly influence the determination of the balance of power. It is just as important, or more so, to recognize and negotiate on the basis of time and space factors involved in considerations enumerated earlier in this paper. Unless these logistic elements are given full consideration and weight in negotiations, subsequent agreements will prove disastrous to the United States and its

allies if deterrence fails, and the probability of failure of deterrence increases when the potential enemy recognizes these very basic and fundamental factors have been disregarded in negotiated agreements. Thus, actions must be taken to:

- Lessen the U.S.-NATO disadvantages enumerated above where possible.
- Where deficits, time and space factors cannot be eliminated, "weights and measures" must be practically determined so as to recognize and negotiate with such attendant risks fully considered.

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ATTACHMENT

SUPPLEMENT B to
Task Force 9 ReportLONG TERM DEFENCE PROGRAMMETask Force No. 9 on Consumer LogisticsPRINCIPLES OF NATO LOGISTICS(Applicable to Consumer Logistics)

The basic foundations for the planning and execution of NATO logistics operations in peace, transition to crisis, and, if required, combat are the "Principles of NATO Logistics" which are derived from NATO agreements and implementing directives. It is from these principles that goals and objectives are established with follow-on tasks, projects, etc. It is through the pragmatic application of these principles that objectives of NATO logistical readiness will be achieved. These principles are:

1. Economy of Logistic Force is the basic logistic principle. (Ministerial Guidance 1975 and Declaration on Atlantic Relations of 26th June, 1974).
2. Co-operation and collaboration are required for more efficient and economical use of logistic resources. (Ministerial Guidance 1977).
3. Logistic Interdependence requires "guaranteed satisfaction" of other national force logistic requirements equivalent to one's own. (MC 36/2(Revised) of 18th May, 1960).
4. Provision of Logistic Resources to meet NATO operational plans is a national responsibility. (MC 36/2(Revised) of 18th May, 1960 and Council Resolution of 23rd February, 1952).
5. Determination of logistic requirements is a NATO responsibility. (MC 36/2 and MC 53 series).
6. Multinational logistics is a NATO responsibility. (MC 53 series).

(*) When separated from the Appendix, this part can be downgraded to NATO UNCLASSIFIED.

SUPPLEMENT B to
Task Force 9 Report

7. Logistic practice must be the same in peace as in war. (Ministerial Guidance 1977)

8. Standardization of materiel and services should be attained. (Ministerial Guidance 1977 and Communiqué of NAC in Heads of Government Session in December 1957).

9. Interoperability must compensate for any lack of standardization of materiel and services. (Ministerial Guidance 1977).

10. Logistic information will be fully and reliably exchanged within NATO. (Declaration on Atlantic Relations of 26th June, 1974).

11. Constant satisfactory logistic readiness must be maintained. (Ministerial Guidance 1977).

12. Logistic plans must be based on updated combat operational plans and immediately convertible to combat logistic operations at the moment of enemy attack or threat. (Ministerial Guidance 1977).

13. Mobility and dispersion must replace voluminous static storage of combat supplies and equipment. (Second Conference of NATO Senior Military Logisticians).

14. NATO logistic facilities must be configured for passive defence in peacetime to assure survivability in war. (Partially in Flexibility Studies, and in Ministerial Guidance 1977).

15. Duplication of common logistic functions must be minimized within the Alliance through specialization, single management, etc. (Ministerial Guidance 1975)

16. Logistic procedures should be standardized and harmonized to provide flexibility between nations in logistic support of NATO forces. (EUROGROUP Principles of Co-operation in Logistics.)

Note: Appendix to Supplement B provides extracts from NATO documents pertaining to each one of the principles listed above.

(*) When separated from the Appendix, this part can be downgraded to NATO UNCLASSIFIED.

**COMBAT SUSTAINABILITY
IN THE
U.S./NATO-WARSAW PACT BALANCE**

by
Charles W. Groover

COMBAT SUSTAINABILITY
IN THE
U.S./NATO-WARSAW PACT BALANCE

INTRODUCTION

There is probably no other aspect of Defense combat capability where there is as much ambivalence as exists regarding combat sustainability. During the 15 years that I was involved in Defense logistics planning and macro resource allocation, the Military Departments consistently bemoaned the lack of needed combat sustainability while just as consistently refusing to fund it adequately when preparing their financial programs and budgets. But that gets ahead of the story. I have been asked to lay out my understanding of the combat sustainability dimension of the NATO/Warsaw Pact conventional force balance. In responding, I will follow roughly this route. I will:

- identify the few assumptions that underlie my thinking,
- define a few key concepts and terms as I will employ them,
- touch on the time/distance considerations,
- offer some observations on strategic warning and the effect that assumptions regarding it have on our policies, resource allocation, force posture, and estimates of our combat sustainability,
- present some realistic, although notional, sustainability inventory requirements for various crucial materiel commodity classes,
- offer a few comments on production base planning and requirements,
- present a general assessment (hopefully not too badly dated) of U.S./NATO combat sustainability today,
- offer a few comments about the history of how we got to where we are today,
- discuss the difficulties inherent in trying to estimate Warsaw Pact combat sustainability, and consequently in trying to devine the NATO/Pact "combat sustainability balance", and
- wrap up with some conclusions about what strike me as some reasonable courses for NATO to pursue.

ASSUMPTIONS

The assumptions that are explicit or implicit in the discourse that follows are relatively few, namely:

- France is involved in the defense of NATO Western Europe from M-Day; however, it draws no sustainability stocks from the alliance nor contributes any to it; the line of communication (LOC) across France is available from M-Day.
- Essentially the same U.S. force levels as today remain forward-deployed in Western Europe.
- The INF Treaty is ratified and implemented.

DEFINITIONS

Before preceding further, a few definitions are in order. "Readiness", in particular, means many things to many people. My analysis and exposition employ the following terminology: Total combat capability comprises four basic attributes--

- Force Structure: the size and mix of our active and Reserve combat and support forces, e.g., the numbers of tactical air wings, armored divisions, carrier battle groups, transportation companies ... that comprise the force structure;
- Modernization: the technological sophistication or quality--the proximity to the state-of-the-art--of the weapons and equipment in that force structure; we can assess this attribute by comparing fielded technologies on the two sides, and possibly make some judgments about the extent of modernization by assessing the average age of the weapons and equipment in certain classes (e.g., armored vehicles);
- Readiness: the extent to which a weapon system, equipment, or unit (or a collection of them) is able--on short notice--to perform the functions for which it was designed, acquired, or organized; and finally the subject of this paper...
- Combat Sustainability: our ability to continue to sustain our forces in combat with replacement manpower and materiel, and support functions (e.g., maintenance, engineers, transportation and distribution).

CONSTITUENTS OF SUSTAINABILITY

Both manpower and materiel sustainability involve two components: peacetime inventories and post-M-Day production (in the case of manpower, this "production" takes the form of draftees, volunteers, and callup of the individual ready reserve). In most plausible NATO scenarios, materiel sustainability would become a serious problem far earlier in the conflict than would manpower. Because of that, I focus here almost exclusively on the materiel picture.

As noted above, materiel sustainability consists of two constituents--inventories that exist on M-Day plus the additional assets that can be produced thereafter. Those M-Day inventories may be physically located in the theater where they are needed, or elsewhere--in the continental U.S. (CONUS) or in some other theater. Obviously, those M-Day stocks that are located outside the theater on M-Day must be moved into the theater before the in-theater stocks are depleted if we are to avoid stock outages.

The various critical materiel commodities differ widely in their weight by volume, cost by weight, options for delivery into the theater, and potential for substitution within categories. These differences translate into different problems and solutions. For example, munitions and POL by virtue of their high consumption rates, high weights by volume, and relatively low cost by weight are not serious competitors for scarce airlift; they must be moved by surface transportation--ship, rail, truck, or pipeline. A possible exception to this rule is some of the very high cost, low volume, light weight munitions such as air-to-air missiles or weapons guidance kits, which might be air-lifted into theater and almost certainly would, on occasion, be redistributed within the theater via tactical airlift.

The important implication of these facts is that if we want to avoid a situation where our forces exhaust their conventional staying power before the enemy exhausts his, we must preposition enough of these commodities in theater before D-Day to support consumption until the resupply flow into the theater can be established. (More later on the distinction between M- and D-Day.)

In contrast with munitions and POL, spare weapon system components and repair parts--particularly for aircraft--tend to be very high cost by weight and volume. Quite aside from the distribution issue, the tremendous cost of spares constrains our investments in them in a global sense. In general, the Air Force does not buy spares to preposition in an overseas theater to support the possible wartime needs of forces that would deploy to that theater from CONUS or elsewhere in time of crisis or conflict. In the case of tactical air forces, we--at least in theory--buy war reserve spares, but most of them are held with the operating units, configured for rapid deployment with those units in time of crisis; the rest are held in central depots. The Army provides some war reserve spares in the theater; however, the Army's major problem is more likely to be the shrinkage in its population of weapons and equipment via attrition than a shortage of spare parts.

That combat equipment requires yet another perspective. Munitions, POL, and spares have one characteristic in common: All three of these commodities exist to enable the weapon systems to function. Although there is some potential for substitution among munition types, and we can operate weapon systems in some circumstances without some needed spare parts, in general we can say that units must have munitions, POL, and spares to keep fighting.

The situation is different with major equipment items: A tank is a tank; whether we allocate a given complement of tanks to equip new or existing units of the force structure or set them aside as combat attrition fillers is essentially an allocation decision, which presumably represents judgments about the relative benefits of force size vs staying power.

When we run out of war reserve munitions or POL, the affected units are effectively out of action. Not so with combat equipment: When we run out attrition filler equipment, we are not out of business in the same sense. Although we can no longer replace our attrition as we experience it, we can continue to fight effectively with a shrinking force for some time after our last war reserve attrition filler equipment was put in service.

SOME KEY VARIABLES

To recap the above discussion, munitions, POL, and most combat equipment, by virtue of their criticality, and the volume, tonnage, and consumption rates involved, must be prepositioned in the potential combat theater in quantities calculated on the assumption that replenishment must come via surface transportation. How that general principle translates into a quantitative prepositioning requirement depends on at least three factors: (1) anticipated consumption rates during the early stages of combat, (2) time/distance considerations, and (3) strategic warning.

Consumption Rates: There are major difficulties involved in estimating wartime consumption rates of munitions, POL, spares, and combat equipment. A vast number of variables will affect our actual wartime consumption; over the years, the Services have experimented with numerous approaches to estimating that consumption--they range from relatively simple expected value models to very large, complex, detailed, and long-running combat simulation models. Critiquing those methodologies is clearly beyond the scope of this paper, not to mention the competence of the author. Suffice it to say that we do have methods for estimating combat consumption, and--for the purposes of this paper--we should assume that they are as accurate as it is possible to make them today.

Time/Distance Considerations: For purposes of establishing war reserve prepositioning requirements for U.S. forces forward-deployed in or planned for deployment to Western Europe, we generally assume that the additional stocks of munitions or combat equipment that would be shipped to the NATO theater would come from depots or production lines in CONUS. This shipment entails breaking stocks out of depots (or taking them from production lines), marshalling the necessary intra-CONUS transportation (truck or rail), delivering those assets to East or Gulf Coast seaports, transshipment at the CONUS ports, possibly convoy make-up time, trans-Atlantic shipping time, transshipment at the European ports,

and intra-theater distribution time. The sum of these time segments has generally been assumed to be at least 30 days.

Strategic Warning: This is a critical variable in setting war reserve prepositioning requirements and, possibly even more important, in its effects on our policies for and allocation of resources to industrial preparedness and production base planning.

Strategic warning affects theater prepositioning requirements in at least two ways: First, if we have several weeks of warning and use it (among other things) to deploy additional forces into the theater before D-Day, we increase aggregate demand rates for munitions and POL, and--all other things being equal--increase prepositioning requirements. Second, and with effect counter to the first point, if we take advantage of the warning to start the resupply flow toward the theater before D-Day, we reduce the quantity of stocks that we needed to have stored in the theater prior to that warning.

Strategic warning has an even more profound effect on the way we must look at the attractiveness and utility of peacetime investments to expand the capacity and enhance the responsiveness of the defense industrial base. With current manufacturing technology and the production base we start with, I remain convinced that even a modern, capacity-expanded, promptly responsive production base could not expand output and deliver it to the potential combat theater any earlier than about four months after the decision to do so. (Some view this as an heroic assumption.) If we assume no strategic warning, this means that the production base cannot help us any sooner than about D+120 days.

However, if we are willing to assume some significant strategic warning (effectively defined as the time lag between M-Day and D-Day), we then have a situation where the production base begins to contribute to combat sustainability much sooner than D+120 days. This, in turn, has two effects: (1) we reduce the total worldwide inventory of war reserves (e.g., of munitions or combat equipment) that we must buy in peacetime to provide a given level of combat sustainability; and (2) we make production base investment far more attractive. Unfortunately, these two effects may provide an incentive to wishful thinking on the part of those who seek an excuse to reduce the calculated war reserve inventory required to sustain forces until resupply could be reestablished, and those who believe--as an article of faith--that more investment to provide a more robust defense industrial production base is imperative.

Over the past several years I have become convinced that we have repeatedly deluded ourselves about the likelihood of our receiving operationally useful strategic warning. The key here is "operationally useful." I have no doubt that we would receive strategic warning. Numerous defense analysts--including Len

Sullivan--correctly observe that the world situation would very likely deteriorate significantly from today's relatively benign atmosphere before any premeditated Warsaw Pact attack on the West. However, I believe that strategic warning would most likely take the form a series of individually ambiguous incidents that, collectively and well after the fact, would be seen to have constituted "strategic warning." Strategic warning that we fail to act on is of no benefit. Reacting to--and taking advantage of--strategic warning will normally be costly in both political and financial terms. It entails such actions as calling up reserves, reinstating the draft, and accelerating production of hundreds of items of critical military materiel, particularly including munitions and combat equipment. Each would be expensive and politically painful. As a result, there would be an enormous temptation on the part of both the Executive and Legislative branches to temporize in the face of a series of individually ambiguous stimuli, rather than pay the price of responding and exploiting that warning.

The above line of reasoning leads me to believe that our combat sustainability should be planned, acquired, and assessed on the assumption that we would be very unlikely to take advantage of a significant period of strategic warning by expanding our manpower base, or rapidly increasing and redistributing our inventories of munitions and combat equipment. In other words, we should focus on the combat staying power we could get from the stocks on hand now, or on some future M-Day, rather than assuming away the significance of any deficiencies in anticipation of "getting well" upon receiving strategic warning.

REALISTIC (NOTIONAL) SUSTAINABILITY OBJECTIVES--DERIVED FROM THE ABOVE

Our basic objectives in setting quantitative combat sustainability requirements are: (1) to make sure we have enough materiel in our total inventories on M-Day so that--even with little or no strategic warning (i.e., warning acted on)--the Warsaw Pact could not outlast us conventionally; and (2) to distribute those materiel inventories in peacetime so as to insure that the stocks in-theater, and deliverable with the forces deploying into the theater, could sustain combat consumption until a resupply pipeline could be established.

These general principles have often been translated into requirements to preposition 45-60 days of munitions consumption and about 30 days of anticipated combat equipment attrition in the theater; and ultimately to build to a total inventory of at least 90 days worth of munitions consumption and 60 days of combat equipment attrition.

These requirements apply to the relatively low cost-by-weight munitions; as suggested earlier, the very high cost munitions such as air-to-air missiles and guidance kits can be and are distributed

and redistributed by air, with their prepositioning requirements reflecting that reality.

Weapon system (e.g., aircraft) spare and repair parts represent some special problems and suggest different solutions. As noted much earlier in this paper, spares are so expensive that they are routinely airlifted in peacetime and we expect that they would continue to be in time of war. We maintain additional spares inventories in the theater in peacetime to support the higher wartime activity levels of the peacetime forward-deployed forces. We do not preposition war reserve spares to support the additional forces that would deploy into the theater after M-Day; deploying tactical air forces bring with them packages of spares (war readiness spares kits--WRSKs) that are designed to support the deploying unit for some specified period of operation (normally either 15 or 30 days). The Air Force proposes to buy additional war reserve spares, most of which would be maintained in CONUS depots.

There are enormous uncertainties about spares demands in wartime. Even in peacetime, we have great difficulty in forecasting spares demands for a highly predictable peacetime flying hour program where aircraft land at planned bases after the vast majority of the missions flown. In a major NATO conflict, demand projection would be enormously more difficult. First, peacetime experience may not be fully representative of the "break rates" we would face in wartime. Second, the fluid nature of the war, coupled with completely "unforecastable" enemy damage to our runways and tac air installations, means that we would face numerous instances where aircraft would recover, without preplanning, to other than their launch base. In other words, we're going to have many instances where the spares demand is at Base A and the supply is at Base B. Theoretically, one could protect against such situations by buying redundant inventories. In the case of spares, economics absolutely prohibit it. The only way the Air Force can hope to provide adequate spares support to its forces in wartime is by building far more flexibility and resilience into its logistics support structure. It is taking steps to do so; one such initiative is the Air Force's relatively new European Distribution System (EDS)--a small, dedicated intra-theater air-lift system designed to redistribute spares among bases, virtually on a daily basis, in response to the inevitably shifting geographical distribution of spares demands.

This discussion of the wartime spares resupply problem has focused on Air Force tactical air forces. This is not to suggest that analagous problems do not exist in the other Services. I am confident that they do; however, they have been far less thoroughly analyzed, and are far less well understood.

APPROXIMATE STATE OF U.S./NATO SUSTAINABILITY TODAY

We might take as a realistic, although notional, benchmark these U.S. war reserve stockage objectives for the NATO theater:

- 45 days of modern, highly effective munitions;
- 60 days of the older munitions (less effective, less expensive, but with substantial inherited inventories);
- enough air-to-air missiles and other so-called "mission-oriented" items to kill the Services' allocated shares of the enemy threat systems against which those weapons were designed to operate;
- 30 days of combat equipment attrition replacements;
- 30 days of weapon system (primarily aircraft) spares, with most of the Air Force's war reserve spares being configured as WRSKs or Base Level Sufficiency Stocks (BLSS) for the forward-deployed units.

Against that bench-mark, we can safely(?) say that we are:

- generally well short of the modern munitions objective;
- probably have at least 60 days worth of many, but certainly not all, of the older munitions, although they are maldistributed because of theater storage shortages;
- so low on such items as air-to-air missiles that we would probably exhaust our inventories within a week or two--well before we could expect to have dealt with the allocated shares of the enemy air threat;
- have virtually no combat attrition replacements in theater for many if not most land force combat equipment items; in fact, for many items, there are not enough assets in theater to equip the units (including the prepositioned unit sets of equipment that we call POMCUS) to authorized levels;
- have most of the required assets available to fill the prescribed 15- or 30-day WRSKs, but very few assets of most items to satisfy the demands that would be encountered beyond that initial period.

The NATO Allies are, almost across the board, significantly worse off than we are. We never had completely credible data on the allies' stockage postures when I was in the Defense Department and had access to what data did exist, and I have no reason to believe that problem has completely gone away. Politically, the allies were reluctant to provide candid data on their sustainability postures because they were almost certainly embarrassingly meager, and they knew the U.S. would increase its already consistent

pressure on them to buy more. Partly because of the politics, individual countries' reported stock levels were suspect and, until recently, their sustainability postures were reported in days of supply that were derived by applying nonstandard national rates to those suspect stockage levels. There has been some progress toward adopting standard NATO munitions consumption rates and other standard reporting criteria, but I have no reason to believe that the NATO Allies' reluctance to buy adequate war reserve inventories has disappeared.

In the earlier discussion on strategic warning, I emphasized the close link between strategic warning assumptions and the useful and timely production output one could expect to get from the production base. Obviously, one cannot assess either the U.S. or NATO Allies' sustainability postures without considering post-M-Day production. There are at least three parameters to be considered here:

- (1) What is the maximum potential rate of output of the existing production facilities if operated at their absolute limits?
- (2) How does that rate compare to the rate of consumption/attrition we could anticipate in wartime?
- (3) How long would it take us to attain that maximum rate of output?

For the U.S., for the vast majority of items--munitions, combat equipment, or spares--anticipated U.S. consumption/attrition rates during the early months of the conflict far exceed the maximum theoretical rate of output of the U.S. production base. The limited evidence that I have seen of the Allies' situation suggests that the rate disparity is even more severe for them. Compounding the difficulty is the fact that it would take several months for the U.S. production base to expand to its maximum -- although inadequate--rate of output. There is no reason to think the Allies' facilities could respond much quicker, although they are obviously producing output closer to their points of demand. (There is also the question of which side of the FEBA (forward edge of the battle area) the surviving allied facilities would be on when they reached their maximum production rates.)

Given current U.S. and Allied stockage levels, in-theater stocks would barely last until the resupply flow from M-Day CONUS or other out-of-theater stocks could be established. Even if these other worldwide stocks could be moved into the theater before the prepositioned stocks were exhausted, the total assets available would be exhausted long before the expanded output from the production base could be delivered to the combat theater.

This state of the world has always argued to me that we should apply virtually all of our new investments in combat sustainability to increasing war reserve stockage levels, rather than to

increasing the capacity and responsiveness of the defense production base. I remain convinced that--given reasonable assumptions about our willingness to respond to ambiguous strategic warning--no realistically attainable, near-term (5-10 year) investment in the production base can create a base that could deliver expanded output to the combat theater quickly enough to do us any good. Many well-informed defense analysts--probably including several on this panel--will disagree strongly with my conclusions on this point, but today the logic seems inescapable to me.

HOW WE GOT THAT WAY--SOME HISTORY

On the U.S. side, there has always been a "declaratory policy" to provide adequate combat sustainability. Resource allocation decisions have normally been another matter. In OSD in 1969-70, we who were responsible for drafting the Secretary's Logistics Guidance to the Services, found that we spent about half of each year resisting the Services' demands for higher war reserve stockage objectives. The rest of the year we spent trying to get them to put enough money in their budgets and financial programs to procure to the objectives they had just argued were dangerously inadequate.

Up until at least the early 1970s, the Services were quite candid about their resource allocation priorities: They were to allocate their peacetime budgets preferentially to force structure and modernization of that force structure, if necessary at the expense of funding for readiness and combat sustainability. There were normally two primary justifications offered for this view:

- "Buy forces and modernization in peacetime when money is scarce; we'll get the added money for readiness and sustainability in time of crisis."
- "Large, visible, modern forces are a more effective deterrent than the relatively invisible readiness and sustainability of those forces."
- And occasionally a third: "Why should we buy all those war reserves when the NATO allies will give out of ammunition in the first week or so?"

Beginning in the mid-70s, there was a gradual shift in the thinking of the OSD leadership toward the view that--given the kinds of strategic warning the JCS were saying we could count on--we had to give more attention to readiness and sustainability in our peacetime resource allocation.

Notwithstanding this shift in OSD thinking on the need to buy readiness and sustainability in peacetime, the Services' preference for force levels and modernization continued.

With the almost complete decentralization of Defense planning and resource allocation in the Weinberger Pentagon, the Services' preferences dominated the allocation of the growing Defense budgets of the early 1980s. Although spending on combat sustainability expanded in absolute terms during the early 1980s, our posture in terms of the duration of combat we could sustain did not improve correspondingly. This was largely because the increasing absolute funding levels were outpaced by munitions and equipment unit costs and an expansion in the size of the force to be supported.

Meanwhile, on the other side of the Atlantic, our NATO Allies were continuing to find their own reasons for not buying adequate war reserves. They can be characterized roughly as follows:

- "We cannot afford to buy the ridiculous levels of stocks that the Americans propose."
- "Anyway, we don't want to suggest to the Soviets that we are willing to fight an extended conventional war."
- "In any event, the U.S. will resupply us when we give out of ammunition."

In short, we continue to have a major disconnect between our rhetoric and our resource allocation.

THE NATO/WARSAW PACT SUSTAINABILITY BALANCE

An earlier section of this paper commented on the difficulty associated with estimating U.S. wartime consumption/attrition rates for munitions, POL, spares, and combat equipment. Naturally, estimating those rates for the Warsaw Pact is even more uncertain. When one considers that consumption/attrition rates are only one variable--although a critical one--in estimating combat sustainability, the problem of estimating relative NATO/Warsaw Pact combat sustainability looks even more formidable. In addition to the methodological issues associated with estimating consumption rates, there are, not surprisingly, serious data problems associated with estimating Warsaw Pact sustainability.

First, is the problem of estimating Soviet and Warsaw Pact inventories of munitions and equipment. In response to the need to make such estimates, the intelligence community has devised a method that has come to be known as "shedology": the practice of estimating the capacity of storage sheds from satellite photography and then--based on assumptions about capacity utilization and munitions mix--estimating the munitions inventories stored therein.

Soviet/Warsaw Pact munitions consumption rates are expressed, at least by U.S. and NATO analysts, in terms of "units of fire" per day. These units of fire are quantified based on what we know of Soviet combat doctrine and their planned levels of consumption for

conflicts of varying intensities. As noted repeatedly, variations in actual consumption will be a key driver in our sustainability estimates.

Another key unknown in our assessments of Soviet/Pact sustainability is their ability and desire to redistribute assets from East of the Urals. A major consideration here is the Soviet desire to maintain materiel stocks (and combat capability) in areas opposing the PRC and elsewhere in the Far East.

Finally, another major uncertainty is just how a NATO conflict might unfold, and the implications that the course of combat has for the consumption/attrition of munitions and equipment. There are several subsets of this broad issue:

- One is the question of what fraction of their force the Soviets/Warsaw Pact would commit to combat vs hold in reserve.
- Another related issue is that of "rationing"--that is, to what degree can a force that is running short of munitions ration its consumption without major adverse effect on its combat effectiveness?

DIA's analyses of likely NATO combat scenarios normally envision a quick, intense start, followed by a rapid Pact breakthrough, and subsequent "mopping up" with relatively light Soviet/Pact munitions consumption and equipment attrition after the initial assault. This expectation translates into relatively robust estimates of Pact sustainability.

Until the last few years, I had not seen any rigorous, credible analyses of comparative NATO/Warsaw Pact combat sustainability in a European conflict. The prevailing and longstanding assumptions had been:

- The Warsaw Pact has overwhelming superiority in sustainability; it is inevitable that NATO would be outlasted conventionally.
- The only factor keeping the Warsaw Pact at bay was the NATO theater (and U.S. strategic) nuclear deterrent; improved NATO conventional sustainability might even weaken the nuclear deterrent.

In the mid-80s, General Bernie Rogers, then SACEUR/CINCEUR, reinforced these perceptions of dangerously inadequate sustainability. In numerous speeches and in Hill testimony, he estimated that NATO could fight conventionally for no more than a week or ten days before he would find it necessary to request nuclear release authority. (His concern was broader than just NATO's meager munitions inventories; he was also quite concerned about inadequate U.S. Army combat service support structure.)

Also in the mid-80s, the Secretary of Defense's staff began to take a systematic look at the NATO/Pact sustainability balance. The OSD work was essentially a sensitivity analysis of estimated Warsaw Pact munitions sustainability for a range of variations in the key factors that determine that sustainability.

OSD examined these ranges of assumptions about these "shedology"-based estimates of Pact munitions stockage levels:

- Percent fill (+/-5% of DIA est);
- Mix: i.e., how much of the total estimated tonnage is tank and artillery ammunition (the OSD work varied this assumption between 45% and 55%); there is also some reason to question the extent to which the mix of munitions in the Pact inventories matches the mix of weapons to be supported--the Soviets are thought to retain several earlier generations of weapons, equipment, and presumably munitions;
- Consumption rates were varied from 1.1 to 1.3 "units of fire" per day;
- Fraction of the Pact force engaged on a given day was varied between 30% and 40%; and
- Stocks assumed withheld to support Soviet forces opposing the PRC and the Far East were varied between 5% and 15%.

Various combinations of these variables were employed to compute a range of estimates of Pact munitions sustainability. The compounding effect of these relatively modest variations in the individual variables produced big swings in the estimate of Warsaw Pact sustainability--ranging from about one to two and a half months. In contrast, DIA had generally estimated two to three months.

These estimates generally suggested that the Pact had a clear edge in combat staying power, but nothing like the magnitude previously assumed to exist. A clear and key conclusion was that--although the Pact almost certainly had an edge in conventional munitions sustainability--it is just as clearly within NATO's reach to redress that disparity.

CONCLUSIONS

I draw the following conclusions from all of the foregoing:

1. The U.S. almost certainly possesses less conventional combat sustainability for a potential NATO conflict than does the Soviet Union/Warsaw Pact.
2. The NATO Allies almost certainly possess even less combat sustainability than does the U.S.

3. The U.S. Military Services have consistently resisted spending enough money on sustainability--particularly war reserves of munitions and spares--to buy out their stockage objectives when those objectives are sized to their projected force levels and contain an efficient mix of the modern, much more effective munitions now available for procurement. It seems likely that this reluctance will continue as the Defense budget inevitably gets even tighter.
4. The U.S. Army continues to be seriously underfunded in its equipment procurement accounts. The result is that the Army cannot afford to buy all of the modern weapons and equipment needed to equip its force structure. The consequence of this is not only the "hollow Army" that a previous Chief of Staff expressed such concern about, but also an inability to buy the attrition replacements needed to sustain those units in combat.
5. Although the U.S. and NATO almost certainly possess less combat sustainability than do the Soviets and Warsaw Pact, the gap is not so wide that it is beyond the ability of the Alliance to close with some modest shifts in priorities, Defense spending increases, or both.
6. Whereas the nuclear deterrent has provided the Allies a convenient excuse for neglecting conventional combat sustainability--not to mention conventional combat capability overall--the new INF Treaty may provide the impetus and the will to provide the increased conventional combat capability and sustainability that is needed.
7. It would be wishful thinking to believe that the U.S./NATO sustainability deficiencies can be rectified via some no cost/low cost industrial base planning program. Any initiative that actually makes significant increases in the capacity and responsiveness of the Defense industrial production base would be very expensive. However, that major investment even if made would not yield a production base that could respond rapidly enough in time of crisis or war to obviate the need for significantly larger war reserve inventories than we now possess.
8. We clearly need to move away from the current heavy reliance on the U.S./NATO nuclear deterrent. Substantial increases in conventional combat sustainability must be a key element in that move.

**NATO-WARSAW PACT
CONVENTIONAL FORCE BALANCE**

by
John M. Collins

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BIRDSEYE VIEW OF THE BALANCE

The NATO-Warsaw Pact conventional force balance is a complex equation that involves objectives, perceived threats, strategies, and postures on both sides. Nuclear, chemical, and biological balances have a big influence on conventional capabilities and limitations.

NATO OBJECTIVES

1. Objectives specify what NATO must do to assure the security of member states against possible Warsaw Pact aggression. Basic obligations include:
2. PEACETIME OBJECTIVES
 - a. Deter armed aggression against NATO nations (includes encroachment).
 - b. Build and maintain regional stability.
 - c. Inhibit the expansion of Soviet influence wherever NATO has strong security interests.
 - d. Counter Warsaw Pact disinformation and subversion.
3. WARTIME OBJECTIVES
 - a. Limit the scope and intensity of conflict (control escalation).
 - b. Block invaders at boundaries between NATO and Warsaw Pact.
 - c. Repel invaders rapidly.
 - d. Limit damage and casualties to NATO.
 - e. Terminate conflict quickly on NATO terms.
4. TRIBUTARY TASKS

Each basic objective includes tributary tasks, of which the following are merely representative:

- a. Reach agreement on beneficial arms reductions.
- b. Reinforce and resupply rapidly from the Continental United States (CONUS). Specifically, move 6 Army divisions, 60 tactical fighter squadrons, 1 marine amphibious brigade, and associated support from CONUS to Europe in 10 days.

- c. Conduct conventional defense long enough to make rational decisions concerning escalation.
- d. Delay, disrupt, and/or destroy enemy follow-on formations before they can reinforce first echelon assault forces.

WARSAW PACT OPPOSITION

- 1. Warsaw Pact opposition to NATO objectives is a matter for speculation in Western intelligence communities. A few fundamental conclusions concerning Warsaw Pact objectives, capabilities, and limitations nevertheless seem evident.

2. WARSAW PACT MILITARY OBJECTIVES

- a. Deter armed attacks of all kinds on Warsaw Pact territory.
- b. Achieve early victory, if conflict occurs.
- c. Control escalation.
- d. Limit damage to the Warsaw Pact.
- e. Limit damage to NATO assets the Warsaw Pact might use during or after a war.

3. WARSAW PACT COMBAT CAPABILITIES¹

The Warsaw Pact could exercise all or part of the following offensive combat capabilities, if it chose to run serious risks:

- a. Inflict catastrophic damage on CONUS with strategic nuclear weapons as a prelude to war in Europe.
- b. Invade Western Europe with little warning, using air and ground forces now in East Germany and Czechoslovakia.
- c. Support conventional operations with theater nuclear and chemical weapons targeted against NATO forces, airfields, ports, command/control centers, and supply installations.
- d. Challenge NATO for air superiority over Western Europe.
- e. Reinforce initial efforts with ready reserves in European Russia and Poland.

¹Capabilities indicate realistic options, not predicted degrees of success.

- f. Seriously interfere with reinforcement and resupply from the United States by interdicting trans-Atlantic air and sea lanes and terminals.
- g. Mobilize additional combat power.

4. WARSAW PACT STRENGTHS

Several strengths underpin Warsaw Pact combat capabilities.

- a. USSR provides preponderant combat power (annexes A and B).
- b. Unity of command is achieved through centralized Soviet control.
- c. The Warsaw Pact has the initiative. There won't be any war, unless they start it. They thus can peak for readiness, surge training, and concentrate combat power at times and places of their choosing. Favorable force ratios of many-to-one are possible in some circumstances.
- d. Warsaw Pact weapons and equipment are interoperable.
- e. Warsaw Pact forces operate on interior lines of supply.
- f. The Soviets maintain immense reserves of uncommitted land and tactical air forces. Obsolescent systems, which are still lethal, can replace huge combat losses. Trained personnel, recently released from active service, are ready to operate them.
- g. Soviet offensive capabilities developed since 1970 include:
 - (1) Operational maneuver group (OMG) concepts refined and capabilities much enhanced;
 - (2) 13,000 more main battle tanks (three new generations);
 - (3) 54,000 more armored fighting vehicles (five new generations);
 - (4) 14,000 more artillery tubes; many now self-propelled;
 - (5) Mobile air defense umbrella;
 - (6) World's best combat bridging;
 - (7) Almost 3,000 modern aircraft designed for ground attack;

- (8) 1,200 helicopter gunships;
- (9) Much expanded theater nuclear missile capabilities;
- (10) Much expanded sea denial and power projection capabilities.

5. WARSAW PACT LIMITATIONS

Several circumstances significantly limit the likelihood that Warsaw Pact armed forces will attack NATO at an early date:

- a. Soviet leaders have avoided high risk military ventures since World War II.
- b. The Soviet Union perceives potential enemies on at least two major fronts, perhaps three (east, west, south).
- c. Unrest creates internal security problems in the Warsaw Pact.
- d. Warsaw Pact forces would be vulnerable to nuclear retaliation, if they massed for conventional assaults.
- e. Terrain and urban sprawl in NATO Europe channelize high-speed avenues of approach for Warsaw Pact divisions.
- f. Major reinforcements from European Russia must move over lengthy and vulnerable land LOCs.
- g. Logistical and C³ deficiencies persist.
- h. Warsaw Pact conventional forces consequently could not execute a short-war strategy with high confidence of success at acceptable costs.

NATO RESPONSE

- 1. NATO's strategy and supporting force posture are designed to accomplish Alliance objectives despite perceived Warsaw Pact threats.

2. SAMPLE ASSUMPTIONS

- a. Assumptions, presumed correct in the absence of contrary proof, fill current information gaps and replace facts concerning the future.
- b. Sample assumptions listed below helped shape this assessment of NATO's capabilities, vulnerabilities, and requirements.

- (1) Strategic warning probably will be ambiguous and could be measured in hours or days, rather than weeks or months.
- (2) Soviet leaders probably are wary about the wartime reliability of Warsaw Pact allies.
- (3) NATO leaders probably are wary about the wartime reliability of some Alliance members.
- (4) Dissidents in Western Europe could constitute security problems in wartime.
- (5) Spetsnaz constitute serious rear area security problems.
- (6) Any large-scale war would be won or lost on the central front.
- (7) Limited objective attacks by the Warsaw Pact are unlikely; NATO's far north flank is the most likely target, if they occur.
- (8) NATO may not be able to use nuclear weapons first, for several reasons:
 - (a) NATO's release procedures may prove too ponderous.
 - (b) NATO's nuclear weapon stockpiles may be destroyed, as the opening act of any surprise attack.
- (9) Strengthening NATO's conventional forces will raise the nuclear threshold only if NATO's vulnerable nuclear weapon stockpiles and delivery systems are better protected against preemptive attacks.
- (10) Rapid reinforcement and resupply from the Continental United States is problematic for at least two reasons:
 - (a) NATO navies probably cannot control essential sea lanes expeditiously.
 - (b) Warsaw Pact forces will try to close NATO's ports and airfields as the opening act of any full-scale war.
- (11) Defense budgets of most NATO members will decrease or stay steady for the next decade, unless some unforeseen shock occurs.

3. NATO STRATEGY

NATO's military strategy laces together many policies. Those displayed below are prominent, although not all pertain in every instance, and some are not always honored:

Deterrence/Defense Policies

- a. Containment (not rollback)
- b. Flexible response
- c. Forward defense
- d. Non-provocative posture
- e. Central control
- f. Discourage preemption
- g. Control escalation
- h. High nuclear threshold desired
- i. First use of nukes, if required
- j. Minimum civilian casualties
- k. Minimum collateral damage
- l. Lowest credible force levels
- m. Heavy reliance on:
 - (1) CONUS reserves
 - (2) Mobilization
 - (3) Airlift & sealift

Burden Sharing Policies

- a. Fundamental philosophy:
An attack against one member is an attack against all, whether it occurs on the flanks or in the center sector.
- b. U.S. provides:
 - (1) Primary nuclear capability
 - (2) Most sea power
 - (3) Substantial air power
 - (4) Substantial land power
- c. Europe provides:
 - (a) Limited nuclear forces
 - (b) Most land power
 - (c) Most air power
 - (d) Substantial sea power
 - (e) Installations, facilities
 - (f) Territory

4. NATO DETERRENT CAPABILITIES

- a. Forces that underpin NATO's deterrence are summarized in annex A. See annex B for total U.S. inventory.
- b. Quantitative imbalances that favor the Warsaw Pact dilute NATO's conventional deterrent.
- c. Qualitative superiority, once NATO's strong suit, is less pronounced than in the past and, in some important respects, has disappeared.
- d. Warsaw Pact limitations listed on page 89 nevertheless reduce the likelihood that deterrence will collapse in the foreseeable future.

5. NATO DEFENSE CAPABILITIES²

NATO could exercise all or part of the following defensive combat capabilities in Western Europe:

- a. Conduct conventional forward defense operations along the present line of contact.
- b. Conduct delaying operations, if the crust cracks.
- c. Engage targets in Warsaw Pact territory, such as major assembly areas, airfields, missile sites, C³ nodes, and transportation bottlenecks.
- d. Conduct counterair operations.
- e. Dispatch reinforcements from CONUS and elsewhere.
- f. Mobilize additional combat power in NATO Europe.
- g. Escalate conflict with nuclear weapons.

6. NATO DEFENSIVE STRENGTHS

Defensive forces have intrinsic advantages. NATO's defensive posture has improved remarkably during this decade, in response to many initiatives.

- a. Front-line forces and many reinforcements are first rate.
 - (1) Leadership at all levels is outstanding.
 - (2) Training is rigorous and realistic.
 - (3) Morale is high.
 - (4) West European forces fight for their homeland.
 - (5) Indigenous forces are especially familiar with defensible terrain.
- b. Weapons and equipment have been much modernized since 1980.
- c. Infrastructure is much stronger.

²Capabilities indicate realistic options, not predicted degrees of success.

7. NATO DEFENSIVE WEAKNESSES

- a. Total concentration on deterrence and defense forfeits initiative.
- b. Quantitative disadvantages are apparent, given NATO's objectives and Warsaw Pact inventories (annex A). NATO forces consequently lack flexibility.
 - (1) Theater and corps level reserves are small and few.
 - (2) Combat losses cannot be replenished expeditiously.
 - (3) Conventional counteroffensive capabilities are insignificant (Berlin, for example, is indefensible).
- c. The rapid pace of Warsaw Pact (mainly Soviet) modernization is unmatched by NATO's qualitative advances.
- d. NATO deployment problems limit defensive capabilities, if combat occurs.
 - (1) NATO concentrates strength on the most easily defended approaches; allotments are less on high-speed avenues.
 - (2) NATO, deployed for conventional combat, is vulnerable to preemptive nuclear and chemical strikes.
 - (3) NATO forces and installations are congested in Germany, with little room to maneuver forces or disperse installations.
- e. Follow-on Forces Attack (FOFA) is afflicted with shortfalls in realtime intelligence, smart weapons, and air defense suppression, all of which are essential for success.
- f. Logistical defects could be decisive.
 - (1) Timely control of critical sea lanes and terminals, a prerequisite for rapid resupply from CONUS, is doubtful.
 - (2) Timely reinforcement, as well as resupply, from CONUS is in doubt, because air and sea terminals are poorly protected against aircraft, missile, and Spetsnaz attacks.
 - (3) Stockpiles, including POMCUS, also are open to preemptive attacks.
 - (4) Strategic airlift and sealift are insufficient to move personnel and equipment in times prescribed.

- (5) NATO's main supply routes, which run north-to-south near the present line of contact, are vulnerable to early disruption.
- (6) The shortage of D-to-P (D-Day-to-Production Day) stocks ensures a short war that NATO could lose before retooled industries take up the slack.
- g. Chemical warfare, electronic warfare, and civil defense capabilities are slight, compared with perceived threats.
- h. NATO's politico-military decision-making processes are glacially slow.
- i. U.S. sustainability relies heavily on reserve components that are not ready enough to satisfy requirements.

8. NATO'S MAIN NEED

- a. NATO's conventional forces probably are adequate to maintain a strong deterrent. Their ability to accomplish critical wartime objectives and implement wartime strategies unaided are dubious, no matter how much money and attention defense decision-makers devote during the next decade.
- b. Deterrence, in direct consequence, is more than a politically and economically desirable NATO ambition. It is a militarily indispensable objective, for which there is no realistic substitute. Nuclear deterrence as a back stop for conventional capabilities seems prudent for the foreseeable future.

NATO IMPROVEMENT OPTIONS

- 1. This report does not differentiate popular reforms from those that are politically, economically, and/or culturally unattractive. The status quo in some instances seems unacceptable, if NATO nations expect to preserve a strong deterrent and accomplish wartime aims.

2. CORRECTIVE ACTIONS

- a. NATO is well aware of many deficiencies, and is addressing them wisely, albeit slowly.
- b. Others may be uncorrectable. Vulnerabilities that result from congested facilities and north-south supply routes near the front will persist as long as French real estate remains unavailable. Attempts to redeploy U.S. forces from present sectors to the North German Plain would be time-consuming, tremendously costly in terms of

construction, and perhaps provocative. Berlin will always be indefensible.

- c. Political will to take appropriate corrective actions generally ebbs and flows in response to public perceptions of Warsaw Pact threats. Anxiety and wishful thinking alternate. West Germany's opposition to barriers along its eastern border is perennial.
- d. Widely advocated solutions to perceived problems, listed below in no particular order, are limited to high priority deterrent/defense problems that need additional attention (unfulfilled plans can't stop enemy tanks or aircraft). They include procedures, as well as weapons and equipment. Most are long-term projects.
 - (1) Invigorate efforts to gain German approval of obstacles that could delay, disorganize, and channelize enemy assaults along NATO-Warsaw Pact line of contact.³
 - (2) Reduce forward deployments and increase theater reserves in direct consequence.
 - (3) Levy requirements for simple, high performance hardware at costs that permit mass deployments to reduce quantitative imbalances.
 - (4) Develop semi-self-sustaining combat and transport STOL aircraft with much improved designs to reduce dependence on a few vulnerable airfields.
 - (5) Develop and deploy tactical ballistic missile defenses for key installations. Couple with stronger air defenses for the same purpose.
 - (6) Deploy antitanks guns to supplement missiles, which are of limited value in woods, cities, smoke, and fog.
 - (7) Deploy retaliatory chemical capabilities to deter Warsaw Pact CW employment.
 - (8) Improve rear area security against Spetsnaz, with particular attention to C³ installations, transportation bottlenecks, and nuclear repositories. Couple with civil defense.

³For some offbeat suggestions concerning border defense, see Sullivan, Leonard, Jr., "From Psychosis to Armored Sunroofs," Armed Forces Journal, March 1988, pp. 34, 38, 40, 42, 44-46, 48.

- (9) Develop a maritime strategy keyed to quick control of sea lanes that are essential for rapid reinforcement and resupply.
- (10) Revitalize NATO merchant fleets with self-sustaining and roll-on roll-off transports that can unload without access to full facility ports, which may be unusable. Deploy logistics over the shore (LOTS) capabilities.
- (11) Invigorate efforts to reopen LOCs through France and reconstitute logistic infrastructure along them.
- (12) Invigorate efforts to increase D-to-P stocks.
- (13) Seek permission to plan on selected Italian, and perhaps Spanish, land and air forces as emergency reinforcements on NATO's Central Front.
- (14) Streamline politico-military decision-making to facilitate fast, smooth transition from peace to war in response to surprise attack.

3. ACCOMPANYING COSTS

- a. Improvement costs depend on how much of what is required in what time frame. Quantitative and qualitative superiority is essential in some instances; parity suffices in less demanding circumstances; inferiority sometimes is acceptable.
- b. Cost estimates associated with the preliminary appraisal, therefore, would be premature, until NATO adopts specific proposals. High tech steps to prevent Warsaw Pact assault forces from penetrating far into the FRG, for example, would carry a different price tag than low tech solutions.
- c. It is impossible to calculate costs at this stage for weapons and equipment not yet designed, much less developed. Tactical ballistic missile defenses are one example.

CONCLUSIONS

1. The U.S.-Soviet global balance is inseparable from the NATO-Warsaw Pact balance, because the two superpowers are primary sources of reinforcement and resupply.
2. NATO's continental and maritime balances are inseparable, because most resupply must move by sea.
3. The NATO-Warsaw Pact conventional balance is inseparable from global and theater nuclear balances, which are primary sources of NATO's deterrent strength.
4. NATO improvements since 1980 are impressive in absolute terms, but less so in relative terms, because the Warsaw Pact (mainly USSR) has been modernizing faster for a long time.
5. NATO's deterrent nevertheless remains strong. The INF Treaty probably will not detract unacceptably, unless it leads to additional nuclear reductions before NATO in some way offsets conventional force imbalances.
6. NATO's defense posture is less salutary. The successful accomplishment of most wartime objectives is in serious doubt.
7. Corrective actions cannot create conventional defensive abilities that could stand alone, no matter how much money and attention decision-makers devote during the next decade.
8. Corrective actions to assure a strong deterrent posture therefore should include robust nuclear components, so that risk-versus-gain ratios never let aggression of any kind seem attractive to the Warsaw Pact.

ANNEX A

NATO-WARSAW STATISTICAL SUMMARY

January 1, 1988

CENTER REGION

	NATO			WARSAW PACT			NATO STANDING	
	U.S. 1/	Other NATO	TOTAL	USSR 3/	Other Warsaw Pact 4/	TOTAL	Absolute	Percent of Warsaw Pact
ACTIVE PERSONNEL 5/	285	1110	1395	555	675	1,230	165	131.4%
DIVISIONS								
Committed 6/ 7/								
Tank	2 1/3	11 2/3	14	14	8	22	-8	63.6%
Other	2 1/3	11	13 1/3	12	10	22	-10 2/3	55.6%
Subtotal	4 2/3	22 2/3	27 1/3	26	18	44	-18 2/3	80.1%
Ready								
Reinforcements 8/								
Tank	1 2/3	1/3	2	3	2	5	-3	40.0%
Other	7 2/3	8 2/3	16 1/3	4	1	5	11 1/3	326.7%
Subtotal	9 1/3	9	18 1/3	7	3	10	8 1/3	183.3%
Ready								
Reinforcements 9/								
Tank	2	3	5	14	2	16	-11	31.3%
Other	9 1/3	4	13 1/3	16	6	22	-6 2/3	66.7%
Subtotal	11 1/3	7	18 1/3	30	8	38	-17 2/3	50.9%
TOTAL	25 1/3	36 2/3	64	63	29	92	-28	69.6%
MEDIUM TANKS 10/	5,200	8,700	13,900	19,460	9,600	29,260	15,360	210.5%
TACTICAL AIRCRAFT 11/								
Fighter-Bomber/Attack	450	1450	1900	900	930	1,830	70	103.6%
Fighter	100	430	530	930	495	1,425	895	37.2%
Reconnaissance	30	250	280	275	110	365	-105	72.7%
Subtotal	580	2130	2710	2,105	1,535	3,640	-930	74.5%
Attack Helicopters	258	500	758	775	150	925	-167	81.9%
TOTAL	838	2630	3468	2,880	1,685	4,585	-1,097	76.0%
MREMs/IRMs 12/	108	16	126	308	0	308	-162	40.9%
GLOMs 13/	320	0	320	0	0	0	320	

CENTER REGION

- 1/ U.S. active personnel strengths, committed divisions, medium tanks, and tactical aircraft include only those forces forward deployed in Central Europe. Dual-based and other augmentations from CONUS are in the categories called "Ready Reinforcements" and "Other Reinforcements."
- 2/ Other NATO forces include those of West Germany, Belgium, the Netherlands, Luxembourg, the United Kingdom, Denmark (included here, though technically part of the Northern Region), and France.
- 3/ Soviet forces include all stationed in East Germany, Czechoslovakia, Poland, and the three Western Military Districts (Carpathian, Baltic, and Belorussian). Strategic reserve forces located in the Moscow, Volga, and Ural Military Districts are excluded.
- 4/ Other Warsaw Pact forces include those of East Germany, Czechoslovakia, and Poland.
- 5/ Active Personnel include all NATO and Warsaw Pact active ground and air forces in place in the Center Region; the Warsaw Pact includes estimated personnel strengths of low readiness divisions. NATO numbers include 285,000 Americans, 81,000 Belgians, 7,000 Canadians, 24,000 Danes, 393,000 French, 447,000 West Germans, 93,000 Dutch, 65,000 British, and 600 Luxembourgers. Warsaw Pact numbers include 560,000 Soviets (435,000 in East Germany, 50,000 in Poland, 75,000 in Czechoslovakia), 160,000 East Germans, 315,000 Poles, and 200,000 Czechs. Militarized security forces are not included in the NATO or Warsaw Pact Figures. In 1986, these Warsaw Pact forces included 309,000 Soviets, 100,000 Poles, 65,000 East Germans, and 10,000 Czechs.
- 6/ The size and capability of divisions vary greatly from country to country. French divisions counted here have only about one-half the size and firepower of Germans, U.S., or Soviet divisions.
- 7/ Committed NATO divisions are those located in Belgium, Netherlands, Denmark, and West Germany, except for one Dutch and one Danish reserve division, which are included in Ready Reinforcements. The three French divisions deployed in Germany are considered committed. Warsaw Pact forces include high readiness divisions located in East Germany, Czechoslovakia, and Poland.
- 8/ Ready Reinforcements reflect what COULD be committed quickly, as opposed to what necessarily WILL be. U.S. forces include U.S. Army POMCUS designated and other active divisions and brigades in CONUS. NATO forces include the French Rapid Deployment Force

(FAR) and remaining available NATO reserve divisions and brigades. Warsaw Pact forces include Soviet ready divisions from the three Western military districts and remaining ready divisions from the national forces of Czechoslovakia, East Germany, and Poland.

- 9/ Other Reinforcements do not conform to current war contingency plans, but reflect ALL remaining available forces that COULD BE MADE AVAILABLE in Central Europe. Warsaw Pact forces include remaining lower readiness Soviet forces in the three Western Military Districts, and the lower readiness national forces of East Germany, Poland, and Czechoslovakia.
- 10/Over 1,500 U.S. medium tanks in POMCUS are included.
- 11/Tactical aircraft include all NATO and Warsaw Pact aircraft in units based in Central Europe, including those in the UK, Denmark, and the three Soviet Western Military Districts. 138 U.S. F-111 bombers based in the UK and all Soviet light bombers are included in the Fighter-Bomber/Attack aircraft category.
- 12/U.S. MRBMs/IRBMs are Pershing IIs deployed in West Germany. The NATO MRBMs/IRBMs are French S3s. According to the INF Treaty, 243 of the 405 Soviet SS-20s are in European Russia. Some of the remaining 162 might be able to cover some European targets as well. The remaining Soviet systems in this category are 65 SS-4 MRBMs, all of which are deployed opposite NATO. All counts reflect launchers, not missiles.
- 13/GLCM total of 320 reflects 80 launchers, each with 4 missiles. Total includes all U.S. GLCMs deployed in all of Europe as of January 1, 1988, since GLCMs in Italy can reach the same targets as those based in the Center Region. See table 15 for characteristics of that system.

NATO/WARSAW PACT CENTER REGIONDETAILED BREAKOUT¹

	<u>NATO DIVISIONS</u>			<u>SEPARATE MANEUVER BRIGADES, REGIMENTS²</u>
	<u>Tank</u>	<u>Other</u>	<u>Total</u>	
<u>COMMITTED DIVISIONS</u>				
Belgium	0	1 1/3	1 1/3	1
Britain	2 2/3	0	2 2/3	0
Canada	0	0	0	1
France	3	0	3	0
Netherlands	0	2	2	0
United States	2 1/3	2 1/3	4 2/3	3
West Germany	6	6 2/3	12 2/3	4
Denmark	0	1	1	0
Subtotal	14	13 1/3	27 1/3	9
<u>READY REINFORCEMENTS</u>				
Belgium	0	2/3	2/3	0
Britain	1/3	1	1 1/3	1
Denmark	0	1	1	2
France	0	5	5	0
Netherlands	0	1	1	1
United States	1 2/3	7 2/3	9 1/3	4
West Germany	0	0	0	6
Subtotal	2	16 1/3	18 1/3	14
<u>OTHER REINFORCEMENTS</u>				
France	3	4	7	0
United States	2	9 1/3	11 1/3	15
Britain	0	0	0	3
Subtotal	5	13 1/3	18 1/3	18
TOTAL	21	43	64	41

¹NATO references in footnotes 2, 6, 7, and 8 of Table 37 also pertain to this table.

²The size and capability of regiments vary greatly from country to country. Only separate brigades and regiments are counted.

CENTER REGION DETAILED BREAKOUT

	WARSAW PACT DIVISIONS		
	READY	NOT READY	TOTAL
<u>IN CZECHOSLOVAKIA</u>			
<u>Czechoslovakian</u>			
Tank	3	2	5
Motorized Rifle	4	1	5
Subtotal	7	3	10
<u>Soviet</u>			
Tank	2	0	2
Motorized Rifle	3	0	3
Subtotal	5	0	5
TOTAL	12	3	15
<u>IN EAST GERMANY</u>			
<u>East Germany</u>			
Tank	2	0	2
Motorized Rifle	4	0	4
Subtotal	6	0	6
<u>Soviet</u>			
Tank	11	0	11
Motorized Rifle	8	0	8
Subtotal	19	0	19
TOTAL	25	0	25
<u>IN POLAND</u>			
<u>Polish</u>			
Tank	5	0	5
Motorized Rifle	3	5	8
Subtotal	8	5	13
<u>Soviet</u>			
Tank	2	0	2
Motorized Rifle	0	0	0
Subtotal	2	0	2
TOTAL	10	5	15
<u>TOTAL COMMITTED DIVISIONS</u>			
<u>Non-Soviet Warsaw Pact</u>			
Tank	10	2	12
Motorized Rifle	11	6	17
Subtotal	21	8	29
<u>Soviet</u>			
Tank	15	0	15
Motorized Rifle	11	0	11
Subtotal	26	0	26
TOTAL	47	8	55
<u>READY REINFORCEMENTS IN WESTERN RUSSIA¹</u>			
<u>All Soviet</u>			
Tank			17
Motorized Rifle			18
Airborne			2
TOTAL			37
TOTAL DIVISIONS ^{2,3}			92

¹The designation "Ready" has replaced Categories I and II; "Not Ready" has replaced Category III. See Table 17 for definition of designations.

²Ready reinforcements in Western USSR count Baltic, Belorussian, and Carpathian Military Districts. About 70 per cent of divisions are categorized as not ready.

³Eighteen Soviet Central Strategic Reserve divisions from the Moscow, Ural, and Volga Military Districts are excluded from Tables 37 and 38.

NATO/WARSAW PACT NORTH FLANK

	<u>NORWAY</u> ¹	<u>LENINGRAD MILITARY DISTRICT (LEMD)</u>		
		<u>Kola Peninsula</u>	<u>Elsewhere</u>	<u>Total</u>
<u>GROUND FORCES</u>				
Active Personnel (In Thousands)	37	21	64	85
Divisions				
Tank	0	0	0	0
Other	0	3	9 ²	12
Total	0	3	9	12
Brigades/ Regiments	14	1	1 ³	2
Medium Tanks	122	250	1070	1320
<u>TACTICAL AIRCRAFT</u> ⁴				
Fighter-Bomber/ Attack	84	0	135	135
Fighter	0	0	0	0
Reconnaissance	0	25	0	25
Total	84	25	135	160

¹In addition to the forces shown, the U.S. could reinforce Norway with elements of a Marine Amphibious Force (one reinforced division and an air wing). Other NATO nations also have some capability to reinforce the Northern Region.

²Includes one Airborne Division which is not subordinated to the LEMD.

³Air Assault Bde is subordinated to LEMD.

⁴Only Norwegian aircraft are shown. The United States could reinforce with USMC tactical aircraft and additional CONUS-based USAF units and Aircraft. USAF also has 18 F-15s in Iceland. Soviet aircraft included are all based in the Leningrad Military District. Count excludes 270 interceptors based in the LEMD. They protect the Soviet homeland and Central Reserve Forces.

NATO/WARSAW PACT SOUTH FLANK

	Total NATO ¹	Total Warsaw Pact ²	Soviet Union	NATO STANDING	
				Absolute	Percentage of Warsaw Pact
<u>ACTIVE PERSONNEL</u> ³ (In Thousands)					
Military	1447	470	257	977	307.9%
Militarized Security	0	139	73		
Total	1447	609	330	838	237.6%
<u>DIVISIONS</u>					
Tank	2	14	11	-12	14.3%
Other	33	60	39	-27	55.0%
TOTAL	35	74	50	-39	47.3%
<u>MEDIUM TANKS</u>	7200	15150	11200	-7950	47.5%
<u>TACTICAL AIRCRAFT</u> ⁴					
Bomber/					
Fighter-Attack	780	875	650	-95	89.1%
Fighter	340	1015	500	-675	33.5%
Reconnaissance	100	200	130	-100	50.0%
Subtotal	1220	2090	1280	-870	58.4%
Attack Helicopters	70	100	100	-30	70.0%
TOTAL	1290	2190	1380	-900	58.9%

¹Warsaw Pact divisions include all national forces of Hungary, Bulgaria, and Romania and the Soviet forces based in Hungary and the Military Districts of Odessa, Kiev, North Caucasus, and Transcaucasus.

²NATO includes forces of Portugal, Italy, Greece, Spain, Turkey, and U.S. forces in-theater. In addition to the forces shown, the United States could reinforce in the Mediterranean with elements of a Marine Amphibious Force (one reinforced division and an air wing).

³Active personnel includes ground and air forces. Naval forces are excluded.

⁴Includes 72 U.S. F-16 aircraft based in Spain. The United States could reinforce with USMC tactical aircraft and additional CONUS-based USAF units and aircraft.

NATO/WARSAW PACT NAVIES

	Aircraft Carriers (Fixed Wing & Helo)	Attack Submarines	Battle-ships, Cruisers, Destroyers	Frigates and Corvettes	Mine Warfare Ships & Craft	Amphibious Ships ¹
NON-U.S. NATO						
Belgium	0	0	0	4	24	0
Britain	3	29	13	35	40	7
Canada ²	0	3	4	8	0	0
Denmark	0	4	0	10	12	0
West Germany	0	24	7	14	78	0
Greece	0	10	14	6	18	3
Italy	2	9	6	27	34	2
Netherlands	0	5	0	18	22	0
Norway	0	11	0	7	13	0
Portugal	0	3	0	17	0	0
Turkey	0	17	14	5	48	2
TOTAL	5	115	58	151	289	14
France ³	2	17	17	14	25	2
Spain	1	8	11	21	12	4
U.S. ATLANTIC COMMAND ⁴	14	58	56	62	11	24
TOTAL NATO FORCES	22	198	142	248	337	44
NON-SOVIET WARSAW PACT						
Bulgaria	0	3	0	3	2	0
East Germany	0	0	0	19	0	12
Poland	0	3	0	1	21	0
Romania	0	1	1	3	7	0
TOTAL	0	7	1	26	30	12
SOVIET FLEETS ⁵	3	181	69	122	85	25
TOTAL WARSAW PACT FORCES	3	188	70	148	115	37

¹Includes LST, LSD, LPD, LPH, LCC, LHA, and LKA; excludes LSMs and other landing craft. As of end 1987, Poland had 23 Polnocny LSMs, Bulgaria had 2, and the Soviet fleets (see note 5) had 20.

²Excludes Canadian Pacific forces (8 frigates).

³Includes French Atlantic, Channel, and Mediterranean fleets. French ships deployed overseas are excluded.

⁴Includes U.S. Second and Sixth Fleets. U.S. carrier count totals 8 multipurpose carriers (CV/CVN) plus 6 amphibious helicopter carriers (LHA/LPH). Figures include the following U.S. reserve forces: 1 destroyer, 10 frigates, 7 minesweepers, and 1 amphibious ship. Figure for amphibious ships excludes the 6 LHAs/LPHs. All reserve ships are with the 2nd Fleet.

⁵Includes all Soviet naval forces except the Pacific Ocean Fleet and the Caspian Flotilla. Carrier count includes 1 Kiev class CVHG, which operates V/STOL aircraft and 2 Moskva-class CHGs, which do not.

NATO/WARSAW PACT NAVIES

	NATO		NATO TOTAL	WARSAW PACT TOTAL	WARSAW PACT			
	European Members	U.S. 2nd Fleet			Soviet Northern Fleet ¹	Soviet Baltic Fleet	Poland	East Germany
<u>ATLANTIC NAVAL FORCES²</u>								
Submarines								
Strategic Nuclear ³	10	29	39	39	39	0	0	0
Diesel	0	0	0	6	0	6	0	0
Subtotal	10	29	39	45	39	6	0	0
Attack ⁴								
Nuclear	15	51	66	80	80	0	0	0
Diesel	70	1	71	78	36	39	3	0
Subtotal	85	52	137	158	116	39	3	0
Total	95	81	176	203	155	45	3	0
Surface Combatants								
Aircraft Carriers								
Fixed Wing	0	6	6	1	1	0	0	0
Helicopter ⁵	3	5	8	0	0	0	0	0
Battleships/ Cruisers/Destroyers								
	34	45	79	47	28	18	1	0
Frigates/ Corvettes								
	104	60	164	96	45	32	0	19
Total	141	116	257	144	74	50	1	19
Amphibious Ships ⁶								
	9	13	20	30	6	12	0	12
Total Forces	245	210	467	377	235	107	4	31

¹Attack submarine count for Northern Fleet includes about five boats assigned to the Mediterranean Squadron.

²NATO naval forces shown include the U.S. 2nd Fleet, the French Atlantic/Channel fleet, Canadian Atlantic fleet, and the fleets of the United Kingdom, Belgium, Denmark, West Germany, The Netherlands, and Norway. Warsaw Pact naval forces include the Soviet Northern and Baltic Fleets, and the fleets of Poland and East Germany.

³European SSBNs are British (4) and French (6). One French SSBN is being refitted to carry new M-4 SLBMs.

⁴Includes SSGN/SSG and SSN/SS. Excludes reserves. Soviet Northern Fleet figures include about five submarines normally assigned to the Mediterranean Squadron.

⁵The 3 European helicopter carriers are British Invincible-class ASW carriers. They can operate V/STOL aircraft as well as helicopters. The U.S. helo carriers are LHA/LPH amphibious assault ships. LHAs can operate V/STOL aircraft.

⁶Includes LST, LPD, LSD, LCC, and LKA; excludes LSMs (Polnocny Class). LCTs and other landing craft. In 1987, the Polish Navy had 23 LSMs; the Soviet Northern Fleet, six; the Soviet Baltic Fleet, nine. Norway had 5 LCTs. U.S. count includes 1 reserve LST with the 2nd Fleet, and excludes LHAs/LPHs, amphibious assault carriers which are counted with the helicopter carriers.

NATO/WARSAW PACT NAVIES

	NATO ¹		NATO Total	Warsaw Pact Total	WARSAW PACT ²			
	European Members	U.S. 6th Fleet			Soviet Union	Bulgaria	Romania	
<u>MEDITERRANEAN/BLACK SEA</u>								
<u>NAVAL FORCES</u>								
Surface Combatants								
Aircraft Carriers								
Fixed Wing	2	2	4	0	0	0	0	0
Helicopter ⁵	3	1	4	2	0	2	0	0
Cruisers/Destroyers	52	11	63	24	3	20	0	1
Frigates/Corvettes	82	2	84	51	2	43	3	3
Subtotal	139	16	155	77	5	65	3	4
Attack Submarines ³	55	6	61	35	5	26	4	0
Amphibious Ships ⁶	11	9	20	7	1	6	0	0
TOTAL SHIPS	205	31	236	119	11	97	7	4
Naval Fixed Wing Aircraft ⁷	81	152	233	10	0	10	0	0

¹NATO naval forces include those of Portugal, Spain, Italy, Greece, and Turkey, the French Mediterranean Fleet, and the U.S. Sixth Fleet.

²Warsaw Pact naval forces include the Soviet Black Sea Fleet, the Mediterranean Squadron, and navies of Bulgaria and Romania. Soviet Mediterranean Squadron surface forces are broken out from the Black Sea Fleet. Quantities shown here exclude the Caspian Flotilla's 5 frigates/corvettes.

³Most Soviet submarines assigned to the Mediterranean Squadron are from the Northern Fleet because the Montreux Convention restricts transit between the Black and Mediterranean Seas. Most surface ships are from the Black Sea Fleet.

⁴Soviet Mediterranean deployments are averages. At any time in 1987, there could have been between 9 and 15 Soviet ships in the Mediterranean: 2 to 5 cruisers/destroyers, 2 to 3 frigates/corvettes, 5 to 6 attack submarines, and 0-1 amphibious ships. Soviet Mediterranean surface units usually come from the Black Sea Fleet, submarines from the Northern Fleet.

⁵The European NATO helicopter carriers are Italian (2) and Spanish (1). The Spanish carrier operates V/STOL aircraft; one of the Italian carriers is configured to operate V/STOL aircraft. U.S. helo carrier is an LHA or LPH amphibious assault carrier. LHAs operate V/STOL aircraft. Soviet helo carriers in 1987 were Moskva class CHGs; they operate only helicopters.

⁶Includes LST, LPD, LSD, LCC, and LKA; excludes LSMs (Polnocny Class) and other landing craft. In 1987, the Soviet Mediterranean Squadron had no LSMs; the Black Sea Fleet had 8 Polnocnys, and the Caspian Flotilla had 15. Bulgaria had 2 Polnocny LSMs in 1987. U.S. count excludes LHA and LPH amphibious assault ships, which are counted under helicopter carriers.

⁷Excludes 90 Soviet shore based naval bombers.



APPENDIX VI

APPENDIX VI

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>NET CHANGE</u>	
								<u>1987</u>	<u>1980-1987</u>
<u>THEATER NUCLEAR</u>									
<u>MISSILES/ROCKETS</u>									
IRBM/GLCM Launchers	0	0	0	13	86	140	160	188	188
SRBM Launchers	226	229	229	197	143	65	65	65	-161
TOTAL	226	229	229	210	229	205	225	253	27
<u>GROUND FORCES</u>									
<u>Divisions</u>									
Active	19	19	19	19	19	20	21	21	2
Reserve	9	9	9	9	10	11	11	11	2
TOTAL	28	28	28	28	29	31	32	32	4
<u>Separate Brigades</u>									
Active	6	6	6	6	6	6	5	4	-2
Reserve	20	20	20	20	17	16	16	4	-16
TOTAL	26	26	26	26	23	22	21	8	-18
Separate Regiments	7	7	7	7	7	7	7	7	0
<u>COMBAT WEAPONS</u>									
Heavy/Medium Tanks	11561	11328	11881	12410	13347	14320	14780	15332	3771
Light Tanks	1560	1559	1554	1430	552	552	408	408	-1152
APC/AFV/AAV/LAV	15974	16453	16737	17454	18879	19873	21064	22118	6144
Artillery	4753	4945	5559	5596	5598	6032	5980	6112	1359
Heavy Mortars	2825	2691	2619	2667	2656	2672	2672	2672	-153
MLRS	0	0	0	79	123	167	207	253	253
ATGM Launchers	17778	17863	18030	18564	18767	17434	18089	18089	311
<u>ACTIVE AND RESERVE</u>									
<u>COMBAT AIR FORCES</u>									
Medium Bombers	252	248	237	217	198	198	198	192	-60
Fighter/Attack									
Shore-Based	2686	2834	2884	2899	2900	2953	3012	3076	390
Carrier-Based	816	840	840	797	850	841	829	839	23
Subtotal	3754	3922	3961	3913	3948	3992	4039	4107	353
Helicopter Gunships	1023	1082	1104	1191	1397	1157	1337	1438	415
<u>ASW Aircraft</u>									
Fixed Wing	443	443	443	443	443	443	453	453	10
Helicopters	174	174	174	178	208	215	230	249	75
Subtotal	1640	1699	1721	1812	2048	1815	2020	2140	500
TOTAL AIRCRAFT	5394	5621	5682	5725	5996	5807	6059	6247	853

	<u>SOVIET ARMED FORCES RECAPITULATION</u>								<u>NET CHANGE</u>
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1980-1987</u>
<u>MANPOWER (In thousands)</u>									
Active Military	4837	5275	5163	5255	5388	5436	5478	5131	294
Reserve	9149	9304	9136	9037	9156	9157	8671	8552	-597
Civilian	677	677	677	677	677	677	677	668	-9
Total	14663	15256	14976	14969	15221	15270	14826	14351	-312
<u>STRATEGIC NUCLEAR FORCES</u>									
<u>Offense</u>									
<u>ICBM</u>									
Launchers	1398	1398	1398	1398	1398	1398	1418	1389	-9
Warheads	5002	5302	5862	6420	6420	6420	6440	6400	1398
<u>Submarines</u>									
Nuclear	69	69	68	64	65	62	62	63	-6
Diesel	14	14	14	14	14	14	14	9	-5
Subtotal	83	83	82	78	79	76	76	72	-11
<u>SLBM</u>									
Launchers	985	985	969	961	946	931	967	969	-16
Warheads	1625	1817	1865	1957	2122	2307	2695	2941	1316
<u>Bombers</u>									
Aircraft	220	235	245	260	300	325	325	326	106
Bombs/ACMs	295	325	345	810	1040	1210	1180	1214	919
<u>Total</u>									
Delivery Systems	2603	2618	2612	2619	2644	2654	2710	2684	81
Weapons	6922	7444	8072	9187	9582	9937	10315	10555	3633
Tankers	50	50	50	50	50	50	50	60	10
<u>Defense</u>									
ABM Launchers	32	32	32	32	16?	16+	96	100	68
SAM Launchers	9330	9475	9500	9430	9565	9200	9000	8400	-930
Interceptors	2550	2650	2500	1200	1210	1255	2250	2250	-300
<u>THEATER NUCLEAR MISSILES/ROCKETS</u>									
LRINF Launchers	560	555	600	615	520	553	553	470	90
SRINF Launchers	158	120	120	120	130	142	122	197	39
SNF Launchers	1260	1270	1275	1280	1340	1425	1490	1410	150
Total	1978	1945	1995	2015	1990	2120	2165	2077	99
<u>GROUND FORCES AND NAVAL INFANTRY</u>									
<u>Divisions</u>									
Ready	82	79	82	81	81	80	80	79	3
Not Ready	103	104	109	112	120	124	130	131	28
Total	185	183	191	193	201	204	210	210	25
Separate Brigades	0	0	0	0	?	?	12?	12?	12?
Separate Regiments	6	6	3	3	3+?	3+?	21?	24?	18?
<u>COMBAT WEAPONS</u>									
Heavy/Medium Tanks	48000	48700	49800	51800	52900	52600	53580	53130	5130
Light Tanks	2045	1710	1310	1310	1310	1310	1330	1340	705
APC/AFV	62890	64925	69990	76075	80975	83875	85000	85750	22860
Artillery	19360	20915	20935	24675	25925	25400	25425	28625	9265
Mortars (>100mm)	6790	7900	7930	9455	10505	10405	10450	10560	3770
MLRS	5000	5200	5600	6100	6400	6600	7000	7100	2100
ATGM Launchers									
Portable	8090	7590	9105	9515	3615	3915	4040	4400	-3690
Vehicular	17000	18000	23000	24600	30500	34000	34000	34000	17000
Subtotal	25090	25590	32105	34115	34115	37915	38040	38400	13310

UNITED STATES ARMED FORCES RECAPITULATION									NET CHANGE
	1980	1981	1982	1983	1984	1985	1986	1987	1980-1987
<u>NAVAL COMBATANTS</u>									
<u>Aircraft Carriers</u>									
<u>Multipurpose Carriers</u>									
Nuclear	3	3	4	4	4	4	5	5	2
Oil	9	9	9	9	9	9	9	9	0
Subtotal	12	12	13	13	13	13	14	14	2
Helicopter Carriers	12	12	12	12	12	12	12	12	0
TOTAL CARRIERS	24	24	25	25	25	25	26	26	2
<u>Battleships</u>									
Cruisers	0	0	0	1	2	2	3	3	3
Cruisers	27	27	27	28	29	32	33	36	9
<u>Destroyers</u>									
Active	80	83	73	68	68	68	68	68	-12
Reserve	1	1	1	1	1	1	1	1	0
Subtotal	81	84	74	69	69	69	69	69	-12
<u>Frigates</u>									
Active	72	80	85	92	97	98	98	96	24
Reserve	0	0	4	6	9	15	15	19	19
Subtotal	72	80	89	98	106	113	113	115	43
<u>Attack Submarines</u>									
Nuclear	76	82	91	93	95	97	96	98	22
Diesel	6	5	5	5	5	4	4	4	-2
Subtotal	82	87	96	98	100	101	100	102	20
<u>Amphibious Ships</u> (minus Helicopter Carriers)									
TOTAL MAJOR COMBATANTS	49	49	49	49	47	49	49	51	2
TOTAL MAJOR COMBATANTS	335	351	360	368	378	391	393	402	67
<u>AIRLIFT AIRCRAFT</u>									
<u>Strategic</u>									
Active	304	310	316	322	329	334	340	341	37
Reserve	0	0	0	0	0	16	16	33	33
Subtotal	304	310	316	322	329	350	356	374	70
<u>Tactical</u>									
Active	218	223	218	218	218	216	202	200	-18
Reserve	368	352	305	302	302	292	296	288	-80
Subtotal	586	575	523	520	520	508	498	488	-98
TOTAL	890	885	839	842	849	858	854	862	-28
Utility/Cargo Helos	4918	4970	5027	5024	5157	5264	5177	5123	205
<u>MERCHANT MARINE SHIPS</u>									
<u>Cargo</u>									
Active	278	276	278	262	264	254	244	218	-60
Reserve	166	180	180	182	193	193	199	206	40
Subtotal	444	456	458	444	457	447	443	424	-20
<u>Tankers</u>									
Active	558	563	531	495	442	409	404	397	-161
Reserve	15	16	14	17	22	26	27	27	12
Subtotal	573	579	545	512	464	435	431	424	-149
TOTAL	1017	1035	1003	956	921	882	874	848	-169

**THE ROLE OF UNCERTAINTY IN ASSESSING THE NATO-PACT
CENTRAL-REGION BALANCE**

by
Paul K. Davis

APPENDIX VI

APPENDIX VI

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>NET CHANGE</u> <u>1980-1987</u>
<u>COMBAT AIR FORCES</u>									
Medium Bombers	525	565	575	556	553	542	567	535	10
Fighter/Attack									
Shore-Based	3850	4175	4225	5485	5460	5265	4500	4500	650
Carrier-Based	60	60	60	60	60	70	70	70	10
Subtotal	3910	4235	4285	5545	5520	5335	4570	4570	660
Helicopter Gunships	N/A	N/A	N/A	N/A	950	950	1200	1400	N/A
ASW Aircraft									
Fixed Wing	195	195	200	210	205	205	205	205	10
Helicopter	195	205	245	265	275	275	280	260	65
Subtotal	390	400	445	475	480	480	485	465	75
Total Aircraft (Less Helo Gunships where unavailable)	4825	5200	5305	6576	6553	6357	6362	6342	1517
<u>NAVAL COMBATANTS</u>									
Aircraft Carriers									
Guided Missile VTOL	2	2	3	3	3	3	3	3	1
Helicopter	2	2	2	2	2	2	2	2	0
Total Carriers	4	4	5	5	5	5	5	5	1
Cruisers	36	36	36	37	38	36	38	34	-2
Destroyers	64	69	64	67	70	69	65	60	-4
Frigates	168	169	176	177	177	177	179	180	12
Attack Submarines									
Nuclear	98	105	109	113	114	117	124	128	30
Diesel	180	182	170	162	156	146	140	136	-44
Subtotal	278	287	279	275	270	263	264	264	-14
Amphibious Ships	26	26	28	32	33	35	37	39	13
TOTAL MAJOR COMBATANTS	576	591	588	593	593	585	588	582	6
<u>AIRLIFT AIRCRAFT</u>									
Strategic	180	205	235	275	305	345	395	410	230
Tactical	590	580	545	585	525	530	500	460	-130
Total	770	785	780	860	830	875	895	870	100
Utility/Cargo Helos	2000	2400	2700	2550	2745	2945	3125	3125	1125
<u>MERCHANT SHIPS</u>									
Cargo	1348	1357	1354	1376	1381	1379	1370	1331	-17
Tanker	310	311	310	309	312	313	307	297	-13
Total	1658	1668	1664	1685	1693	1692	1677	1628	-30

SUMMARY

A basic question in any discussion of the military balance is which balance one is addressing: the balance of "inputs" such as defense expenditures and manpower under arms, the balance of combat equipment such as tanks, the balance of force readiness and mobilization potential, or...the balance as measured by likely war outcomes if deterrence failed. This paper is concerned primarily with the latter, and with the challenge of addressing that warfighting balance in the face of massive uncertainty rendering it meaningless to talk about allegedly "best-estimate" scenarios.

The beginning of wisdom about this balance is recognizing that war outcomes are sensitive to scores of factors, rather than the handful regularly discussed. Assessment should consider a vast range of plausible scenarios, where scenario is construed broadly to mean a set of assumptions about, for example, political-military context, warning times, mobilization times, alliances, operational strategies, force effectiveness, sheer quality of leaders and their troops for constant equipment, and even the "laws" of combat that determine rates of advance and attrition. Moreover, analysis should be based on a gaming approach, at least in structure, because the confrontation of opposing strategies and tactics is fundamental to warfare and antagonists regularly make every effort to fight under circumstances very different than those found in standard planning scenarios.

The results of such multiscenario analytic war gaming defy reductionist analysis: simulated war outcomes often change drastically with what might naively be considered small changes of assumption, and even the relative value of alternative improvement measures varies substantially from scenario to scenario. Measures or capabilities critical in some circumstances are almost irrelevant in others.

These wild fluctuations are not analytic artifacts, but rather a manifestation of something that professional military officers and historians have known since time immemorial, that war is an incredibly complex phenomenon characterized by uncertainty--except in instances where one side has overwhelming force (a situation that does not exist in Europe). Moreover, tactics, strategy, and other human factors matter greatly. It is unfortunate that the commonly used analytic methodologies obscure these basic aspects of warfare in the search for well-behaved and simply explained results.

What can be said from initial experience with multiscenario analytic war gaming applied to Europe's Central Region? Some of my personal conclusions so far are as follows (e.g., Davis, 1986a):

- . There exist both 'good' cases and bad--i.e., cases in which NATO could today hold its own and defeat a Pact invasion, and cases in which the Pact would sweep to a quick and decisive victory.

PREFACE

This paper was developed for the Conventional Defense Study Group (CDSG) created by the Congress under the 1988-1989 National Defense Authorization Act. The CDSG is chaired by the Comptroller General and has representatives from the Congressional Budget Office, Congressional Research Service, Office of Technology Assessment, and General Accounting Office. The author was asked to develop a paper on the net assessment of the NATO/Pact Central Region balance that would include issues of quality, readiness, mobilization, and sustainability. The paper is the sole responsibility of the author and does not necessarily reflect the views of the RAND Corporation or any of the Defense Department sponsors for whom the author has conducted research over the years.

- . Another challenge for NATO is new: the era of potential large-scale conventional arms control. Instead of attempting to "limit damage" or avoid it, the U.S. and NATO should approach arms control ambitiously--but with hard-headed and operationally rich military analysis to guide negotiations. Arms control focused on readiness and other operational issues has the potential virtually to eliminate the short-warning-attack-after-lengthy-but-ambiguous-preparations scenario, which should probably be the most worrisome for NATO. Going further, force reductions could be stabilizing if sufficiently large and strongly asymmetric, but dangerous otherwise. The long-discussed move toward "defensive defenses" by both sides is also more plausible and worthy of study than it has been in the past.
- . The long-standing policy of seeking conventional capabilities for merely an initial defense is now bankrupt: although a nuclear deterrent should be maintained, NATO's policy should include providing for successful conventional defense with no qualifications. This will require greater stockpiles and rapidly mobilizable production facilities.

Turning again to methodology, I would argue that studies of the warfighting balance and arms-control alternatives should be based on both human war gaming and operationally sensitive simulation, because simpler treatments--however useful for communicating individual concepts--tend to omit many of the most important factors in actual warfare--especially maneuver phenomena and strategies employing surprise, deception, and realistically imperfect decisions and behavior; also, important aspects of readiness, mobilization, and sustainability. At the same time, even the more sophisticated games and simulations depend sensitively on uncertain assumptions about force-generation rates, the scoring of weapon systems, the scoring or nonscoring of support-force contributions to effectiveness, and other factors highlighted in recent years in both the classified and unclassified literature. If analysis is to serve the purposes of policy, these assumptions and others (many of which are NATO-favorable) need to be examined more critically than in years past.

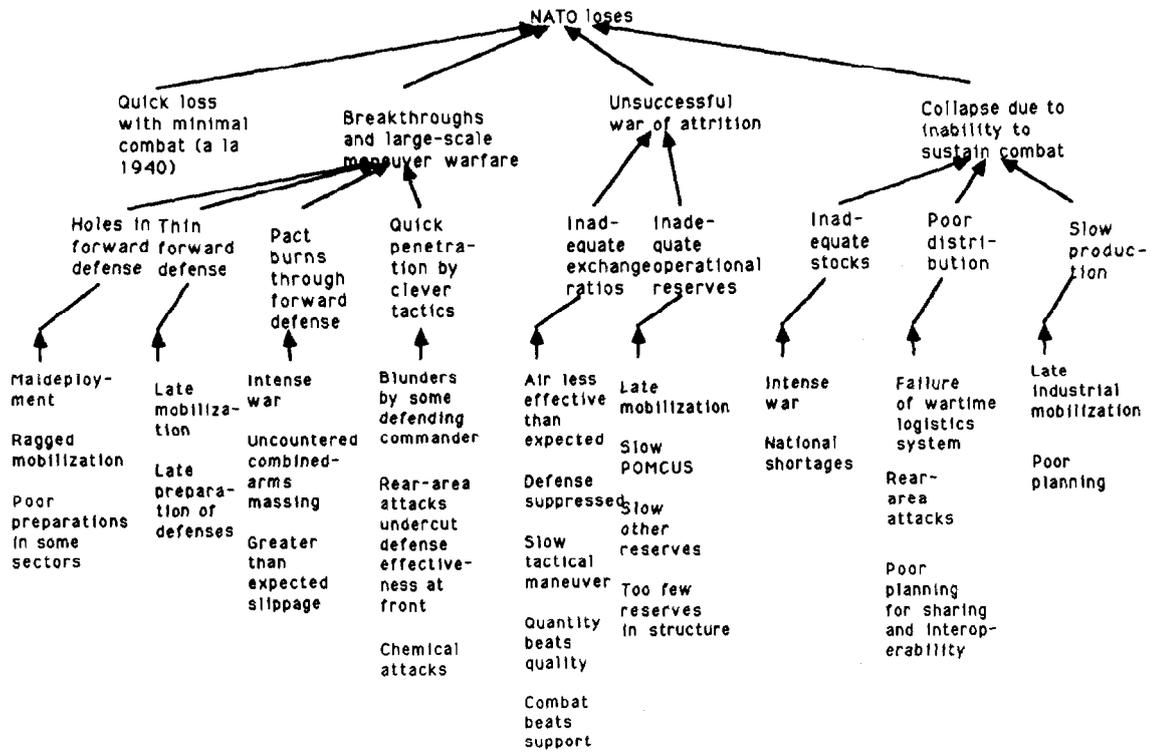
Finally, figure 1 provides a "fault tree" depiction of ways in which NATO could lose a Central Region war and suggests a systematic way of assessing measures to improve the military balance. It shows alternative ways for NATO's defense to fail. The challenge is to block the paths to failure by eliminating deficiencies and other vulnerabilities.

- . Claims that NATO is hopelessly outnumbered, or that conventional defense would surely fail, are wrong.
- . Claims that "NATO could probably thwart a Pact invasion today" are potentially quite misleading because disaster-ridden scenarios are "probably" about as likely, or more likely, than the good scenarios. Moreover, the balance is demonstrably quite fragile. Many "good cases" turn into "bad cases" with only modest changes of assumption.
- . Those most optimistic about the balance usually assume away the operational-level and political-military problems about which many strategists, including myself, are most concerned. Indeed, the optimists often confuse their readers about the difference between what "could be" or "should be" and what "is."
- . The likely outcome of a war fought literally one week or one month from today is not especially relevant, since any war would probably be preceded by many months of tension and asymmetric preparations. Readiness, planning, and the details of political-military context could change substantially over such a period even though force structure could not. The Pact's force-structure advantages should not be rationalized away by looking only at current readiness levels.
- . Should the Soviets decide on war, they would have the initiator's advantages in choosing the time and place, and in more generally shaping major elements of scenario--even to the extent of sequentially preparing for and backing away from war until the circumstances seemed appropriate.
- . NATO should be particularly concerned about scenarios in which the Soviets raise general readiness for war over a long period of time and then, perhaps after a period of tension but no acute crisis, go to war with only a short mobilization and enough ambiguity of political signals to disrupt the coherence and decisiveness of NATO's reaction to initial warning. In retrospect, that would constitute the strategic surprise emphasized in Soviet military thinking.
- . The military challenge for NATO is to make such Pact-favorable scenarios less plausible--by eliminating potential Achilles Heels (which include a probable lack of flexibility and decisiveness in top-level command-control because of the political constraints placed on NATO's military commanders and planners during peacetime), by increasing the robustness and sustainability of its defenses, by creating additional challenges to preferred Soviet operations, by planning feasible responses to strategic warning, and by continuing to develop innovative weapon systems and operational concepts. Affordable opportunities for improvement abound.

ACKNOWLEDGEMENTS

The author has benefited greatly in his understanding of the Central Region balance from collaborative studies with colleague Robert Howe. Andrew Marshall has been a major impetus behind the effort to develop analytic war gaming as a methodology for improving balance assessments. Bruce Pirnie reviewed an earlier draft and provided thoughtful suggestions.

FIGURE 1



to reduce NATO's security substantially.⁴ In my view, some of the recent unclassified papers and books on the Central Region balance provide an outrageously rosy picture--however much I may agree with many of their arguments and deplore the tendency of others to exaggerate the threat.

One of the complications in this debate about the military balance is that there are actually many balances, some of them favorable and some of them unfavorable. As emphasized for many years by Steven Canby and others, NATO's input (spending levels and men under arms) compares well to the Pact's but the bean count output of combat systems strongly favors the Pact (see, for example, Levin, 1988, Karber, 1984, and Donnely, 1983). NATO's readiness and support capabilities are in many respects superior (Levin, 1988, Posen, 1988), and so on. As summarized in the Levin report, the situation is multifaceted to say the least.

This paper deals with a particular military balance, notably the warfighting balance that one infers by considering the likely and plausible outcomes of war if deterrence failed and the sides fought in a variety of scenarios with their actual forces, doctrine, command-control systems, and likely strategies. This balance does not assume a "fair fight," but rather assumes that the purpose of strategy, operational art, and tactics is to create especially favorable circumstances for battle.

TRADITIONAL POLICY-LEVEL ASSESSMENTS

Basic Buildup Curve Methodologies. Before recommending a new methodology it is useful to review what has been used in years past by those attempting to go beyond bean counts in performing analyses that would be used in the development of broad defense policy and programs. The general approach has had its locus in the Office of the Secretary of Defense (Program Analyses and Evaluation) and dates back to the 1960s. Over the years, many alumnae of that organization, including myself, have published articles revealing the essential features of the approach. Other organizations such as the CBO have also used it, and some individuals in the academic community have both used it and, in some instances, extended it.⁵ The continuing themes of that school include (Davis, 1986a):

⁴This statement is based on unpublished 1986 work by the author, and on Thomson and Gantz (1987).

⁵William Kaufmann, one of the nation's most experienced defense analysts and an advisor to numerous secretaries of defense, has also used, developed, and taught these methods for years (e.g., Kaufmann, 1983).

INTRODUCTION

DEFINING THE MILITARY BALANCE

Balance assessments are important.¹ They are important because they affect our intuition and our mindsets, which in turn affect indirectly everything from defense programs to operational planning. On one extreme, excessive pessimism about the balance can paralyze efforts to improve it, as suggested by the familiar refrain: "Why throw good money after bad? 'Everyone knows' conventional defense is not feasible and that deterrence depends on the threat of nuclear retaliation." This deeply pessimistic image has been commonplace over the years, and remains dominant within much of the military community and in much of Western Europe. The image has been created primarily by widespread quotations about asymmetries in the "bean count" (e.g., the 2.4:1 ratio of main battle tanks in the Central Region).² It has been exacerbated by General Rogers' statements, when SACEUR, that in the event of war he would have to request nuclear-release authorization after a week or so, and by a continual stream of defense-department briefings and studies in which the only question seems to be when (not whether) NATO's defense would crumble. It has been further exacerbated by the apparent failure, despite the Reagan administration's defense buildup, to improve NATO's sustainability. "What do you mean we still can't fight for thirty days? What have you done with all that money?" are common questions.³ As I shall discuss later, my own conclusion is that the balance is much less adverse than the pessimists would have it.

At the other extreme, optimism or complacency can divert resources and postpone important problem solving. Overly enthusiastic assessments could also have a deleterious effect on NATO's planning for conventional arms control, which should be prudently conservative given the potential for the wrong type of agreements

¹This section draws on material presented to the German Strategy Forum (Davis, 1986a) and to a RAND conference, "Enhancing NATO Conventional Defense in Central Europe," March 3-5, 1986.

²Levin (1988) provides a critically organized summary of static comparisons and explains how the comparisons can be made to appear much more or less adverse depending on details.

³Part of the answer is that the assumed rates of consumption have been greatly increased during the same period in which stocks were increasing (Shilling, 1988).

Yet another continuing theme has been the discrepancy between how NATO assesses its own ability to quickly mobilize and deploy low-readiness units (poor) and the way it assesses Pact capabilities to do so (good). These matters are discussed at length by Posen (1988), but without the benefits of classified information. The DoD's Soviet Military Power (1987) confirms that many Soviet and Pact units are currently at low states of readiness, but provides few details. Levin (1988, page 22) provides more details from an unofficial source of unspecified validity (Almquist, 1987).

None of the above topics needs to be examined with anything more sophisticated than a method for normalizing divisions to a standard measure (e.g., Armored Division Equivalents, ADE), and a model for predicting the rates at which various forces can be mobilized and deployed to the front. Such "models" can be back-of-the-envelope constructs plus some relatively detailed data tables distinguishing among units at different levels of readiness, although in the current era it is more convenient at a minimum to use a personal computer and spreadsheet software.

These simple models have been influential because they are understandable, dealing with issues at only the most aggregated of levels. Also, the principal conclusions drawn from them about improvement measures have been almost obviously valid: strategic mobility is good; rapid mobilization is good; operational reserves are good; and providing divisions in Europe with substantial firepower and mobility is good.⁸

Extensions and Dubious Improvements. In recent years, there have been attempts to increase the sophistication of simplified analyses. Kugler, and Posen have, for example, used "FEBA-Expansion Models" that include force-to-space considerations and distinguish among NATO corps for a variety of heuristic purposes (see Posen, 1985). There have also been a number of publications providing numerical calculations of attrition and movement based on solutions of Lanchester equations (e.g., Kaufmann, 1983) or improvements over Lanchester equations (Epstein, 1985). For

effect, but it is nontrivial.

⁸The simple model's emphasis on ADEs has been a chronic problem in some respects, however. In particular, zealous proponents of the firepower approach have often "proved" the nonutility of infantry divisions by showing they were costly per ADE procured. This was a spurious conclusion, because Europe is a complex theater with many types of terrain and there are a number of specific but important zones where light but relatively mobile infantry could be far more effective than their firepower score would indicate, and in some ways more useful than armored forces. I encountered the analogous issue in earlier work on defense of Southwest Asia in 1979-1981.

- . The NATO balance is driven by assumptions about which nations will commit forces, which forces of each nation to include, how to count forces of different quality and composition, and timing (e.g., Blaker and Hamilton, 1977)
- . NATO's chances for success should be reasonably good for theater force ratios less than about 1.5, with force ratios of 2.0 being quite worrisome⁶
- . The principal problem, then, is for NATO to assure that theater force ratios be kept as low as possible at all times--thus implying a need not only for forces but also for rapid mobilization and deployment
- . High-leverage measures include: (a) maintaining European reserves at a high state of readiness; (b) prepositioning equipment for U.S. forces so that fully equipped divisions can be available as quickly as the men can be flown in from the CONUS (POMCUS programs); (c) starting NATO mobilization early; and (d) obtaining substantial early French participation

An additional theme emphasized by PA&E analysts for 10-25 years has been the argument that either NATO armies should reallocate their resources to increase the tooth-to-tail ratio, or they should be willing to give themselves credit in divisional scores for the benefits of support forces such as those able to repair tanks close to the battlefield, provide command and control to improve maneuver and fire support, and maintain the flow of munitions to the active battle areas. Recent unclassified articles by Posen, who worked briefly at one point for PA&E, illustrate the significance of this issue particularly (e.g., Posen, 1985 and 1988). Unfortunately, it is not clear which part of the either-or statement is most appropriate. Some analysts, like Steven Canby, have long argued that NATO force structure has an unreasonably low tooth-to-tail ratio (e.g., Canby, 1986), especially for a short war, and that the extra tail doesn't help much.⁷

⁶Roughly speaking, these rules of thumb relate to the famous 3:1 criterion of local concentration as follows: imagine, say, 40 NATO and 60 Pact divisions scattered evenly among 8 corps sectors (5 and 7.5 divisions per sector for an overall force ratio of 1.5). The Pact could take its excess 20 divisions and concentrate them on main axes. With, for example, 2-3 main axes, the Pact could achieve local corps-level force ratios of 2.8-3.5 if NATO failed to detect and react by counterconcentrating.

⁷Another complication here is that the attacker has advantages with respect to support: he knows where his main-thrust axes will be, and where intensity will be highest. By contrast, the defender must have a logistics system adequate to shift both forces and munitions to where they are needed. I have not quantified this

Despite the many advantages and track record of success for such methods in the past,¹³ there are several problems with this super-aggregated analysis. Among the more serious are that:

- . They lack credibility among those familiar with more detailed treatments, who recognize that many of the key issues are misrepresented or overlooked.
- . Because of their aggregation and associated abstraction, they have no potential for unifying such disparate communities as the technologists, historians, maneuver warfare advocates, and resource managers. They are read by one community and ignored by the others.
- . They have little useful to say about matters of operational strategy, command-control, doctrine, logistics, sustainability, force composition, the potential value of new weapon systems, or (with some important exceptions) the relative merits of alternative arms control measures.

The last item is especially damning, since it is most unlikely that NATO will be in the force expansion business in the next decade. Instead, in the absence of favorable forms of arms control on a large scale, **most improvements in the balance will come about precisely because of improvements in the very things that the buildup-curve analysis is poor at capturing.**

I would also note that those using these methodologies often confuse their readers, if not themselves, regarding the difference between what the balance "should be" considering NATO's inputs (and even its output resources) and what the balance actually is--as measured by what would happen if war occurred. Although the authors in question discuss war outcomes, they are often cavalier in assuming away the effects of surprise, intra-alliance coordination problems, doctrinal and other constraints, the inherent advantages of the aggressor, and likely defender mistakes. Alternatively, they acknowledge the issues in footnotes, but claim

¹³Analyses based largely on theater force ratio vs time have been influential in decisions to buy POMCUS equipment, strategic mobility assets oriented toward the Rapid Deployment Force, and prepositioned equipment for Southwest Asia. They have also been influential in discussions of the military balance in Europe, Korea, Southwest Asia, and elsewhere.

reasons discussed briefly in attachment A, I believe these computational efforts have been largely an unintendedly obscuring step in precisely the wrong direction: they add complexity while failing to add significant content.⁹ Because adding content to correctly reflect maneuver issues, command-control problems, breakpoints, flank protection and other matters becomes complex and data intensive quickly, the next step beyond force-ratio buildup-curve methods should be careful simulation and war gaming. It is not, however, an effort to be undertaken lightly, and classified information is often important.^{10 11}

SHORTCOMINGS AND CHALLENGES

Before leaving this description of traditional policy-level analytic methodologies, with and without extensions, I might emphasize that one of the "school's" historically rooted ethics has been that policymakers should assure that the military has adequate resources and, when necessary, "prove" that they have adequate resources (e.g., as in Enthoven and Smith, 1971), but not explore how the resources (forces) should be employed or what problems might be encountered in doing so; instead, such operational analysis should be, in this ethic, the responsibility of the generals. This sounds virtuous, but ignores the strong relationships between politics, policy, strategy, doctrine, training, exercises, and warfighting. There are many constraints on what generals are able to do, and many of them severely undercut military effectiveness.¹²

⁹Another unfortunate effect has been to encourage a cottage industry of individuals rediscovering the Lanchester equations and its intricacies. In some respects this is unfortunate, since the shortcomings of Lanchester equations are much more severe than suggested by Epstein (1984) or more recent articles (e.g., Lepingwell, 1987 and Homer-Dixon, 1987), and such investments of effort in Lanchester theories are probably misplaced. See attachment A.

¹⁰I note that Mearsheimer (1988, footnote 5) is also dubious about the extensions of methodology, and that Kugler has based much of his recent work on human war gaming.

¹¹There is an important difference between using simplified models as heuristic devices to explain conclusions on an elementary level and counting on such models to arrive at valid insights and conclusions in the first place.

¹²One of the more vociferous, hyperbolic, but thoughtful commentators on such matters has been Steven Canby. See, for example, Canby, 1986 and references therein.

The alternative, which I strongly recommend, is to explore a diversity of scenarios in an attempt fully to face up to uncertainty. Table 1 illustrates the questions one may ask.

TABLE 1. Illustrative "What If?" Questions

-
- . What if one or more of the NATO allies reacted slowly in crisis, resulting in a ragged mobilization process and disrupting the general defense plan?
 - . What if Poland cooperated only minimally with the Soviet Union, or fought with less than high intensity?
 - . What if Pact forces proved somewhat less effective, for constant equipment, than nominally assumed?
 - . What if the intensity of war proved higher (or lower) than usually assumed? Would NATO fare better or worse, and how would this affect sustainability?¹⁵
 - . What if deployment times proved much longer than usually assumed (e.g., for U.S. POMCUS forces or low-readiness Soviet divisions)?
 - . What would a Soviet simulation of conflict look like if it began by assuming a NATO invasion of the Pact? How would this affect the circumstances of battle and the nature of campaigns?
-

DIMENSIONS OF UNCERTAINTY

If table 1 is enough to get the reader in the right spirit for multiscenario analysis, then table 2 will be understood as an effort to be more systematic. It summarizes the key dimensions of uncertainty that my colleagues and I try to consider, and includes an illustrative set of the specific variables that can be treated in Central-Region work. **In our parlance, a "scenario" (in the context of discussing "multiscenario analysis") is a set of assumptions about all of the various issues treated in the table--** issues ranging from political-military scenario to the value of certain technical parameters or even the equations that should be used in the simulation models of warfare.

¹⁵Loss rates, which is what I mean here by intensity, are correlated with but different from consumption rates.

they are a different problem having nothing to do with "the balance" (as they conceive it).¹⁴

MULTISCENARIO ANALYTIC WAR GAMING

BASIC PRINCIPLES

As discussed elsewhere (e.g., Davis, 1986a, 1987), the approach to balance studies and other matters being taken by my colleagues and myself in the RAND Strategy Assessment Center (RSAC) is an attempt to meld the better features of human war gaming and analytic modeling. The war-game style is especially important for bringing in a wider range of variables and complications, and for assuring that analysis confronts issues of strategy and tactics under conditions of imperfect information. The work depends heavily on combat simulation models and decision models (see attachment B). Most of the work is interactive, with military analysts playing through simulated wars in some detail. In one common mode of operations an analyst may play Blue, entering orders in an attempt to defeat an automated Red commander following a plausible Red strategy with Red doctrine and forces.

For the purposes of this paper the most important aspect of the RSAC work is our emphasis on facing up to massive uncertainty--i.e., on highlighting the scenario variable. Consider, for a moment, a baseline case in standard analysis, a case that is often treated as though it were a best-estimate scenario: (a) on Pact M Day, the Soviet Union and all its Warsaw Pact allies mobilize and prepare for war with all of the non-Soviet Warsaw Pact states charging forward enthusiastically with their Soviet masters (probably a rather pessimistic assumption for NATO); (b) on NATO M Day, the U.S. and all its NATO allies mobilize together and proceed without friction to implement their war plans (probably an optimistic assumption for an alliance of independent nations reacting to ambiguous warning), (c) war occurs without surprises (e.g., weapons work as advertised, strategies are as advertised or anticipated, and attrition warfare prevails with an elastic defense line), and so on. Whatever this scenario represents, it is not a best estimate, but rather some bizarre mixture of various optimistic and pessimistic (and often unrealistic) assumptions.

The answer, it might seem, would be to construct a realistic planning scenario--a true best-estimate scenario. If one thinks about how to do this for awhile, the difficulties become clear--at least to most people. Others cling to the notion of a best-estimate scenario even though the quality of the best estimate would be very low.

¹⁴See, for example, Mearsheimer (1988, footnote 10), who is at least explicit on this matter.

It should be evident from even a brief perusal of table 2 that there are an enormous number of possible cases. In practice, we must select cases that seem likely to be fruitful. Analysis, then, becomes somewhat of an art--with the potential for providing either great insights or great mischief. It is no panacea.

SENSITIVITY OF OUTCOMES

Naively, one might hope that many of the cases would prove uninteresting--that the sensitivity of simulated war outcomes to most variables would prove to be low. Unfortunately, that is not the case. To the contrary, simulated war outcomes can be highly sensitive to almost any of the variables in table 2. As an example, simulated outcomes can flip from a victory for the Pact to a stalwart defense for NATO if one merely changes assumptions about the intensity of war--without ever leaving the range of highly plausible loss rates, which is at least a factor of two and probably more like a factor or three.¹⁶

An even more troublesome reality is that even the relative value of different improvement measures, or the relative importance of different variables, depends strongly on the scenario (as defined by the value of the "other" variables). This is hardly surprising to someone who thinks for a moment, but it is disquieting to the analyst hoping to proceed by mechanically churning out excursions from a well-oiled model. As an example here, consider the value of a postulated new weapon system and concept of operations for interdicting the Pact's deploying forces. In short-mobilization scenarios in which the sides are both scrambling in a mobilization and deployment race, one might expect the payoff for interdiction to be high, but in scenarios in which there have been weeks or months of preparations and movement, it might be modest. This situation dependence of sensitivities is the rule rather than the exception, and analysis is difficult and technically complex.

To provide some insight about the outcomes of such analytic war gaming, let me describe qualitatively part of a typical presentation. First, we show results for one of the several baseline scenarios. Suppose that this happens to be one of the scenarios in which NATO does well--holding at or close to the border, extracting a highly favorable exchange ratio, and not running out of supplies for the duration of the war simulated. We describe in some detail why the scenario is plausible, what assumptions resulted in the particular outcome, and why the result is not as outlandish as some might think initially (because they

¹⁶This is based on unpublished work using a variety of sources for information on World War II and the Arab-Israeli wars, including recently published Russian attrition data from the Eastern Front campaign. See also Posen (1985), which covers some of the same data.

Table 2
Dimensions of Multiscenario Analysis
(With Illustrative Variables)

<u>Pol-mil Scenario</u>	<u>Strategy and Tactics</u>	<u>Force Structure</u>	<u>Technical Factors</u>
Number of theaters	Duration of Soviet mobilization	Size of threat to Central Region	Intensity of war
Time between theaters	Soviet scheme of maneuver and deception	Value of extra generic divisions	Rates of advance
Mobilization times	NATO defense strategy by circumstance	Cost of fewer divisions	"Break" densities
Allied behaviors	Soviet use of other-theater forces	Net effect of reductions	Tacair effectiveness for killing and counter-maneuver
Premobilization preparations	Use of air forces	Readiness levels	Helicopter effectiveness
		Effectiveness of Capability for repair, war reserves, ammo sharing	National fighting effectiveness
			low-readiness forces
			Value of support forces (e.g., repair and C3I)
			Break-points

and orchestrate the timing of at least initial operations. Also, many aspects of combat modeling tend to introduce defense-optimistic biases. Or, to put it differently, my colleagues and I believe that many standard assumptions favor the defense implicitly and are valid only if the defense is ready, competent, and relatively unconstrained--something that should perhaps not be assumed for a complicated coalitional force in the first days of weeks of a war decades after the last comparable war. When we examine sensitivities dealing with these matters, NATO often suffers in the result because, simply, NATO lacks adequate operational reserves to compensate for things going wrong. The development of III Corps is a great help in this regard, at least for scenarios in which III Corps is able to deploy, but even so NATO's conventional defense is anything but robust. In thinking about this, the reader should understand that **in the most optimistic assessments, NATO almost invariably maintains a coherent prepared defense in depth at all times--something that should simply not be assumed, even if the line "ought to" hold "on average" according to reasonably well accepted equations. Holding "on average" is not good enough if penetrations in any one area can be exploited to change the nature of warfare from defense-favorable attrition warfare to the large-scale maneuver warfare for which Soviet armies have been organized and trained.**¹⁸ There is some analogy between NATO's forward defense and a Maginot Line. Although the Maginot Line failed only because the Germans were able to circumvent it, thereby avoiding a "fair fight," that was of little solace to the defenders.

¹⁸Concerns about such matters have long been expressed by history-reading maneuver enthusiasts. One way I have used for some years to test related sensitivity in analysis is to specify a localized breakthrough in one or another sector at various times, and then observe how well the defense is able to react and contain it. I regard this as a very useful measure of effectiveness for the robustness of NATO's defense in various scenarios. Another technique is simply to specify that initial Pact movement rates are fast enough to get through the zone of prepared defenses quickly and to then simulate the consequences.

have usually been briefed only on unfavorable cases). Next, however, we drop "the other shoe." Here we begin introducing highly plausible assumptions that change the scenario "slightly." Perhaps we assume that one or another of the NATO allies mobilizes more slowly than the others, or that U.S. reinforcements deploy slowly, or that the Soviets are aware of some special weaknesses in a particular area, or that the Soviets have a rather successful H-Hour air strike, or...Or perhaps we change the underlying equations of the simulation "a bit," and perhaps some of the parameters in those equations. Suddenly, we find that what was previously a "good scenario" collapses: NATO loses the war quickly and decisively as illustrated by the cartoon in figure 1. So much for optimism.

Next, however, we look at possible Soviet planning. A second baseline case might be one that appears well suited to Soviet objectives and attitudes about warfare. In the baseline case the Pact may do extremely well, with a campaign that looks like a textbook case of Soviet doctrine--early breakthroughs, vigorous exploitation, and so on. It is not difficult to construct such cases. Again, however, we drop the other shoe. We imagine ourselves to be a prudent Soviet planner and consider some of the "What ifs?" that might trouble him. For example, NATO might vary its operational strategy somewhat--compensating for the maldeployment that is well-known to students of the balance (e.g., Levin, 1988, pg. 8). Or it might be that non-Soviet Warsaw-Pact forces would fight with somewhat less enthusiasm and effectiveness than their equipment might suggest. Or, it might be that the Soviets make more pessimistic assumptions about the quality of their own equipment as reflected in divisional scores (especially for older equipment) Or...(and so on). Again we find that the results of the baseline case collapse, and what was originally a very favorable scenario for the Pact turns into an unmitigated disaster (figure 2). In practice, many of our presentations exploit map-based depictions of the campaigns, and these are more dramatic in showing how success can flip into failure. Upon occasion we can even find instances in which a NATO counteroffensive is plausible.

It would be pleasant to report that results come out with NATO doing well at least half the time. Such is not the case, although at this point I don't know what "half the time" means, because neither I nor anyone else knows how to weight the probability of the various cases. NATO suffers from a significantly adverse force ratio¹⁷ and all the disadvantages of granting initiative to the Warsaw Pact, which can pick the main thrusts of attack, mass fire,

¹⁷In reviewing old studies I noted that in the early 1970s a theater force ratio of 1.5 was considered dangerous. From reading the current optimist papers, one might believe that the danger ratio is now 2:1, although the laws of war have not changed.

ORDER OUT OF CHAOS

Multiscenario analysis can be confusing and even paralyzing. It would seem possible to "prove" anything by merely choosing among the set of possible reasonable assumptions. What, then, does one do? **Figure 3 is an example of a generic technique that I like to use in making sense out of multiscenario results. It is a "fault tree" depicting visually various paths to disaster. The challenge is to make the paths unlikely.** The idea, after all, is not to sit and wring one's hands about the fragility of balance, but to find ways to improve one's odds. By looking at possible ways to fail, one can itemize issues for priority attention. In some cases, this consists of doing research to find out more accurately how well a particular system might work or how high loss rates would probably be. In other cases, it means buying things, changing operational plans, or exercising capability to improve the competence component of readiness. In still other cases it could mean seeking arms control provisions.

An important part of the method is to construct similar trees for Red so that we can better understand what strategies Red might construct to improve its odds and what adverse circumstances Red might be most concerned about. Such Red trees are not simple inversions of the Blue tree (except in the limit in which one makes both trees comprehensive--and incomprehensible), because Red has a different perspective and different variables over which he has control. Without going into details here it should be noted that Red, as the aggressor, has important advantages in his ability to shape and control the scenario--at least for the early period of conflict, and at least if Red is able and willing to back off and try again later if initial efforts to shape an appropriate scenario fail because of NATO reactions.

To illustrate one line of reasoning, suppose that the Soviets wish to avoid a war of attrition because of the advantage defense has under such circumstances given reasonable time for preparations.¹⁹ This almost implies that they would seek to create a scenario in which either NATO as a whole has not mobilized and prepared its defenses in depth, or in which at least one corps sector has not been prepared and well covered, by D Day. Either would virtually

¹⁹In this connection, remember that the Soviets all know and remember the battle of Kursk in World War II--a gargantuan battle in which they were on the defense. The German Army attacked and fought ferociously, but in spite of paying with high loss rates was unable to penetrate the prepared defenses in depth. The Soviets then launched a counteroffensive of historical significance. See, for example, Von Mellenthin (1955) or Caidin (1974). To the Soviets, attacking a fully-mobilized NATO with forward defense in depth must surely resurrect the wrong type of image for optimism.

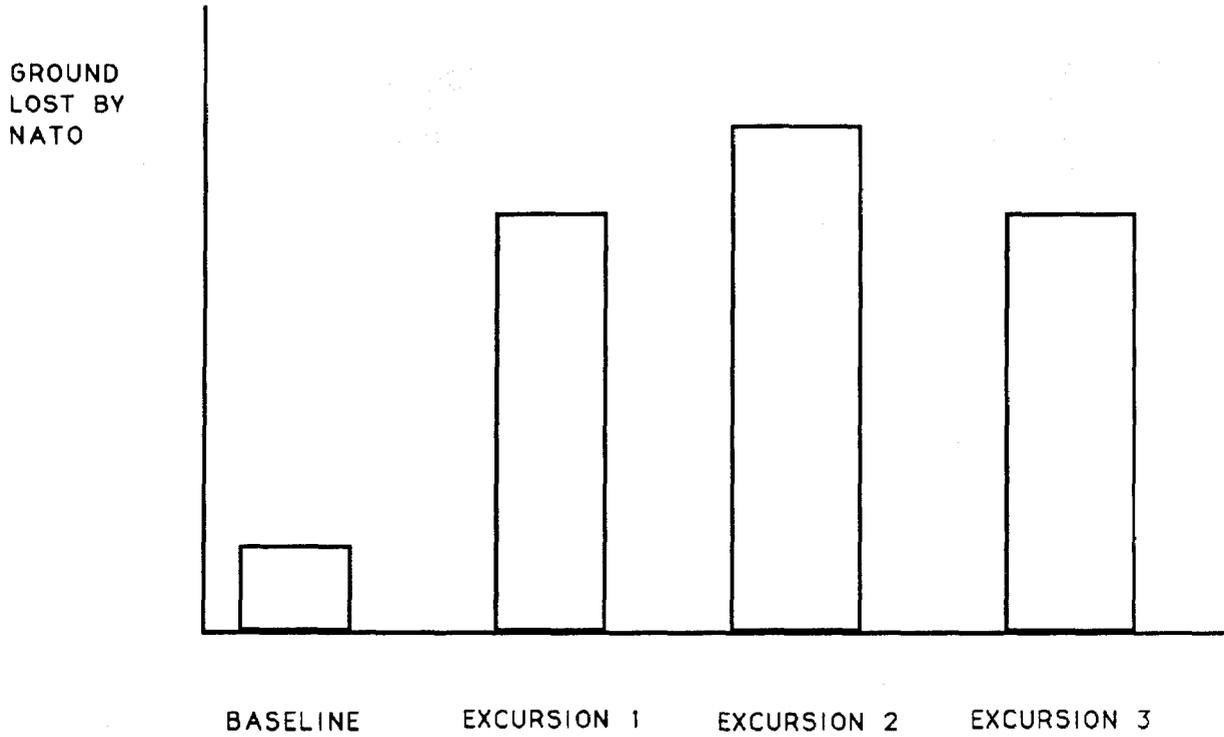


Figure 1. An illustrative family of excursions

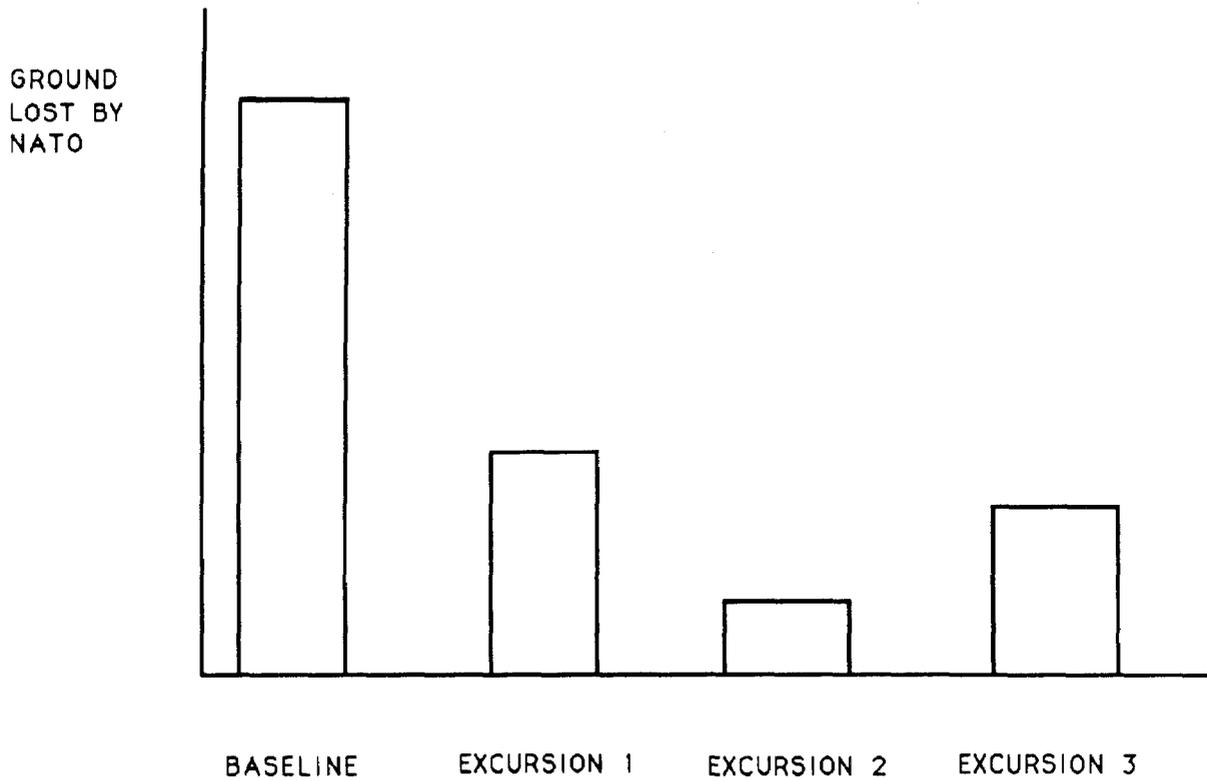


Figure 2. An illustrative offense-favorable family

require achieving strategic surprise. At the same time, according to Soviet Military Power (1987), Levin (1988), and other sources cited by Posen (1988), much of the Soviet army is currently at a low level of readiness. It might prove extremely unreliable under combat conditions without extensive training (e.g., two months and, quite possibly, much more). But without such forces the Soviets would lack the benefit of reserves to compensate for things going wrong such as a bogging down of the first echelon. How, then, to proceed?

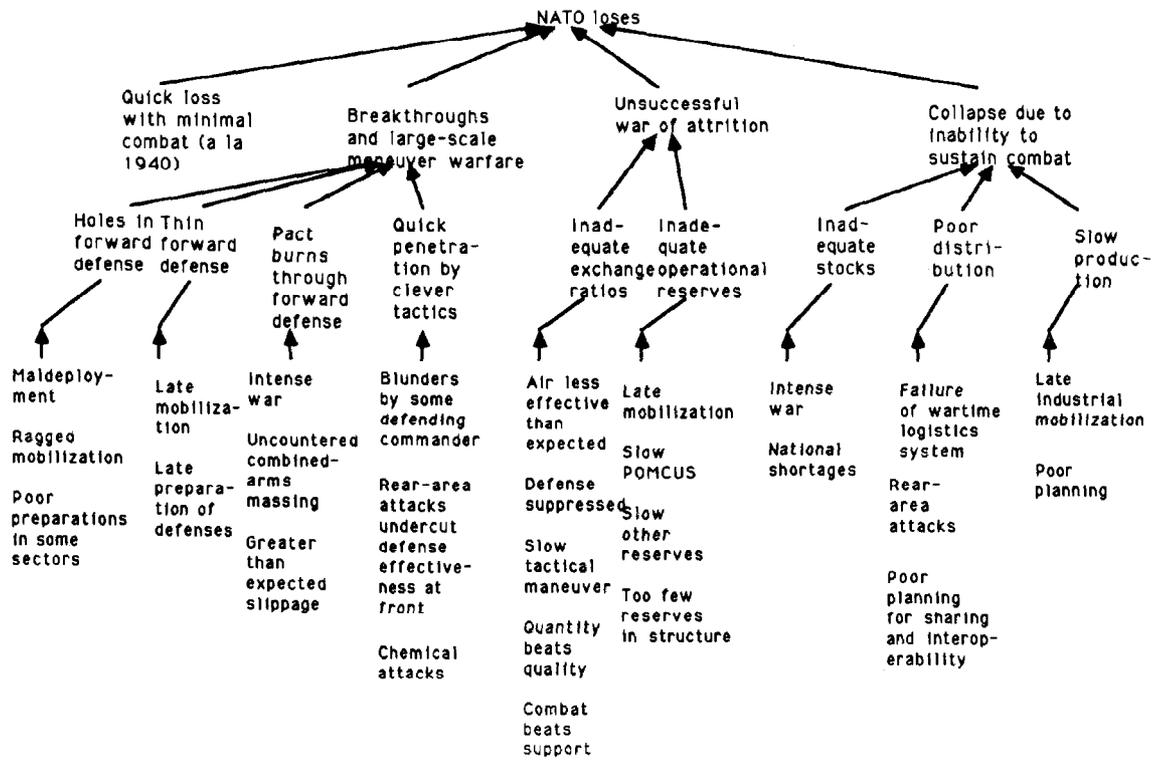
The answer seems clear to me, if not easy to achieve against a vigilant NATO. In my view, **the ideal scenario for a Soviet planner would be to prepare at least a significant portion of his forces over a long period of time** -- gradually raising readiness levels and reliability of enough "low quality" units to assure adequate reserves. After such a period, which might be many months in duration after being triggered by a fundamental change in East-West relations, the Soviet planner would wish to orchestrate a short-mobilization attack that would be under way before NATO forces were all in place and that might even begin without a decisive and coherent NATO response to warning because of ambiguities in the situation and Soviet-generated hints that war might still be averted in the absence of precipitous and provocative actions such as a full-scale NATO mobilization.²⁰

Every analyst has his own favorite threat scenario, but this is mine. It strikes me as the most plausible of the bunch, and dangerous indeed.²¹ It bears little relationship to those discussed in the more optimistic balance assessments.

²⁰By no means do I wish to imply that this strategy would succeed. If NATO were reasonably vigilant, there would be many things it could do during the period of extended tension in response to the increases in Soviet readiness. It is unclear, of course, whether it would in fact do those things if the signals were ambiguous or the political leaders were distracted by other events. Nonetheless, there is much that could be done: adjustment of operations plans, creation of obstacles, higher states of day-to-day readiness, and even creation of additional operational reserves that would be available early.

²¹An excellent reference on surprise attacks is Betts (1982). Vigor (1983) is also quite interesting in its discussion of Soviet emphasis on surprise, although I do not find Vigor's favorite surprise-attack scenario convincing. Levin (1988) also discusses a short-warning scenario without prior preparations. Private communications with Christopher Donnelly suggest that he, like I, considers it more plausible that a short-mobilization attack would come after extensive preparations.

FIGURE 3



READINESS, MOBILIZATION, AND SUSTAINABILITY

Let us now turn to some of the specific issues of interest to this working group, issues of readiness, mobilization, and sustainability -- although, in fact, I have touched on many of them already.

READINESS

There are many aspects to readiness, only a few of which can be touched upon here. Perhaps the most important, although certainly among the more fuzzy, is the issue of man-for-man fighting effectiveness for constant equipment. As we have seen from millenniums of history, wars can be won by the more proficient and innovative of sides despite quantitative inferiority. Generalship matters; doctrine matters; training matters; and so on.²² These are not minor issues when it comes to predicting the outcome of wars. Indeed, it is simply not possible to understand results of historical conflicts without facing up to such matters (Dupuy, 1979). For example, it has been estimated that German forces were twice as effective as their Russian counterparts on a man-for-man tank-for-tank basis in World War II at the tactical level (the Soviets performed very well at the operational-strategic level after the initial debacle). Similarly, only the most stubborn of technologies would deny the evidence that Israeli military forces are simply better, for equivalent equipment, than their Arab antagonists.

Are there examples of such imbalances in the modern NATO/Pact Central-Region standoff? Undoubtedly there are, but it is difficult to predict most of them with any confidence. By and large, most observers believe that U.S. air forces are greatly superior to Pact air forces in their competence for air-to-air operations. This comes from a combination of tradition, major investment in realistic training operations (and the willingness to accept losses), first-rate aircraft, and equally first-rate technology for command and control (as Israeli results in the Bekka Valley indicated, such technology can pay off). Unfortunately, we are unable to assess with any degree of confidence how NATO's superiority in tactical air would translate into operational effectiveness on the ground. Also, the conditions of many-on-many combat in the Central Region are quite different from those in the Bekka Valley.

²²This point can be overdone. We should remember that the stronger side eventually won World War I, World War II, the U.S. Civil War, and the Napoleonic wars. "Strength" in such cases, however, was measured by total national capability to mobilize and conduct long wars, and not by capability to prevail in the first military campaign.

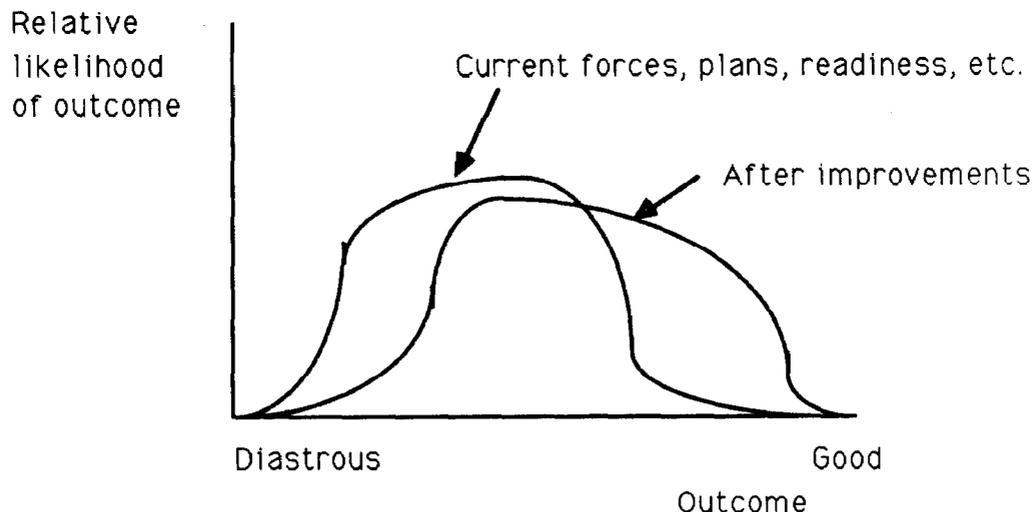
DISCUSSION

Using multiscenario analytic war gaming to identify improvement measures tends to bring out or dramatize many issues that would not even be treated in a more standard form of analysis. Instead of dwelling on well-known problems and solutions visible in standard planning scenarios (e.g., "it would be nice if NATO had ten additional divisions"), it tends to identify a series of discrete, important, and solvable problems--many of them approachable with existing resources. Some of these problems have not previously been solved because the solutions have been deemed politically unpalatable, whether rightly or wrongly. One might hope that by being able to demonstrate the consequences of certain problems with origin at the political level, pressures would build to correct them--despite the need for negotiations and coordination. It is heartening to observe, for example, that the Levin report (Levin 1988) correctly highlights the maldeployment of NATO forces as one of NATO's more serious problems.

In summary, then, this operationally sensitive multiscenario analysis is a fundamentally different way of approaching balance assessments and strategic planning. It faces up to uncertainty and emphasizes the importance of hedging, adaptation, flexibility, aggressiveness, and other characteristics military commanders understand but have often not been able to explain or translate into specific action measures supported by political authorities.

Once one truly accepts and internalizes the paradigm, balance assessments can never be the same again: there is never a single answer, but only an abstract imprecisely defined concept such as that depicted in Figure 4--a concept in which one knows that the breaks might fall one way or the other way, and the purpose of planning is to improve the odds.

Figure 4. A notional multiscenario image of how one thinks about the value of improvement measures



- . Sortie rates, kill rates, and loss rates for fixed-wing aircraft and helicopters as a function of mission, type battle, and time of day.
- . Delay times in theater-and corps-level command-control processes (e.g., how long does it take the theater commander to correctly identify the main thrusts and react; how long does it take him to recognize a potential breakthrough situation and allocate theater reserves to a corps in trouble? How long does it take him to reallocate and reapportion tactical aircraft?)
- . What frontage can a division defend and still hold ground? (one might assume that in the absence of combat experience a division would initially find itself losing ground under circumstances where doctrine said it could hold--unless the attacker were equally green.)
- . How far could a defensive division be stretched without suffering severe penetrations, local envelopments, and a breakthrough? (this would be a function of skill in reconnaissance and maneuver, familiarity with terrain, and ability to undercut enemy operations)
- . What operational strategies are plausible given the distribution of readiness across units and the associated nominal and conservative buildup rates?

The intention here is to provide only enough examples of how readiness enters into simulation assumptions so as to get across the point that **there are outlets for measuring the value of readiness if we make the effort to do so and accept the need to make subjective assessments.** In recent years the intelligence community has been increasingly helpful on such matters. Nonetheless, there is much more that could be done and many of the current outlets are not used or are used with dubious assumptions --for both Pact and NATO forces.

MOBILIZATION

There are many dimensions to mobilization, including the process of simply filling out units with warm bodies and the process of preparing those bodies to work effectively within their unit and in cooperation with other units (training). Training, of course, directly affects the readiness discussed above. The issues are not identical, however, because one might argue that even a rather lengthy mobilization would at best bring forces up to a nominal level of readiness consistent with the nation's doctrine and planning factors. One side's ready forces might still be much less effective than the other's ready forces.

As a minimum, however, we should assume that neither side can perform miracles and that it takes substantial time to turn civilians (even with prior military experience) into fighting men.

If we turn to ground forces, there is little that can currently be said with confidence beyond what appeared in Senator Levin's recent report. Training levels and morale in NATO forces appear higher than in Pact forces. But combat effectiveness depends on a host of factors, including doctrine, circumstances, and who has the initiative. It is notable, for example, that Arab forces fought with great bravery and considerable skill during the Yom Kippur war, and that in certain battles where they possessed the initiative, they did very well indeed.²³ Also, Soviet doctrine is designed to compensate for what the Soviets have long recognized to be a reality of their society--a lack of creativeness and initiative at lower levels of command. So long as the Pact had the initiative, their fighting effectiveness might be high. Even in human war games, with all their uncertainties, one can see the tangible benefits to the Pact of having the initiative: the NATO commander is constantly trying to assess the situation and react, and is often "behind the power curve;" by contrast, the Pact commander can proceed straightforwardly to pursue his plan--until and unless things go badly awry.²⁴

Turning from the philosophical to the specific, **how can we reflect readiness issues in theater-level analyses?**²⁵ In fact, we do so implicitly or explicitly in many ways every day that we use games and simulations--e.g., in assumptions about:

- Fighting effectiveness for constant equipment as discussed above (to assume nothing is to assume something--that all forces are equally capable!). We currently assume effectiveness scores increase with training time from M-Day levels to "full-readiness" levels.

²³Dupuy specifically identifies "setpiece battles" as special because brave but otherwise only modestly competent forces may be much more competent than in a free flowing situation.

²⁴The same type of phenomenon occurs at the tactical level, and those experienced with the National Training Center can testify how dramatically the competence of defenders (and attackers) changes with experience, in this case synthetic experience.

²⁵Not discussed here is the very important issue of top-level command-control readiness, which depends on such matters as the realism of theater-level exercises and the appropriateness of political and military decision-making arrangements for the circumstances of crisis and war. To explore such issues we consider, for example, scenarios in which NATO obtains strategic warning but acts upon it slowly and with "halfway measures."

significant increases in readiness would be visible, because they would involve tens of thousands of people drawn from the civilian world (for unusual training and the like). In an arms-control regime that included various types of intrusive inspection, the risks of covert training might be raised even more.

Another important point to be made here about mobilization is that it is not a single process. To the contrary, it seems likely that a NATO/Pact war would be preceded by months or years of cold war. In such an environment, there would be a long list of preparatory measures that could be carried out well before formal mobilization occurred. This could include not only raising the readiness level of low-readiness units, but also such important matters as reevaluating operations plans, resolving issues such as how to share equipment, munitions, and support-related duties, filling out prepositioning sets, acquainting NATO officers with terrain and challenges in areas other than those for which they have long been nominally slated, and perhaps preparing to use units not in the regular force structure for specialized defensive missions.

Another potentially crucial step in the premobilization period might be the opening up of assembly lines to produce munitions and equipment. As noted below, this could be essential.

SUSTAINABILITY

Most net assessments have not dealt with sustainability issues in depth--instead summarizing sustainability in terms of nominal days of supply (e.g., NATO's force goals include being able to sustain conventional conflict for n days, where n is always much shorter than would be prudent, and the assessed actual value of n at a given time is shorter yet).

Sustainability takes many dimensions. First, there is the simple issue of ammunition. It is well-known that NATO as a whole has only a short supply of the high-tech munitions that increase substantially the capability of certain weapon systems. Also, it is well-known that certain nations within NATO have shortages in particular munitions. In war games and simulations these shortages can be treated more or less realistically, although there are differences of opinion about what realism is, since under wartime conditions there would surely be more of an effort to share ammunition than can be exercised in peacetime when NATO is attempting to pressure each of its member nations into fulfilling its obligations.

If conventional defense were successful for a long enough period, the simpler munitions could be produced again. A careful net assessment should account for this explicitly. More work should also be conducted to study ways in which to produce high-tech munitions more quickly than would now be possible.

It has been a continuing source of irritation to those of us attempting net assessments and defense planning over the years that the Soviets are generally given credit for being able to mobilize forces and send them into battle far more quickly than the NATO countries. Many people believe we give the Soviets too much credit in this regard, even with the DoD reassessments alluded to in Posen (1988). The author is unaware of any effort to do a careful assessment using the same experts and measures to look at both sides' plans and capabilities.

One factor that has confused analysis in the past has been the Soviet doctrinal willingness to use lower-readiness divisions when necessary, even if they would be expected to take high losses. This is hardly surprising, considering the Soviets' history in the Great Patriotic War in which it was only by throwing everyone into the breach they were able, barely, to fend off defeat. Also, it is not surprising for a nation with a doctrine calling for (and postulating) early breakthroughs by first-echelon forces. If the Pact forces were indeed able to achieve early breakthroughs, it is plausible that low-quality forces could exploit the breakthroughs. Let us now consider, however, the case in which the Pact does not have a cake walk--the case in which the first echelon is stopped cold by NATO's defenses and the second echelon is asked to assault prepared defenses in depth, albeit defenses manned by battered NATO forces of uncertain cohesion and capability. Under these circumstances, I would expect low-readiness assault divisions to be ineffective--especially since NATO doctrine would be encouraging innovative and aggressive tactical (and conceivably operational-level) operations to frustrate Pact operations. Our simulations can reflect such effects straightforwardly.

If this chain of reasoning is valid, it seems likely that analysis of the balance should: (a) assume that Pact planners would attempt to bring second-echelon forces to a considerable level of readiness before attempting an invasion, even if it required months to do so; and (b) assume that forces asked to assault prepared defenses in depth would be relatively ineffective in terms of man-for-man fighting capability and breakpoints unless trained for considerably longer than is often considered adequate to being forces to full readiness. Similar assumptions should be made about the lower-readiness NATO units, but it is at least plausible that such units would be better in the defense than equally competent Pact forces would be on the offense. There is certainly historical basis for such a belief.

It is impossible in an unclassified paper to discuss these issues in much more detail, but one point is especially significant: if, as argued by the author elsewhere and by Posen and others in recent articles, the Soviets second-echelon forces are at relatively low states of readiness that would require considerable time to change, then **an important objective of conventional arms control should be to place restrictions on Soviet efforts to increase readiness.** In my view, and without the benefits of detailed analysis, observing

innovative use of light infantry forces to cover specific zones in which infantry is especially effective--thereby releasing mechanized forces for other purposes.

- Expand efforts to provide capability for the creation of barriers and obstacles in crisis or wartime--not just on the intra-German border in the form of permanent barriers, but also (and perhaps more importantly) wherever they are needed in the course of combat. That is, consider obstacle creation to be a force multiplier at the tactical and operational level rather than merely a strategic option that is unlikely to be adopted for political reasons.
- Develop stockpiles and production capability to sustain conventional conflict as long as necessary to thwart a Pact invasion. This requirement should not be compromised by fuzzily constructed assumptions about the role of nuclear weapons, even though the nuclear deterrent should be preserved and will probably continue to play a dominant role. The quantitative "requirements" for sustainability should be reexamined critically, and should reflect uncertainties about the actual intensity of warfare, the distribution of intensity across corps sectors and time, and the feasibility and reliability of intra-theater distribution during war. The conclusions should inform judgments about both stockpile requirements and the value of certain support forces.
- Move toward a conception of military strategy that recognizes the necessity of having fundamentally different concepts of operations for different scenarios (Davis, 1986a) or (less likely) develop the substantial additional in-place force structure to assure that NATO's preferred strategy can be followed in all instances.
- Modify the interpretation of MC 14/3 so as to require of the national partners development of stockpiles, production capability, and wartime distribution systems adequate to sustain NATO forces in a protracted conventional war. However, be realistic in the assessment of likely warning times.
- Finally, look upon arms control as an opportunity rather than a complication. More than any other factor, arms control has the potential for effecting major changes in the real and perceived balance--for good or for bad.
- In approaching arms control, seek restrictions on Soviet ability to increase readiness; also, seek large and highly asymmetric reductions (Thomson and Gantz, 1987) and, perhaps, as slow shift toward so-called "defensive defense systems." (e.g., von Bulow in Pierre, 1986, and Huber, 1986)

Turning from munitions to other matters, NATO would find itself having trouble replacing both major end items of equipment and the people to man tanks and other equipment. There are substantial stocks of prepositioned war material in Europe, and more stocks exist in the U.S. and elsewhere, but the history of modern warfare suggests that equipment may suffer high attrition rates and there is reason to believe it would take quite a long time for the U.S. and Western Europe to begin producing such equipment--too long to affect results in even a moderately protracted war (see Levin, 1988, for discussion).

One aspect of sustainability that should be mentioned here is repair. NATO forces have generally emphasized the ability to repair damaged equipment such as tanks relatively far forward; Soviet doctrine deemphasizes this. One tangible measure of NATO support structure's value is the difference in repair rates assumed for Red and Blue in war games and simulations. In our work at RAND we do assume such asymmetries, although there are, as always, uncertainties on the matter.

In dealing with sustainability, then, we again find that there are outlets in simulation for information that should be reflected in net assessments.

CONCLUSIONS

The principal purpose of this paper has been to discuss a new paradigm for conceiving and assessing the military balance, and to comment on how issues of readiness, mobilization, and sustainability can play in such assessments. It is appropriate, however, to spend some time discussing improvement measures, even though no details can be presented here.

A program to improve the Central Region balance should be conceived as a package with components involving force structure, top-level military strategy, operational planning and related political constraints, training, and grand strategy. The balance is multifaceted, and should be approached that way.

There are long and well known lists of possible measures. Without providing details here I would mention only a few, along with some personal comments.²⁶

- Increase operational reserves, especially in NATO's weak NORTHAG area. In considering options for doing so, consider redeployment of existing forces, development of new units that would be manned by Europeans but equipped by drawing on existing stocks, and the

²⁶See also, for example, the ESECs report (European Security, 1983), Mearsheimer (1988 and earlier), Huber (1986), Von Mellenthin and Stolfi (1984) and many other studies.

of the attrition equations used or the precise way in which forces and their effectiveness are counted and scored. To put it differently, Lanchester-like equations can be very useful for understanding certain types of local phenomena, but the character of the whole is not the character of the average local situation (except in very special instances). Efforts to find more and more elegant or rigorous ways to solve equations that do not describe the phenomena at issue represent misdirected effort.

As one more general observation, anecdotes about real wars and real battles often emphasize the role of special circumstances such as a particularly effective general, a successful surprise operation, or the superiority of one weapon system over another give the tactics used. In models and simulations such special circumstances must often be considered as partially correlated random events. That is, the battles of a war do not all follow the same laws of war with the same parameter values. Instead, defenses sometimes hold and sometimes fail under "the same conditions," but a lucky success now may increase the likelihood of a subsequent success.

As a result, efforts to assess the military balance based on equations (or simulations) that do not account for uncertainties and "random factors" can be misleading and, in my experience, can often be defense-optimistic--especially if the defender is attempting to defend with a marginal force-to-space ratio and minimal reserves, or if the defender is slow to maneuver ground and air forces in response to events. The attacker has advantages in all of this by having the initiative. This is why NATO generals talking about their defense strategy increasingly emphasize the necessity (not merely the desirability) of regaining the initiative as quickly as possible. So also are Israeli military figures passionate about the necessity of going onto the offensive as soon as possible. While the famous rules of thumb about defender advantage up to 3:1 and the imagery of Lanchester equations suggest that the defense can be static, it would seem instead that a defender must be very active merely to achieve the effectiveness usually ascribed to him.

A Few Specific Comments

Let me next comment on some of the specific problems I see in some of the published models. These are merely examples, and by no means an attempt to be comprehensive. I should also emphasize that all models can be criticized (including, most definitely, the simulation models used by colleagues and me at RAND), and that simple models with shortcomings can nonetheless be quite useful for specific purposes when manipulated by careful analysts. Thus, my comments are not intended to be standard nitpicking, but rather examples to illustrate how the models in question convey a very different picture of warfare, and the major factors in the military balance, than my own. Briefly, then:

**ATTACHMENT A: SELECTED COMMENTS ABOUT ANALYTIC
METHODOLOGY**

In recent years there have been a number of attempts to go beyond simple theater-force-ratio analyses and toward more dynamic treatments of warfare, while still using very simple and highly aggregated models. There is always an important place for simplified models in the communication of specific concepts, but serious problems arise when simplified models used to draw broad conclusions omit many of the factors important in the phenomenon being studied. So it is, in my opinion, with the analyses focused on Lanchester equations (e.g., Kaufmann, 1983), the FEBA-expansion model (Posen, 1985, 1988), and certain improvements over Lanchester equations (Epstein, 1985, 1987). Although they can be useful for some purposes, they are not a good basis for assessing the military balance--especially if one believes that maneuver phenomena are important.

General Comments

Before summarizing some of my relatively narrow concerns with these methods, let me state clearly what I consider to be the bottom line: If one seeks to study theater-level combat, the natural vehicle for doing so is computer simulation rather than anything close to Lanchester equations in paradigm. Models derived from the Lanchester concepts have the character of assuming a single continuous battle fought to a conclusion under constant conditions. Real warfare, however, even within a corps sector, has the character of a sequence of battles under very different circumstances of terrain, defender preparations, defender objectives, air power, natural barriers, and so on. Furthermore, the forces involved in such battles arrive and are pulled out in discrete chunks, often after losing cohesion rather than being annihilated. Although in abstract theory it might happen that these complications "average out," the essence of operational art is to assure that they do not. Both sides attempt to modulate the intensity of battle so as to maximize intensity in the areas and times when they have favorable conditions.²⁷

To be sure, individual battles involve attrition, and the laws of war describing that attrition may be reasonably approximated by some variant of Lanchester equations under some circumstances. However, except in special cases (what might be termed static attrition warfare), campaign outcomes are more sensitive to the distribution of battle types over time, which is a result of all the operational considerations mentioned above, than on the details

²⁷Epstein (1985) identifies real and serious problems with Lanchester equations, but does not go nearly far enough in correcting them. Instead, he takes only one step down the path toward simulation.

with enormous uncertainties, approximations, and, often, errors).²⁹

ATTACHMENT B: MODELS FOR THEATER-LEVEL ANALYTIC WAR GAMING³⁰

This attachment provides some information on the models used in the RAND Strategy Assessment Center for Central Region studies. More extensive documentation will be published shortly. Some details and most data are classified. The model described here is complemented with human gaming at a higher level of resolution (e.g., IDAHEX) and considerable offline analysis, since it is still rather aggregated in order for it to be useful in policy analysis. As should be evident, the model provides numerous outlets for representing issues of readiness, mobilization, and sustainability.

ENTITIES AND LEVEL OF RESOLUTION

The model follows Blue brigades and Red divisions, by name if necessary. A given unit is principally characterized by its score in Equivalent Divisions and Effective Equivalent Divisions (EDs and EEDs)--the former measuring weapon capabilities and the latter including effects of incomplete mobilization, incomplete training, loss of cohesion following intense combat, inefficiencies due to operations in a corps sector where the principal language is different from its own, combat inefficiencies due to using another nation's supplies, and, sometimes, subjective factors for national fighting quality (e.g., if we are attempting to understand a battle in an Arab-Israeli war or a WWII battle on the Eastern Front, it is essential to include quality factors).

The model also keeps track of more detailed information on force composition (e.g., number of tanks, number of artillery tubes, etc.), which it uses in rules designed to avoid some of the more egregious errors of aggregated-firepower methods. For example, a division consisting only of artillery and air defense assets cannot attack. In recent work, we have begun to use situationally

²⁹Those interested in Lanchester equations and the problems in using them should also see Biddle (1988), which I read while proofing the current paper.

³⁰The models described here have been developed by colleagues Bruce Bennett, Arthur Bullock, Carl Jones, Robert Howe, Patrick Allen, and myself. Bruce Bennett has directed the overall effort on combat simulation models. There is considerable documentation available for those with access to the RAND Strategy Assessment System.

- . Lanchesterian models that purport to give probabilities of defense success (e.g., Kaufmann, 1983) are doing a great disservice, since most of the causes of uncertainty are not reflected in the underlying calculation.²⁸
- . Models assuming continuous and cohesive defensive lines, even lines allowed to stretch, miss important aspects of maneuver phenomena and do not really represent "breakthrough" well. It is notable that the attacker has historically broken approximately even in successful campaigns, rather than suffering an exchange ratio of 2:1 or so as is often assumed in the various simple models. Often, a key to success was changing the character of the battle from assault to exploitation of breakthrough.
- . Models that allow forces to fight to completion, as in models solving Lanchester equations, the FEBA-expansion model, and Epstein's models, ignore cohesion-related "breakpoint" phenomena, which have an important effect on outcomes, as can be demonstrated with simulation and as is recognized by military doctrine through echeloning methods and other plans for troop rotation.
- . Treating air power as merely another source of firepower to be added to the combat potential of ground forces largely ignores the counter-maneuver aspects of air operations, which historically have been far more important than air-to-ground attrition (e.g., see Kozaczka and Dews, 1981). Also, it tends to focus attention on close air support, which is probably quite misleading.

I would hasten to note that the authors are aware of most of the above shortcomings and often mention them in footnotes to their articles. Moreover, these shortcomings are by no means unique to the models cited. Again, my purpose is to argue that the simpler models are really missing much of the essence of warfare, and are a poor basis on which to proceed. While any specific problem can be worked around or repaired within the framework of the simple models, it seems evident that one should either stick with the high-level view (e.g., buildup curves) or move toward real simulation models in which these and many other complications of warfare can be discussed and treated straightforwardly (albeit,

²⁸See also articles by Lepingwell (1987) and Homer-Dixon (1987). Both are interesting and informative for those interested in Lanchester equations. They are extremely critical of Kaufmann's work--indeed, unreasonably so in my view, since in some cases they assess analytic sin primarily by noting lack of rigor rather than examining whether heuristic methods (e.g., aggregated measures of combat potential) are convenient and approximately right in the context of real calculations.

EEDs), the defender's density (measuring force-to-space ratio), terrain, defender preparations, and type battle. The concept of type battle is especially important and the types recognized are: static engagement, meeting engagement, assault on hasty defense, assault on deliberate defense, assault on prepared defense, assault on fortified defense, delay, withdrawal, and breakthrough/pursuit. A defender ordered to hold ground with inadequate forces will eventually suffer a breakthrough, after which the type battle is breakthrough/pursuit. The defender's losses are then very high and the exchange ratio favorable to the attacker. These types of battle, which have been observed frequently in warfare, are non-Lanchesterian and are often typified by local envelopments with large-scale surrenders or annihilations. Roughly speaking, the attacker suffers grievous casualties during an assault phase but, if he achieves a breakthrough, gets the opportunity subsequently to recoup his losses and more.

The equations used for ground-combat attrition are based on a combination of judgment, historical insights, and analytic convenience. They (as well as parameter of the equations) can be and are varied in sensitivity studies. Overall levels of attrition are lower than in many models and compare favorably with results seen in the Arab-Israeli wars and World War II, including results reported recently (Stoeckli, 1985) regarding Soviet losses on the Eastern Front. Nonetheless, intensity of war (loss rates) is uncertainty as much as a factor of three.

Movement Rates. Movement rates of the FLOT depend on adjusted force ratio, defender density, phase of battle, terrain, the presence of natural or artificial barriers, and the weight and character of air power. In a variant method that integrates other effects, it depends strongly on the ratio of the sides' loss rates. In either method, typical results are that movement is very slow so long as the defender has a good force-to-space ratio after accounting for attrition and associated loss of cohesion. If the defender density drops, however, movement picks up. A defender who insists on trying to hold ground with inadequate forces will suffer a breakthrough, after which movement is very rapid. The result, then, is that average movement rates over the duration of an Army operation can be considerable. The movement rates compare favorably with those observed in World War II, including those from the Eastern Front on which the Soviets were able to emphasize large-scale maneuver. It is by no means clear whether modern movement rates would be faster, slower, or comparable, but the increased mechanization since World War II would not be the critical factor.

Movement. Ground forces are maneuvered within and across sectors, both in accordance with initial plans and as the result of subsequent adaptations. With some human interaction to guard against model problems, it is possible to simulate large-scale envelopments such as those emphasized in Soviet doctrine and demonstrated repeatedly in their World War II experience.

adjusted scores so that, for example, infantry units are assessed as unusually capable in mountains an urban terrain.

Fixed-wing aircraft and helicopters are treated separately,³¹ flying a variety of missions with mission and type-battle-dependent effectiveness and vulnerability. Aircraft kill enemy forces and slow or disrupt their maneuver. For example, they can slow the movement rate of a force that has just achieved a breakthrough and could otherwise move at high speeds. They can also reduce the effective force ratio on the FLOT through BAI missions disrupting the opponent's tactical maneuver, and through both BAI and AI missions delaying the arrival "on the FLOT" of forces being sent to the front from corps or theater-level reserves. The aircraft suffer attrition of various types (on the ground, en route to their mission, during their mission and egress); air-to-ground aircraft also suffer "virtual attrition" in the sense that their effectiveness can drop precipitously if physical attrition is high and conditions are therefore of the type in which historically effectiveness has been very low, despite physical capabilities. Bases can be attacked, reducing sortie rates and destroying unsheltered aircraft.

The "game board" consists of axes of advance broken down into zones of constant character. A zone might be, for example, 40 km on a side and characterized by mixed terrain and other descriptors. Although the model uses axes of advance, forces can maneuver from one axis to another, must protect flanks, and can participate in large-scale envelopment operations involving more than one axis.

In summary, the model's resolution is high in some respects (unit characteristics, type battle, type mission, and so on), but low in others (e.g., with attrition and movement adjudicated for an entire corps in one calculation, and with only some types of support such as tank repair modeled at all).

MAJOR PROCESSES

Forces engage in processes such as alert, deployment to theater, maneuver within the theater, attack, withdrawal, and delay. Engineer assets can produce barriers. Ground forces are subject to attrition from a variety of sources (ground forces on the FLOT, ground forces in the rear, air forces, missiles,...). FLOT movement is another major process.

Attrition. Ground-combat attrition for the opposing FLOT forces in a given corps sector is a function of the force strengths (in

³¹In some analyses it is also necessary to disaggregate certain other weapon systems of ground forces. The MLRS, for example, is sometimes treated separately, depending on the analysis being conducted and the year for which it applies.

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Within a corps sector, forces are sent to the front, pulled out for recovery when their cohesion has dropped due to attrition (unless pulling them out would leave the line uncovered) and moved backup as appropriate. Unit cohesion drops faster than attrition occurs to reflect "break-point" phenomena, which are often very important to results. Command-control decisions can be fully or partially automated, although it is always desirable to have an analyst reviewing the model's decisions on a day-by-day basis. Command-control delays and imperfections are modeled, based in part on experience from human war gaming in which such effects can be crucial (and in which a side often does much worse than its force levels would suggest it "should" from a force-ratio analysis).

The overall operations of ground and air forces are governed by adaptive analytic war plans consistent with a theater-level strategy, which can change during the course of the campaign. Again, an analyst reviews decisions and intervenes to compensate for model imperfections.

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Some Basic Soviet Military Planning Perspectives

I. INTRODUCTION

This paper discusses selected aspects of Soviet military planning and decisionmaking that bear on current Soviet assessments of the conventional balance in Europe. The paper is limited to a discussion of strictly military dimensions of the balance, since within the overall Soviet framework, the state of the "conventional balance" bears on other dimensions of the interactions between nations as well.

There are a number of issues relevant to the conventional balance that are important to understand from the perspective of Soviet military planning. Specifically, the paper will discuss (a) the basic Soviet perspective on warfare, (b) the evolution of Soviet thinking about the nature of warfare since 1960, (c) the Soviet strategic structure for military planning, (d) Soviet battlefield planning procedures, and (e) the Soviet calculus of the correlation of forces. Finally, the paper concludes with some brief comments about the conventional balance assessment itself.

II. BASIC SOVIET PERSPECTIVES ON WARFARE

The Soviet approach to warfare is deeply rooted in Marxist-Leninist principles. From a philosophical basis, the Soviets see armed conflict between two nations or coalitions as one form of the dialectic process between adversaries. Their technical approach starts from a belief that warfare is governed by underlying laws which characterize the essence of combat, and that military plans should be designed to result in the victory conditions implied by these laws. Soviet laws of war are formulated in terms of the relative potential capabilities of the Soviet Union and her adversaries, and the purpose of interpreting the laws for concrete situations is strongly conditioned by Soviet historical experience. Current Soviet military perceptions are strongly influenced by the devastating German offensive of World War II.

Several important details of the Soviet perspective follow directly. The Soviets see the world in terms of the continual provocation-counterprovocation of the dialectic, not in terms of western concepts for trying to maintain a stable relationship between nations. The Soviets have developed both a philosophy and a calculus of the correlation of forces, founded in their laws of war, which they believe allows them to judge the progress of the Soviet Union in the dialectic conflict with her adversaries, and also to judge the likelihood of success by Soviet Armed Forces in specific military campaigns. Once military operations are underway, Soviet military theory argues that the requirement to maintain control of the military situation is a dominant factor. Other dominant factors include the potential for loss of control

SOME BASIC SOVIET MILITARY PLANNING PERSPECTIVES

by
John A. Battilega
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- If a war breaks out, by what forms and methods should it be fought?

In short, Soviet military doctrine specifies a consistent set of assumptions about the nature of the environment within which future military forces are likely to have to operate and establishes the highest level guidelines for the development of military capability. Approved by the political leadership of the Soviet Union (through the Defense Council), Soviet military doctrine serves as the formal tasking from the political leadership to the military for the development of capabilities. Thus, military doctrine is very important, and even minor changes in the provisions of doctrine can change what the military must do.

In about 1960, the Soviets adopted a fundamentally new military doctrine, based on an assessment that changes in military forces in the aftermath of World War II (and specifically, the combination of the development of nuclear weapons, ballistic missiles to deliver the weapons, and modern means of guidance and control) had altered the character of modern warfare. In the view of the Soviet military theoreticians, the most significant change was the reduction in the amount of time required to introduce strategically significant changes in the military situation. While weeks and even months were required in World War II to plan and execute any operation capable of causing radical changes in the situation, Soviet assessments in the 1950s and 1960s concluded that the use of nuclear-missile weaponry could allow the strategic leadership of a nation to directly (i.e., without working through the actions of a full hierarchy of strategic, operational, and tactical levels of command) take actions that could result in the attainment of those strategic goals that are associated with gaining favorable outcomes in the war as a whole.

Soviet theoreticians concluded that the two most important implications of the altered character of warfare were (a) it would be necessary to have the ability to adapt very rapidly to changes, and (b) there would be no sanctuaries in a modern war. Thus, the Soviet strategy of trading space for time and using the vastness of the USSR to build massive armed forces during the course of a long conflict would not work in a future war.

As a result of these theoretical conclusions, Soviet military doctrine in the 1960s was based on the tenets that

- a future major war would likely start with the massive use of nuclear weapons by the forces of both sides;
- the initial nuclear strikes would exert a strong influence on the subsequent course and outcome of the war;
- the nuclear missile forces would be the main striking forces of a modern military force, with the other elements

due to the employment of nuclear weapons, and, more recently, high accuracy conventional weapons, and the potential for direct damage or physical loss of the Soviet homeland.

Soviet military theory argues that the most significant military operations must be executed by combined arms forces. Traditionally, the principal Soviet focus has been on land warfare in areas contiguous to the Soviet Union. As a result, Soviet combined-arms officers have tended to dominate the development of Soviet military thought which has given it a somewhat ground-force orientation. Countries adjacent to the Soviet Union, and the seas in general, have historically been viewed as buffer zones, and Soviet military forces deployed in these buffer zones, plus those deployed interior to Soviet borders, are the principal forces which the Soviets depend on for victory in general war. To date, Soviet forces in areas of the world not contiguous to the Soviet Union have probably not played a major role in Soviet doctrine for general war. Yet in certain lesser scenarios they are probably viewed as effective instruments, and in any case they complicate U.S. planning.

III. EVOLUTION OF SOVIET THINKING ABOUT THE NATURE OF WARFARE SINCE 1960

Soviet decisions about the characteristics of future forces, and their efforts to ensure that procedures are in place to allow for the effective use of the forces in a potential conflict, are all made within the context of a set of design assumptions that are specified as a part of Soviet military doctrine.¹ Included in the specification of Soviet military doctrine are answers to the following questions:

- What is the degree of probability of a future war, and with what adversary will one be dealing?
- What character may be assumed by a war which a country and its armed forces would be fighting?
- What goals and tasks can be assigned to the armed forces in anticipation of such a war and what armed forces must the country possess in order to achieve the stated goals?
- How should one accomplish military organizational development and prepare the army and country for war?

¹Marshal N.V. Ogarkov, Always in Readiness to Defend the Fatherland, Voenizdat, Moscow, January 1982. Translated in AFIS Soviet Press Selected Translations, AFRP 200-1, No. 83*1, Jan.-Feb. 1983.

the two sides to change the forces that are involved), (b) the geographic scope of the war (and the "places and times" that might be decisive), (c) the types of weaponry that could be involved (e.g., nuclear weapons, highly mobile strike forces, etc.), and (d) the composition of the coalitions formed by the sides.

In the intervening 25 years, the Soviets have made significant progress in developing forces that could deal with the complexities of modern warfare that they identified in the 1960s: they have a powerful nuclear missile force, they have command and control systems that can operate within the time constraints that they established as the design criteria, they have developed combined arms forces that are capable of operating in a modern environment, and they have the ability to place greater pressure on the nuclear forces of an opponent. At the same time, however, their planning problem has become more complex because they have concluded that the continuing changes in military technology and the organization of military forces has created the possibility that major wars of the future could exhibit a spectrum of additional characteristics.

Some of the specific features of modern warfare that the Soviets appear to be reflecting in the most recent discussions of doctrine are discussed below:

- As nuclear forces have grown in size and capability, the considerations that would be reflected in a decision to actually employ nuclear strikes in support of the attainment of military objectives have grown more complex, possibly reducing the likelihood that a major war would be initiated with nuclear strikes.
- Other types of weapon systems (e.g., advanced conventional weapons, and reconnaissance-strike-complexes) are increasingly capable of operating at a pace and a level of intensity that approximates that of nuclear forces.
- The mobility and versatility of modern military forces is such that the military situation can change very rapidly during a period of crisis and during the course of a conflict.

As a result, though the Soviets believe that they have made significant progress since 1960 in improving the ability of their forces to deal with the dynamic nature of modern warfare, there is enough uncertainty about the requirements for a future war that it is becoming increasingly difficult for them to develop solutions to military planning problems in peacetime, for implementation in a future crisis or conflict.

To the extent that the Soviets are able to establish a firm design basis for their military forces (with some confidence that they can predict the military environment and can have a good understanding

of the force designed to operate in a nuclear environment and exploit the effects of the nuclear strikes; and

- a war would probably not last very long, and the course and outcome of a major war would probably be determined primarily by the capabilities of the forces existing at the beginning of the conflict.

With these underpinnings as the basis for doctrine, the Soviets concluded that the most important requirements for preparing for a future war would be (a) a large nuclear missile force with a very high degree of readiness, (b) a command and control system capable of planning and controlling combat operations in a rapidly changing environment (including commanders and staffs well-drilled in the use of procedures and decision support systems that could accommodate the rapid pace of decisionmaking), and (c) mechanisms for warning and planning that could support actions to preempt the opponent's initial nuclear strike and gain the initiative at the outset of a conflict.

Thus, for the Soviet views of the nature of warfare in the 1960s, a high premium was placed on the ability to achieve high levels of readiness and to act very quickly and decisively in a future war. Because it was assumed that a war would start with large-scale (or, at least large relative to the sizes of the arsenals existing at that time) use of nuclear weapons, very strong emphasis was placed on the initial strikes (both ensuring high readiness and responsiveness of their own nuclear forces and prompt actions to blunt the effects of those of the opponents). Though this was a difficult planning case, it was one that allowed a substantial amount of preplanning.

By the 1970s, the Soviets, recognizing the realities of the NATO doctrine of flexible response, concluded that a major conflict could include a period of conventional conflict prior to the initial use of nuclear missile strikes. In this context, they had to develop plans and planning procedures that could allow them to achieve their military objectives whether or not nuclear weapons were used at the outset (but always recognizing that use of nuclear weapons could be initiated at any time in a conventional conflict).

In the 1980s, the Soviets have diagnosed a requirement to be prepared to fight an even broader spectrum of possible major wars. In a standard litany, they cite U.S. efforts to design military forces and plans suitable for wars that could be "long or short in duration, regional or global, and nuclear or conventional." Because the Soviets have a commitment to the development of decision support systems that are designed specifically to the decisions that they foresee for each echelon of their command structure, uncertainty about the specific character of the wars for which they are designing their armed forces is problematic. Special problems arise if they are unable to define such features as (a) the duration of the war (and derivatively, the ability of

the capacity of the wartime economic base if a conflict could have long duration;

- the importance of activities in the "threatening period" (that period of time prior to the initiation of combat actions, but in which the probability of war is rising) and in the initial period of a war, for resolving uncertainties about the specific character of a war. The Soviets assess increasing importance for these periods of time and appear to be trying to establish procedures for rapidly completing those preparations that cannot be completed under the conditions of uncertainty that prevail in peacetime; and
- the concerted effort that is being made by potential Soviet adversaries to compound the complexity of their planning problem and to present them with a spectrum of irresolvable uncertainties and an ever-changing threat environment.

Perestroika and Soviet Military Doctrine

Within the last few years, there is evidence that Soviets may have decided to make some basic changes in their doctrine. They have articulated statements about what appear to be changes in military doctrine to correspond to the range of Gorbachev initiatives associated with the requirement to restructure the Soviet economy. The mandate for this has been articulated by Gorbachev and other senior Party leaders a number of ways, generally under the rubric of "new political thinking".

Based on Soviet writings and speeches which are becoming available in the West, it appears that the Soviet military is in the process of deciding what this actually means, and how to implement it. Within the last 9 months a series of increasingly detailed discussions of this subject have indicated the general nature of the way in which the doctrinal changes are being described, and some of the political-military objectives that apparently correspond to the changes. An article by Admiral Kostev signed to press in August 1987, stated formally that the Warsaw Pact states adopted a new doctrine at a meeting of the Political Consultative Committee in Berlin on May 29, 1987. The article gave some broad statements of four main characteristics of the new doctrine:

First, the Soviet Union will not be the first to use nuclear weapons and will never use them against those countries that do not have such weapons in their territories...

Second, at the foundation of our Armed Forces development is the principle of defensive sufficiency. This means that the composition of our Army and Navy forces and the quality and quantity of the means for armed combat are strictly commensurable with the military threat level and the nature and intensity of military preparations.... The limits for

of the types of decisions that will have to be made to accomplish their objectives in a future conflict), they can use their sizeable military planning community in peacetime to establish plans that they should be able to execute efficiently in a future war. If they are presented with a predictable (even though capable) threat or if they can set the terms of the military engagement, they will be able to use detailed preplanning to bring the mass of their military forces to bear in ways that are most favorable to them. If they must maintain their forces in a posture that will allow them to deal with a variety of situations; however, they will be forced to do more planning during the course of a crisis or conflict, and will probably experience a greater delay in achieving a force disposition that is appropriate for the actual situation.

In the last five years, Soviet military theoreticians have commented on the complexity of planning for multiple contingencies and on the fact that the directions of change in military forces are making this problem even more significant. Some specific topics that seem to be the subject of recent study by the Soviets are:²

- the implications of the development of non-nuclear weapons that can perform the strike missions that could previously be performed only by nuclear weapons;
- the importance of ensuring that the adaptation of military forces as a whole can be accomplished as rapidly as required to accommodate the incorporation of new weaponry, including the organizational structure of military forces, the precepts of military art appropriate for the employment of the forces, the training of personnel in planning and execution of appropriate functions, and the system of decision support for planning the actions of the military forces;
- the importance of correctly estimating the duration of a conflict so that the intensity of the operations (and, accordingly, the rate at which military forces are reduced in strength) can be controlled at an appropriate level. Recent Soviet discussions emphasize the importance of ensuring that the rate of loss does not exceed the rate at which forces can be replaced or replenished for the duration of a conflict; they have concluded that the intensity of the combat operations may have to be scoped to

²See, for example, the several articles and pamphlets written by Marshal N. V. Ogarkov, M. V. Frunze: Military Theorist by Colonel General M. A. Gareyev, Progress in Military Technology and the Armed Forces of the USSR by Lieutenant General M. M. Kir'yan, and Economic Conflict in Warfare by Colonel S. A. Bartenev.

superiority, but neither will they permit it in relation to themselves.

[Akhromeyev, 1987, p.3]

Finally, in December 1987, Colonel-General Gareyev, in an article published in English, stated that

The Warsaw Treaty countries are minimum military arsenals for all sides. Military equilibrium at descending levels is crucial to world security. Genuine equal security now implies an exceptionally low, and not high, level for the strategic balance.

[Gareyev, 1987, p.1]

Gareyev then summarized six Warsaw Pact objectives for arms control negotiations which follow from the new Soviet doctrine. (These objectives are basically the same formulation as those published by Soviet Minister of Defense Yazov a few months earlier [Yazov, 1987]):

One, an end to nuclear test with subsequent reduction and full elimination of nuclear weapons; no spread of the arms race to space.

Two, a ban on chemical and other mass destruction armaments involving eradication of all existing stocks.

Three, reduction of armed forces and conventional weapons in Europe to a level where no side, in providing for its defense, would have the resources for a sudden attack on the other side or for offensive operations in general.

Four, strict monitoring over all measures for disarmament.

Five, establishment of zones free of nuclear and chemical weapons, and zones of reduced arms concentration and of enhanced trust. Mutual rejection of the use of military force. Commitments to maintain peaceful relations. Elimination of military bases on the territory of other states. Withdrawal of all troops to within national frontiers.

Six, simultaneous disbandment of NATO and the Warsaw Pact.

[Gareyev, 1987, p.2]

It is not clear yet what the real implications of this new doctrine actually are, or in fact whether it represents a major departure from previous formulations, or simply restatement of old provisions for a different audience and a different political purpose. The detailed implications of perestroika and its derivative military doctrine are probably currently being worked

reasonable defensive sufficiency are determined by the need to prevent unpunished nuclear attack under any circumstances, even the most unfavorable, and also by the currently existing strategic military parity that is a decisive factor in preventing war. A further increase in the parity level will certainly not bring greater security. Therefore, the situation dictates the necessity of maintaining military force equality, but at the lowest possible level....

Third... the U.S. and NATO... military strategy of "flexible response" envisions active preparations to conduct not only a nuclear war, but also an extended conventional war. And they are, therefore, creating military assets whose characteristics are the same as low yield nuclear weapons. This means that our country has to prepare an armed defense using not only nuclear weapons, but also highly effective conventional weapons....

Fourth... it is very important that we train the Army and Navy for war under conditions where the enemy has weapons of enormous power. We are not talking about improving weapons and military equipment, but about intensifying the human factor, decisively increasing the command skills of officers and generals and increasing special training of our personnel... the task is to radically improve the quality of military training....

[Kostev, 87, p.3]

Soviet Chief of the General Staff MSU Akhromeyev, in another article signed to press in November 1987, formulated the "defensive orientation" of the new Soviet doctrine in terms of three "crucial provisions" which "constitute the basis of our military doctrine":

First. The Warsaw Pact states threaten no one, intend to attack no one, and will never take the path of aggression. They have no territorial claims on any state either in or outside Europe. They do not regard any state and any people as their enemy. On the contrary, they are ready to build relations with all countries based on a mutual consideration of interests, security, and peaceful coexistence.

Second. The Warsaw Pact states will never, under any circumstances, be the first to begin hostilities against any state or alliance of states, unless they themselves become a target of aggression or armed attack. The allied socialist states will never be the first to use nuclear weapons.

Third. The Warsaw Pact states will continue to strengthen their defense, carry out military development in accordance with strict principles of military balance, and seek to maintain the military-strategic balance at the lowest possible level necessary for defense. They do not seek

executed by groupings of the military forces (usually consisting of forces of multiple services), are designed to achieve a strategic goal. Some examples of strategic tasks (or missions) are

- routing a large grouping of enemy forces in a TVD;
- capturing vital areas of enemy territory;
- destroying crucial military-industrial targets;
- disrupting enemy state and military control;
- repelling enemy strikes;
- holding strategically important positions and areas; and
- repulsing an enemy aerospace attack.

[Unattributed, 1979]

Strategic missions would normally be executed by a combination of "strategic actions" of the armed forces. Strategic actions consist of combinations of strikes, operations, and combat actions executed by forces of operational echelons. The coordinated employment of these various forms of action, under the control of the Supreme High Command, would be designed to directly accomplish strategic missions. Though discussion of this planning structure, using English language approximations to the Russian terms, sounds rather general, it appears that the "forms of strategic action" both define the capabilities that the armed forces must have and provide the basic building blocks with which plans at the strategic level are built.

Because the Soviet planning structure is a top-down structure, with the strategic objectives established very concretely, the requirements on operational and tactical level forces flow from this specification. Further, the overall Soviet view of the adequacy of their military force posture (their ability to succeed) is based on their evaluation of their capability to successfully execute the various types of strategic actions. (See Figure 1.)

Soviet views of the forms of strategic action have changed somewhat over time. Soviet writings in the early 1960s state that there had traditionally been only two forms of strategic actions: the strategic defensive operation and the strategic offensive operation in a continental TVD. In both of these forms, the principal role was assigned to the ground forces. With the development of nuclear-missile weapons, however (and the possibility that a future war could be brief, characterized by nuclear strikes on the homelands of the sides), additional forms of strategic action were identified. The forms of strategic action in the 1960s were cited as

out in the Soviet Union. Hopefully, more of the details of the Soviet decisions in this area will become available to the West over the next few years.

IV. THE SOVIET STRATEGIC STRUCTURE FOR MILITARY PLANNING

Soviet estimates of the conventional balance in Europe are done within the framework of the Soviet architecture for military planning. The Soviet structure for planning of military operations starts with the specification of strategic goals in each of the Theatres of Military Actions (or TVD, from the Russian). The TVD, defined as

an extensive portion of a continent and its surrounding seas or an ocean (sea) basin with islands and adjacent continental seacoasts, and also the airspace over them, within the boundaries of which are deployed strategic groupings of armed forces and military operations can be conducted.

[Kozlov, 1980]

While the TVD is defined as a geographic entity, its significance derives from the fact that TVD seems to be used as the principal means for structuring the planning of military forces and operations and that the strategic goals that represent the highest level requirements seem to be defined with respect to the TVDs.

The strategic goals are

The envisioned result of military action in war, campaign or strategic operation, the achievement of which leads to a radical change in the military-political and strategic situation and permits the further successful conduct of the war and its victorious completion.

[Kuznetsov, 1979]

As such, the goals are stated in political-military terms and are related to the overall outcome of the war (or, more precisely, the outcome of a projected future war). The Soviets distinguish between "general" strategic goals which express the desired result of a war as a whole and individual (or partial) strategic goals which are the intended results of specific operations. The general strategic goals would usually be achieved through the accomplishment of a set of individual strategic goals. Soviet sources say that, based on strategic goals, "the groupings of armed forces are established in the theaters of operations (or strategic sectors), strategic missions are set, and the forms and methods of combat operations are chosen." [Kuznetsov, 1979.]

In order to accomplish the strategic goals, specific "strategic tasks" are assigned to the military forces. These tasks, to be

- nuclear missile strikes and also the operations of long range aviation;
- offensive and defensive operations by the ground forces and frontal aviation;
- operations by the forces of the PVO Strany; and
- naval operations.

[Sokolovskiy, 1963.]

In this statement of the forms of strategic action, the actions are sorted in terms of the forces that perform them. In the more recent (and highly authoritative) Soviet Military Encyclopedia, the statements of the forms of strategic action emphasize the joint nature of the operations and also provide less distinction between the actions of conventional forces and those of nuclear forces:

- offensive strategic operation in a TVD;
- defensive strategic operation in a TVD;
- strategic operation in an oceanic TVD; and
- strategic operation to repel an "aerospace attack."

[Cherednichenko, 1979]

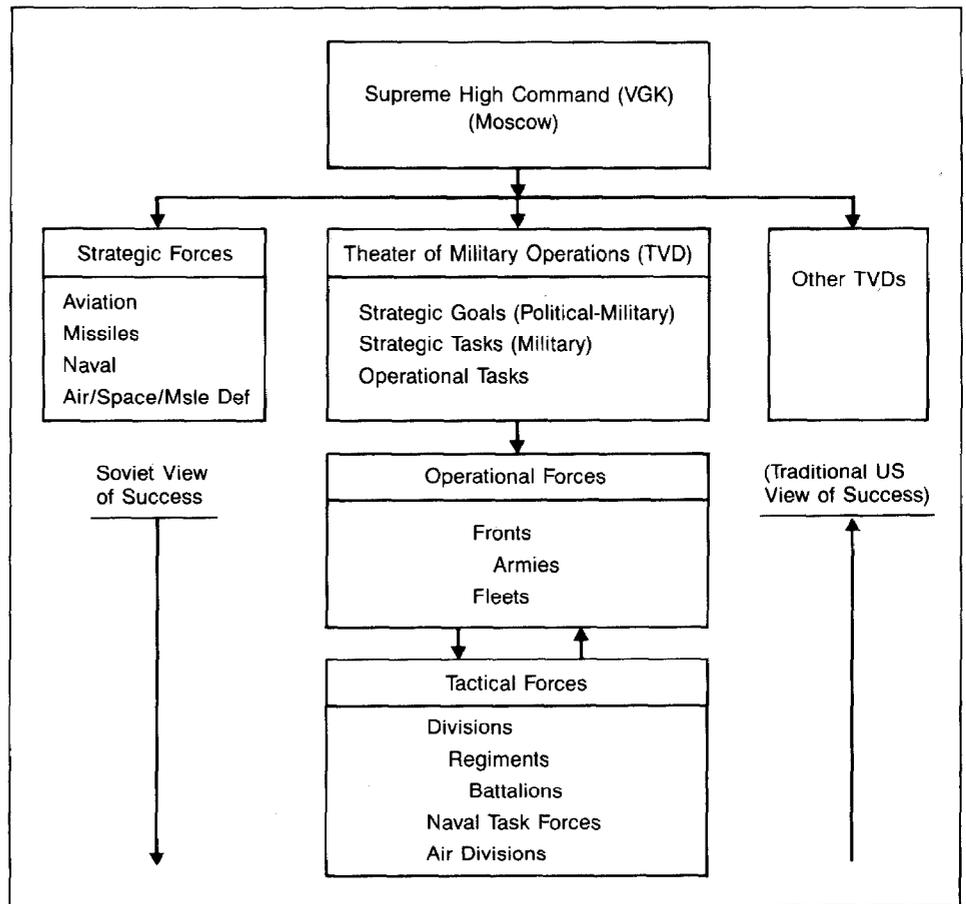
Though the strategic actions are designed to support the accomplishment of the strategic goals for a TVD, some of the actions would be executed on a scale that is somewhat smaller than the entire TVD. In order to structure the assessment of capabilities for the accomplishment of the strategic actions, some of the TVDs have been further divided into "strategic sectors" (or strategic directions). These comprise

An area of land in a continental TVD, along with adjacent areas of water and the air space above them, within which strategic targets are located, and strategic groupings of forces have been deployed (concentrated) or can be deployed to conduct combat activities in order to achieve a strategic goal.

[Unattributed, 1979]

Each TVD can have several strategic sectors. Each strategic sector can, in turn, have several operational sectors, within which operational missions could be assigned. A representative estimate of the strategic and operational sectors in three of the TVDs is included in Figure 2. For planning of a strategic offensive operation in the Western TVD, the Soviets had

Figure 1: Basic Soviet Logic for Combat Planning



traditionally regarded the Front as the principal echelon for planning (the "main operation"). The actions of the other elements of the force that supported the offensive were evaluated in the context of their contribution to the achievements of the Fronts. Recent Soviet discussions, however, have suggested that the planning focus should be higher than the Front [Ogarkov, 1982]. Rather, the focus for planning should be the "operation in the TVD" (also referred to in the West as the Theater Strategic Operation). The Theater Strategic Operation would consist of coordinated actions of several different types, including Front offensive operations, Front defensive operations, air operations, anti-air operations, airborne assault operations, naval amphibious operations, and nuclear-missile and aviation strikes [Ogarkov, 1979].

These operations would be executed by three to six Fronts, as well as Large Units³ of

- Reserve of the Supreme High Command;
- Strategic Rocket Forces (SRF);
- Forces of the National Air Defense (PVO);
- Naval Forces;
- Long Range Aviation (LRA);
- Transport Aviation; and
- Airborne Forces.

Thus the Theater Strategic Operation has a very large scope and involves the actions of very large groupings of forces. (See [Unattributed, 1986] and [Hines 1986] for additional discussion.)

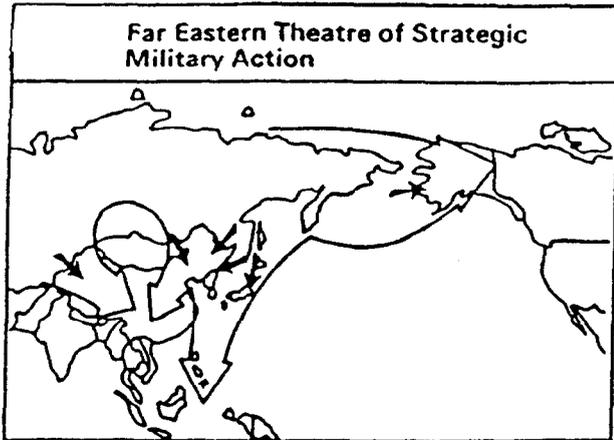
Because the scope of the Theater Strategic Operation is so large, and so many diverse force elements are involved, planning of the operation is highly complex. The planning is further complicated by the fact that the scale (i.e., depth, width, and duration) of the operation is such that several major uncertainties must be accommodated in the planning process.

A critical uncertainty for the Soviet planners is whether nuclear weapons will be used at the beginning of the operation. Since this uncertainty is a factor that is not entirely under Soviet control, they have concluded that the basic plan for a major operation must allow the attainment of objectives whether or not nuclear weapons are used from the outset. Current Soviet planning probably also

³"Large Unit" is a formation of operational size; e.g., naval fleets, SRF divisions, LRA bomber divisions, air armies, etc.

Figure 2

Examples of Strategic and Operational Directions



J. Hines and P. Peterson, "Changing the Soviet System of Control," International Defense Review, March 1986.

likely nature of future operations. This latter research has the dual objectives of allowing pre-planning and of providing decision aids that are tailored to the specific decisions that may have to be made.

Basic Principles Underlying Soviet Battlefield Planning

The most basic principle of Soviet planning is their requirement for "scientific planning." Derived from the scientific determinism of the 19th century German philosophers, Soviet theory holds that all processes are governed by laws. Though they recognize that the laws that govern social phenomena, including warfare, are more difficult to study and understand than the laws of physics, they still believe that such laws exist. The laws that govern warfare are divided into those laws that govern the overall interactions between opposing states (the laws of war) and those governing the outcomes of military engagements (the laws of armed conflict) [Tyushkevich, 1975].

The corollary to the belief in the existence of the laws of war and of armed conflict is the requirement to base all decisions on the best current understanding of the laws (as tangibly captured in the decision aids or norms that are used by the commander and staff to evaluate alternative decisions) [Ivanov, 1977]. Because Soviet military science views warfare somewhat deterministically, it is believed that sound planning can create "objective conditions for victory".

The basic Soviet approach to planning starts with specification of a hierarchical set of objectives--starting with objectives at the highest level, and deriving objectives at each subordinate level from the requirements at the highest. At each level, specific assessments (usually involving the application of some kind of mathematical construct) are used to examine the alternative decisions in the context of the laws. This is referred to as "scientific substantiation" of the decision [Tarakanov, 1974].

The purpose of much of the effort in planning is to estimate the probability that the selected course of action will actually result in the attainment of the designated objectives. In many cases, however, the Soviets have concluded that it is too difficult to directly calculate the probability of success. They have developed a set of indices of the correlation of forces that they believe to be related in some way to the ability to perform the required missions (as indicated notionally in Figure 3) [Tarakanov, 1974].

For military planning, in many different regimes, the Soviets have determined that the principal planning requirement is to "ensure adequate correlation of forces at decisive places and times". The identification of the decisive places and times is probably viewed as having importance equal to that of the assessment of the correlation of forces.

assumes that conventional operations could last for an extended period of time (though always under the threat of use of nuclear weapons).

The principal missions for a Theater Strategic Operation in the Western TVD probably include

- destruction of the main targets, including nuclear;
- prevention of enemy air attack and space attack;
- seizure and/or destruction of key economic centers;
- disruption of troop mobilization;
- destruction of governmental command and control; and
- seizure of key territory and occupation of strategic points.

Key concerns in the planning of the Theater Strategic Operation as in the planning of the operations of a Front are probably (a) providing proper coordination of the actions of the elements of the force in space and time, (b) ensuring adequate correlation of force at decisive places and times, and (c) completing the planning process within the available time.

V. SOVIET BATTLEFIELD PLANNING PROCEDURES

Many of the Soviet key sensitivities about the important aspects of military forces, and, ultimately, the level and characteristics of the conventional balance in Europe, stem from their wartime command and control process. For the last 25 years, the Soviets have devoted a substantial amount of effort to the development of battle management systems appropriate for modern military forces. In the early 1960s, Soviet military scientists concluded that the methods that had been used in the past to plan military operations would not be adequate for planning in the conditions that they expected to face in a future war. This was regarded as one of the most important effects of the "revolution in military affairs" that resulted from the development of nuclear weapons, ballistic missiles to deliver the nuclear weapons, and the development of new means for guidance and control. They perceived that the problems associated with battlefield planning had become both more difficult and more important. As a result, the Soviet discipline of military science has focused attention on the development of planning procedures that may help commanders and their staffs in performing the functions required for command and control in the highly constrained conditions in which they are likely to find themselves in a future war. Two areas of research focus have been (a) designing the activities of the elements of the control process to suit the constraints and (b) research to try to characterize the

Thus, though Marshal Grechko's statement of the purpose of command and control sounds alien to Western ears, it is a precise statement of the Soviet view on the requirements of the system:

to bring some process of phenomenon in the field of military affairs in conformity with the objective laws of war and the current situation.... [Grechko, 1975]

Though the Soviets believe that the requirement for scientific substantiation exists even in battlefield planning, they recognized more than twenty-five years ago that this requirement would be very hard to fulfill in a combat environment. In fact, Soviet discussions of troop control requirements since the revolution in military affairs have indicated four major factors that make battlefield planning even harder than it had historically been. First, because of the mobility of modern armament and the availability of weapon systems that can rapidly bring fire to bear at great ranges, the amount of time available for battlefield planning is smaller than ever before. Second, the operations are much more complex, primarily due to the high degree of differentiation in the capabilities of modern weaponry and the increase in the scope of operations. Third, because the opponent may possess means (especially nuclear weapons) that can rapidly exploit vulnerabilities, the penalties for poor decisionmaking are believed to be much greater than ever before. The class of poor decisionmaking that seems to be of greatest concern is decisionmaking that takes longer than the time available. Finally, Soviet theoreticians concluded that it will be necessary to be able to make good decisions quickly on the first day of the war, and that, unlike most previous wars, there will not be time during the course of the war to develop appropriate battlefield planning procedures. [Ivanov, 1977]

Some of the specific conclusions that the Soviets have apparently deduced with respect to battlefield planning are

- in a future war, the specific procedures used to develop and implement plans may actually be decisive factors in combat;
- the command and control systems themselves will be battlegrounds to a much greater extent than ever before;
- the commander and the staff are the most important elements of the control system, and must, therefore, be "designed" as a part of designing the system;
- preparation for decisions must be made before the start of the war; and
- automation can reduce time, improve decisions, help in handling complexity.

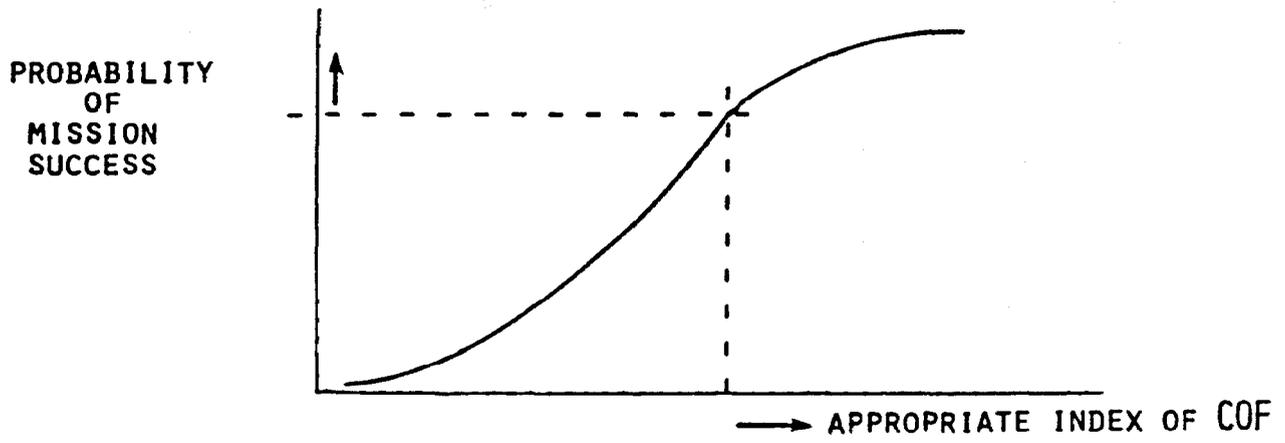


Figure 3

Relationship Between Correlation of Forces and Mission Performance

Each echelon may be viewed as a simple cybernetic loop, consisting of forces or weapons that are subject to interactions with external factors (including the weather, terrain, enemy forces, etc.) and a headquarters that is responsible for controlling the forces or weapons. In each control cycle,

- information is received from the forces (and from the higher headquarters);
- the information is evaluated by the headquarters, decision alternatives assessed, a decision made, and orders prepared; and
- orders are issued to the forces or weapons.

Each of the functions requires some amount of time. The control cycle time (T_{con}) is defined as the sum of the times for the three functions. The control system is considered operative if the control cycle time is less than the difference between the "critical time" and the length of time required to execute the operation. The "critical time" is defined as the length of time within which the operation must be executed in order to have its intended effect [Anureyev, 1967].

For the designers of the Soviet troop control system, the most important task may have been to determine how to maximize the ability to provide "scientific substantiation" within the available time. They have tried to develop sets of procedures and decision aids that allow the system to make a good decision fast enough.

In the process of designing the system, the Soviets have probably done a great deal of work to analyze the relationship between time and quality of decision. Figure 5 provides a notional description of the dependence of both of these factors on the quantity of information that is available. Soviet writings suggest that the troop control system should be designed to provide only enough information to make a decision of acceptable quality within the time available. It was also observed, however, that a control system can only be designed to provide the correct amount of information if the nature of the decisions is also specified as a part of the design process [Altukhov, 1984].

All of the peacetime effort to develop planning procedures and decision aids that will allow the commander and his staff in wartime to function effectively (within the Soviet frame of reference) is based on a projection of the likely nature of the military operations in which the forces will be employed and overall relationships among the elements of the force. Thus, in parallel with the development of the procedures for battlefield planning, Soviet theoreticians have also been working to understand the principles of military art and the hierarchical relationships among objectives and operations.

The problem of getting a system that could operate within the available time, and still allow for "scientific substantiation" of the decision has apparently been a central focus for Soviet efforts to design the troop control system. The Soviet formulation of this problem is represented schematically in Figure 4.

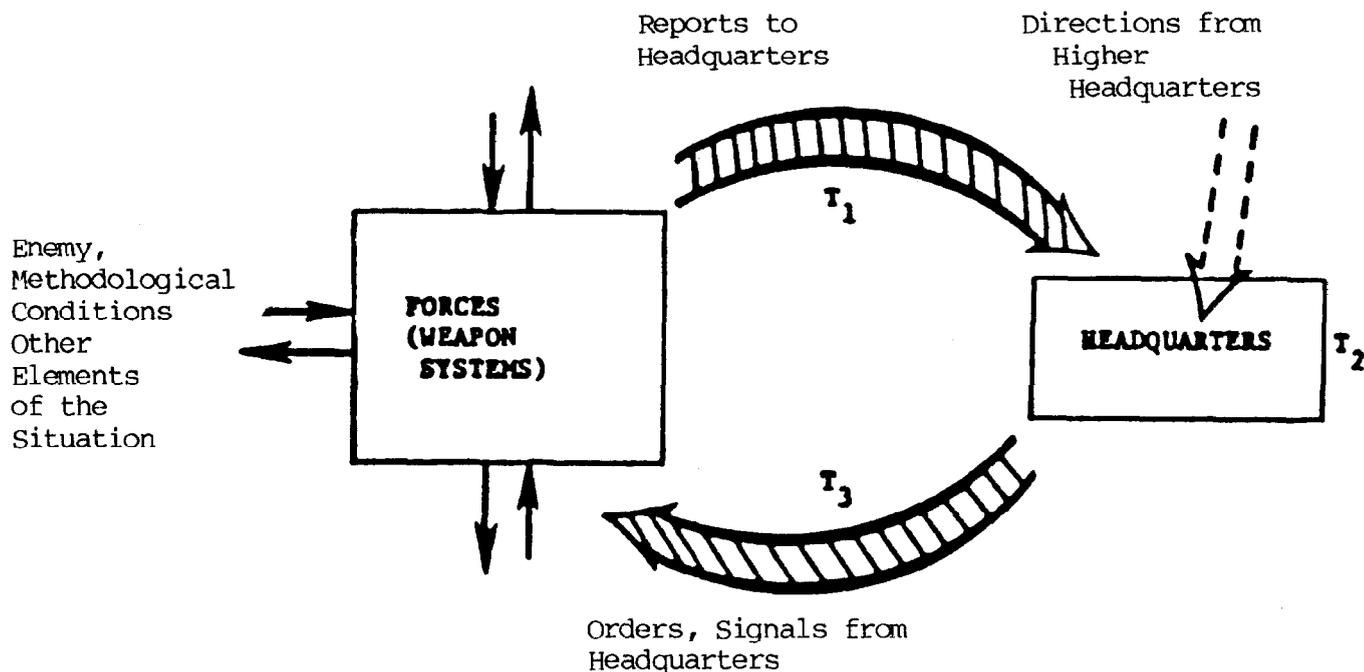


Figure 4

Soviet Definition of the Control Cycle

Soviet Battlefield Planning Methods

Some of the principal characteristics of the Soviet battlefield planning procedures may be summarized as follows:

- the command and staff formulate a concept, using automated decision aids to check feasibility and to generate the plan in detail;
- the focus in the planning process is on coordination of the actions of the various elements of the force and on the timing of the actions.
- the effects of many other actions are assessed in terms of their impact on the scheme of maneuver and on the ability of the maneuver units to achieve their space-time objectives; and
- a set of simple mathematical models is used to estimate the time required and the likely outcome of each action.

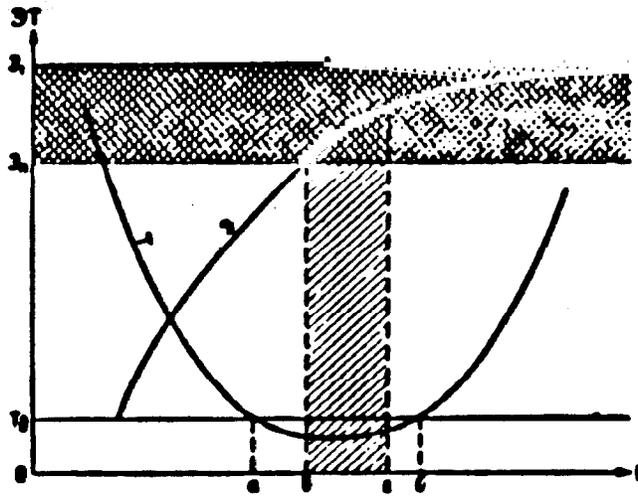
The objective of the procedures is to estimate, in advance, the probability that a concept will succeed, and to provide a mechanism for monitoring progress. In order to accomplish this objective, the system relies heavily on norms and other planning factors that are developed in peacetime.

Implications of Soviet Battlefield Planning Methods

The Soviet planning philosophy upon which the current battlefield planning procedures are based was developed over the last twenty years and is solidly based on Marxist-Leninist theory. Thus, it is unlikely that the principal tenets will change in the next few years. The most basic reason that major change is unlikely is that the current planning methods are intrinsically based on the Soviet views of the laws of war and their historical experience. Some of the major characteristics of the planning procedures that flow from this philosophy are

- all decisions are made at the highest feasible level;
- plans are designed for minimum susceptibility to disruption;
- the planning procedures are designed for dynamic adaptation to the amount of time available;
- the principal questions usually start with "How long?";

Quality of
Decision



Quantity of Information

Figure 5

Relationship Between Decision Quality,
Time, and Amount of Information

war indicate that maintaining a favorable correlation of forces is critical to ensuring a desired outcome in a conflict.

The most general and important law of development is the law of the dependence of the course and outcome of war as the ratio of forces of the belligerents involved, examined as a dynamic bases, taking into consideration the nature of political aims. It is known that the ratio of belligerent forces (quantitative and qualitative) is an objective foundation on the basis of which troops accomplish their assigned missions. A change in this foundation, a strengthening or weakening of the belligerents leads to their success or failure.

... Since the outcome of the war between states (coalitions) depends on the correlation of their military strength and on the ability of the military and political leadership of each of the belligerents to establish superiority in this respect and to utilize this superiority, each military action (engagement, battle, operation) is predetermined by the same concrete conditions. In other words, the law of dependence of the course and outcome of war on the correlation of forces of the belligerents is in effect at all levels of war (Underline added) [Morosov, 1971].

The Soviet literature makes it clear that a principal requirement of peacetime military planning is ensuring that the Soviets can have confidence they will be able to generate adequate correlation of military forces at decisive places and times in a future conflict. Thus,

the foundations of superiority over the enemy are laid down during peacetime and in the process of working out a military doctrine, creating and improving the armed forces, equipping them with weapons and military equipment, training and educating the personnel and elaborating upon the theory of the art of war.

Superiority over the enemy finds expression in the correlation of forces and means. In many large-scale battles in the past, victory over the numerically superior forces of the enemy was gained by means of a secretive concentration of basic forces in a selected sector, the delivery of a sudden attack and decisive follow-up operations [Petrenko, 1978].

The Soviet literature shows that the Soviets have developed a formal calculus of the correlation of forces which is used to assess the adequacy of military forces. This calculus is focused on the estimation of specific indices of the correlation of forces. These indices are usually referenced with the most concrete phrase "correlation of forces and means" (sootnosheniye sil i sredstv as opposed to the more general sootnosheniye sil) which is defined as follows:

- the planning process focuses on trying to ensure adequate correlation of forces at decisive places and times;
- the system is designed to make lower echelons predictable to higher echelons in the event of disruption; and
- the nature of the decisions at a given level are defined.

Though some of these basic characteristics seem to be fairly constant, the planning procedures do change over time, primarily as a result of changes in the expected nature of military operations or as a result of new technological developments. The strongest impetus for change may come from changes in the threat, especially if the changes would have an effect on the overall environment within which Soviet military operations would occur.

VI. THE SOVIET CALCULUS OF THE CORRELATION OF FORCES

The basic framework within which the Soviets assess their force requirements (and, in fact, requirements in essentially every regime of international relations) is based on the concept of the correlation of forces. In the most general sense, the correlation of forces expresses the dynamic relationship of conflict between two opposing social systems

- "an extensive struggle between the basic socio-economic forces, waged along numerous fronts, namely in the economic, political, ideological, and other spheres. At every given moment, the worldwide class struggle differs in intensity, with various forms of struggle coming to the fore" [Sergiyev, 1975]

Thus, a very broad set of considerations (including political, economic, moral, and military potentials) are, at least in theory, encompassed within this framework. There is an explicit recognition that international competition is not confined to warfare and that, even between military opponents, the outcomes of confrontation are dependent upon availability and utilization of resources other than those dedicated to a strictly military mission. In this comprehensive sense, the correlation of forces seems to be a broad philosophic concept, reflecting long-term trends of historical development. As such, it is abstract, and shifts in the correlation of forces (e.g., those which are identified as occurring in 1917, 1949, and 1969-1970 to the Soviet advantage) are perceived by the leadership based on an intuitive "feel" for world events.

In addition to the abstract meaning, however, the correlation of forces plays a very concrete role in military science. The laws of

rates of fire, accuracy, reliability, and (especially for nuclear weapons) explosive power.

The desirability of incorporating factors such as morale and leadership in qualitative correlation of forces assessments is indicated in many of the sources, though most conclude that it is impractical, at least at the time the article was written. Other materials do, however, provide some evidence of progress in this area.

The existence of nuclear weapons has made the consideration of qualitative factors especially important. Prior to the existence of nuclear weapons, it was possible to estimate the probable outcome of a conflict based on information on the relative sizes of the two sides expressed in terms of the quantitative correlations of each of the major combat elements of the force (e.g., personnel, tanks, aircraft, etc.), with and considering historical experience. Thus, in the Great Patriotic War, the set of individual quantitative correlation of forces indices provided an adequate basis for forecasting prospects for success. The development and deployment of nuclear weapons, however, introduced a qualitatively new dimension to warfare (i.e., a "revolution in military affairs") and made it especially important that qualitative evaluations of the correlation of forces be made.

VII. THE SIGNIFICANCE OF SOVIET CONVENTIONAL BALANCE ASSESSMENTS

Soviet military assessments of the conventional balance in Europe are actually done within the strategic planning architecture discussed above, with the help of appropriate indices of the correlation of forces, and with regard to sensitivities about the character of forces and threats that derive from their basic approach to battlefield planning. The assessments are used to guide Soviet decisionmaking. Consequently, Western judgments about the likelihood that the Soviets will agree to specific changes in the balance, or will be especially sensitive to changes in the composition of the NATO force posture, should also be tempered with the sensitivities that derive from the elements of the Soviet military planning process described above.

An objective indicator of the fighting power of opposing sides, which permits a determination of the degree of superiority of one of them over the other. The correlation of forces and means is determined by means of a comparison of existing data on the quantitative and qualitative descriptions of subunits, units, combined units, and armaments of one's own forces and those of the enemy [Belyakov, 1979].

A definition in a 1965 dictionary indicates that this purpose is not to be accomplished by a single all-inclusive index, but rather by a collection of more specific assessments. It defines the correlation of forces and means as

the aggregate of indices permitting evaluation of the relative strength of friendly and hostile troops by comparative analysis of the quantitative and qualitative characteristics of troop organization, performance data on armament and combat material, and other indices which define the combat capability of the force [Radziyevskiy, 1965].

The indices are intended to capture all of the important aspects of the operation being studied (in accordance with the criteria discussed in conjunction with weapon system analysis), and may have various levels of complexity. Fundamentally, the criteria are designated as being either "quantitative" or "qualitative".

The quantitative correlation of forces is defined as a ratio of the number of weapons, units, or personnel on one side to the number of similar assets on the other side. It is this form of index which has been discussed by the Soviets since at least the 1930s and has long appeared as part of the legend on maps of military operations. Thus, the quantitative correlation of forces and means (a) consists of ratios of numbers of things, (b) is applicable only for items of the same type, (c) has been used for many years, and (d) continues to preserve some usefulness at the present. In addition, such a measure is applicable only if the weapons of the two sides are being employed in similar types of actions [Belyakov, 1979]. The caveats on the interpretation of this measure are severe, but it has the advantages of being simple to calculate, containing fewer uncertainties than more complex measures, and being easy to understand.

Indices which are described as qualitative correlation of forces indices incorporate some characteristics of the quality of the weapons or units. Perhaps the simplest of these measures are accomplished by modifying the simple quantitative ratio by an expression which captures the most significant aspects of weapon quality. This approach may allow at least an approximate assessment of the combined correlation of forces if the sides contain somewhat dissimilar forces. In general, the qualitative factors which have been simplest to include are those related to

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PREFACE

The data on Soviet personnel quality and operational level of warfare is primarily based on material provided by Mr. Christopher Donnelly of the Soviet Studies Center, U.K. Information on Soviet personnel was also extracted from a study entitled, "Soviet Training and Maintenance Practices", developed by the U.S. Naval Sea Systems Command under the direction of Captain J.W. Kehoe, USN, (Ret.).

The data on U.S. and Soviet weapon system quality was derived from an extensive study of U.S. and Soviet Weapon System Design Practices, published by the Defense Intelligence Agency, under the direction of Captain J.W. Kehoe, USN, (Ret.).

**The Warsaw Pact-NATO Military Balance:
The Quality of Forces**

by
Kenneth S. Brower

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Technical Qualities of Equipment

The author has participated in a broad study conducted by a group of leading U.S. weapon system design engineers of the comparative design features of U.S. and Soviet military equipment over a 40 year period, 1940 to 1980. Unfortunately, a comparable study of NATO versus Warsaw Pact weapon system design practices has not been conducted. However, the author has studied NATO ship design practices and is knowledgeable of other European weapon systems. The Warsaw Pact generally uses standardized Soviet equipment. It is therefore possible to objectively assess the technical qualities of NATO and Warsaw Pact equipment. It should be noted that a Soviet general staff officer would not develop a net assessment based on a comparison of like systems. Rather, a Soviet net assessment of forces would be based on the qualities of all the systems which might synergistically interact on the battlefield. Within the scope of this study, a comparison of like systems provides the data base needed to develop a top level Soviet style net assessment of the qualities of equipment.

Aircraft

As a proportion of the empty weight of aircraft the Soviets have consistently allocated more weight to avionics and internal weapons than has NATO. However, Soviet aircraft have tended to carry relatively less internal fuel as a proportion of the empty weight of aircraft. Soviet aircraft, even the latest MiG-29, are capable of operation from unimproved airfields because they are equipped with low pressure tires and articulated landing gear. In the past, Soviet aircraft had significantly lower maximum take off gross weights (T.O.G.W.) relative to their empty weights than did NATO aircraft. Hence, Soviet aircraft could be loaded with relatively less external ordnance and external fuel. Newer Soviet fighters can operate at a somewhat higher T.O.G.W. than their predecessors, which means they can now carry somewhat larger external ordnance/fuel loads, although still not as much as NATO aircraft (Figure 1). The Soviets use of a relatively low T.O.G.W. for their aircraft is consistent with their desire for operations from unimproved airfields. If the T.O.G.W. were increased, the use of articulated landing gears and low pressure tires would have had a more significant impact on overall aircraft design. The restriction of T.O.G.W. does not necessarily mean that per pound of empty airframe weight Soviet aircraft have less capability than NATO aircraft when loaded for combat operations. However, they are less capable of being ferried over long distances or of being overloaded for operations in benign conditions.

Prior to 1970, Soviet jet engines had higher thrust-to-weight ratios than NATO jet engines (Figure 2). During the 1970s and 1980s, NATO has fielded engines with much higher thrust-to-weight ratios. During this period, NATO has tended towards the use of afterburning turbofans, whereas the Soviets have used afterburning

The Warsaw Pact-NATO Military Balance:
The Quality of Forces

In the Western alliance, many believe that the military forces of NATO can compensate for their numerical inferiority relative to the forces of the Warsaw Pact by their qualitative superiority. This qualitative superiority is thought to stem from both the qualitative superiority of NATO weapon systems and the qualitative superiority of western personnel. Those who expound this theory point to the success of NATO armaments in Third-World combat, particularly to the results of recent Arab-Israeli wars, the assumed superiority of western training, and the often inferior tactical performance of Soviet formations during World War II.

In most countries, data reflecting the net assessment of a military balance is classified. This is certainly true in the Soviet Union. Moreover, most Soviet literature on combat system effectiveness is based on discussions of NATO equipment. The open literature may also contain deliberate disinformation. Furthermore, generally held perceptions that the Soviets view Western technology as advanced will not necessarily impact a Soviet general staff officer developing a net assessment based on hard data. Therefore, this assessment is primarily based on objective facts. However, the discussion of the operational level of warfare is primarily based on Soviet perceptions. It is obvious that quality of forces significantly impacts the Warsaw Pact-NATO military balance. The difficulty of conducting an assessment of the quality of forces is compounded by the fact that both the Warsaw Pact and NATO comprise formations from a coalition of nations. Furthermore, there are numerous elements which affect the quality of a military force. In order to create a basis for analysis, the elements that affect the quality of a military force have been separated into three general categories:

- The **technical qualities** of the military equipment used by the various national forces. Technical qualities include optimum military performance under benign conditions, user friendliness, reliability, and maintainability.
- The **qualities of the personnel** who use this equipment up to the tactical level, i.e., the division, wing or naval battle group. These qualities generally include the quality of personnel within the force, the adequacy of the training of the personnel, the quality of low level formation commanders, the quality of tactics, and the social cohesiveness of military formations.
- The skills of the commanders and the quality of concepts at the **operational level**, i.e., corps, armies, and army groups, air forces, and fleets.

A discussion of each of the three categories of the elements that impact the quality of forces follows:

- The Soviet tank has a more compactly arranged engine and transmission which requires 30% less volume per unit of horsepower. However, the replacement of a Soviet tank engine is a difficult, manpower-intensive operation.
- The Soviet tank carries about one-half its basic fuel load external to the tanks armor.
- The Soviet tank provides less space for each crew member.
- The Soviet tank carries 20 fewer rounds of ammunition.
- The Soviet tank can depress its gun only 4 degrees, vice 10 degrees for the M-60.

Soviet tanks have equaled, or in the case of the Leopard I and AMX30, considerably exceeded NATO tanks in armor protection. In general, the proportion of tank volume occupied by fuel plus ammunition, is the same for Soviet and NATO tanks. NATO tanks tend to have ready service ammunition stowed in the turret bustle for all around engagements, whereas Soviet tanks have tended to stow ammunition low in the hull, emphasizing frontal engagements. Therefore, the overall vulnerability of NATO and Soviet tanks has generally been comparable. Currently, certain NATO tanks are equipped with better night vision systems than their Soviet counterparts.

During the 1960s and 1970s, the Warsaw Pact deployed a true mechanized infantry combat vehicle (MICV), the BMP, which was only equaled in firepower, mobility, and protection by the West German Army's Marder MICV. Recently, the NATO armies have begun replacing their armored personnel carriers with MICVs. These MICVs differ from the BMP primarily in terms of the greater volume provided for each embarked infantryman.

Ships and Submarines

Before 1975, the Soviets designed surface ships that were much smaller volumetrically than would have been the case if they had been designed by NATO ship designers. Soviet ships were designed with much less emphasis on the features provided for sustained peacetime operations, which included space for access to machinery for maintenance, storerooms for parts, work shops, and personnel-related habitability spaces. This is illustrated by the comparative specific volume of NATO and Soviet frigates (Figure 4). One consequence of the smaller volume of these earlier Soviet ships is the fact they have tended to carry relatively more weapons and sensors per ton of displacement than comparable NATO ships. Newer Soviet ships are much more voluminous than their predecessors, but they remain relatively heavily armed.

Soviet surface ships are generally capable of making higher speeds than NATO surface ships because they have been provided with

turbojets. Hence, NATO aircraft have generally had much lower fuel consumption rates at cruising speeds, but much higher fuel consumption rates with their afterburners engaged.

Prior to 1975, Soviet aircraft had lower wing loadings (Figure 3) and higher thrust-to-weight ratios than NATO aircraft. Nevertheless, because of their superior flight control systems, some NATO aircraft have had superior response characteristics at certain speeds and altitudes. From 1975 until 1985, NATO's high performance air superiority aircraft, the MIRAGE 2000, F-15, F-16 and F-18, were superior to Soviet aircraft in wing loading, thrust-to-weight ratios, and flight control systems. The newest Soviet aircraft now generally equal these aircraft in these areas.

During the late 1960s, NATO slowly introduced advanced integrated avionics systems into service on aircraft like the A-7, Jaguar, and the F-111. These systems, which included inertial guidance systems, digital computers, and head up displays and, in the F-111, terrain avoidance and targeting radars have improved the accuracy of air-to-group weapons delivery by a factor of up to about 6; thereby, increasing lethality by a factor of up to 30 to 40 times that previously obtainable. The NATO aircraft which are equipped with these special radars, including F-111s, A6s, and Toronado's, are capable of the precise delivery of air to ground ordnance in all weather conditions. The U.S. also introduced the first precision guided weapons (PGMs) into service during the late 1960s. The NATO NAV-attack systems for most aircraft, like those on the F-16, are generally only useful for ground attack in clear visual conditions. Most PGMs remain difficult to deliver in other than a benign air defense environment. During the late 1970s, the Soviets began deployment of comparable avionics suites and weapon systems. They have also begun deploying air-to-air radars and missiles with the subclutter visibility needed to detect low flying aircraft. The capability was achieved a decade earlier in NATO, but provided on only a few types of aircraft. NATO has only a few aircraft with air-to-air capability beyond visual range.

Tanks and Armored Fighting Vehicles

Soviet main battle tanks have generally been only two-thirds the size of comparable U.S., British, and German (Leopard II) tanks. They are comparable in size to the German Leopard I and the French AMX30.

As compared to NATO tanks, Soviet tanks have generally had bigger caliber, higher velocity guns, with equal, or better, hit probability and penetration. Their tanks generally have had armor protection and mobility which has equaled that of the larger NATO tanks.

Five design factors have been identified which explain why a Soviet T-62 equals a U.S. M-60 in mobility, firepower, and protection, and yet is only two-thirds of the size:

The specific impulse of Soviet SAMs is higher than that of comparable NATO missiles, in terms of missile weight or frontal area. Thus, when compared on the basis of flying similar trajectories, the range and/or speed of Soviet SAMs is estimated to exceed that of comparable NATO missiles. Soviet missile designers have generally opted for relatively higher speeds and shorter time of flight. Whereas the Soviets have sacrificed range for speed, NATO missiles are generally designed to fly much more slowly, but to longer ranges.

The aerodynamics of Soviet SAMs are excellent. This allows the use of simple, cheap, reliable, low pressure pneumatic actuators for control surfaces, compared to NATO's use of high pressure hydraulics. NATO SAM missiles have been more maneuverable at low to medium altitudes because the deflections of Soviet SAM control surfaces are limited to suit the characteristics of air-frame structure. Based on aerodynamics, the maneuverability of Soviet SAMs could be similar to that of their NATO counterparts.

By comparison to Soviet SAMs, NATO missiles are not as superior in quality and performance as might be expected. Soviet missiles equal or exceed NATO missiles in propulsion and aerodynamics, while being relatively simple, easily produced and less expensive. NATO missile performance advantages are not necessarily the result of technological superiority, but are often explained by Soviet design choices made in response to operational requirements. The Soviets have often deployed tactically innovative systems for which NATO has no equal. The mobile SA-6 system, for example, uses a mix of obsolescent subsystem technology, with newer technology components used only when necessary.

Electronics

Electronics technology can be divided into five generations, based on the type of circuit element that was in extensive use at the time, as shown in Figure 7. A direct comparison of NATO and Soviet electronics design practices cannot be made because the initial widespread Soviet utilization of different generations of electronics technology has usually lagged behind that of NATO by as much as 10 to 15 years. However, it should be noted that the Soviets have often selectively used advanced technology where necessary long before these components were totally proven for use. Thus, some Soviet weapon systems contain advanced electronics technology not found in other Soviet systems introduced at the same time.

The design of Soviet electronics is based on the straight-forward use of proven components and circuitry to satisfy functional requirements at low risk. It is also strongly influenced by component availability. This appears to mean that innovation and complexity are introduced only when absolutely necessary. However, even though the Soviets make extensive use of proven components, poorly designed components have been used in Soviet electronic

relatively more power (Figure 5). Soviet ships have tended to have less endurance than NATO ships. In general, the seakeeping performance of Soviet ships has been excellent because they have used an effective hull form and have been equipped with active fin stabilization systems (Figure 6).

Over the last thirty years, it appears that the U.S. and other NATO navies have tended to emphasize the survivability of a ship as a platform, while the Soviet Union has emphasized the ability of a ship's combat system to continue to perform after the ship has sustained combat damage. The combat systems of Soviet ships are particularly well-configured in terms of redundancy, separation, and backup modes of control. However, notwithstanding the vulnerability of NATO ships illustrated by the Stark and Sheffield, Soviet ships appear to lack the damage control features and quality of construction found in many NATO ships. In summary, Soviet and NATO surface ships of similar size may be about equally vulnerable to a sink kill occurring when attacked by similar weapons. NATO ships may be somewhat more vulnerable to a mission kill. Warsaw Pact ships may suffer more severe platform damage.

Soviet nuclear submarines differ from their NATO counterparts in that they have a double hull configuration. Despite their larger diameter and, therefore, increased drag, they have equal or superior speed because they have relatively more power. Because their pressure hulls are constructed of superior materials, Soviet submarines are capable of diving to deeper depths than NATO submarines. Soviet submarines have nuclear propulsion plants with much higher horsepower to weight and volume ratios than comparable NATO nuclear submarines. However, until recently, they have been significantly noisier and, therefore, much easier to detect with long range passive sensors. New Soviet submarines, or Soviet submarines emerging from lengthy refits, are much quieter than heretofore. New Soviet submarines are generally equipped with much larger, higher speed, longer range torpedoes than Western submarines.

Missiles

Soviet surface-to-air missiles (SAMs) have relatively less weight allocated to warheads than comparable NATO missiles, but more weight allocated to propulsion. Soviet SAMs have lower fuel fractions because more of the solid fuel propulsion systems consist of structure.

Early Soviet missiles were more voluminous than their NATO counterparts. However, current Soviet and NATO SAMs have very similar specific volume (volume/weight). The NATO advantages of more compact electronic packaging and the use of high pressure hydraulics instead of lower pressure pneumatic actuators are generally offset by the clever internal arrangement of Soviet missiles.

standards, the demands on the Soviet logistics system should be limited.

However, a substantial reserve of complete weapon systems, above and beyond that required to replace combat losses, would be required to maintain front line strength. The detail design and development factors which affect the availability of U.S. and Soviet weapon systems compare as shown in Figure 9.

The Soviets' approach to reliability and maintainability appears consistent with their choice of a cadre based, mobilization force and their recognition of the limitations of military personnel. One major factor contributing to the reliability and maintainability of Soviet weapon systems is the Soviet approach to redundancy. The Soviets appear to place emphasis on optimizing the overall combat system effectiveness of a unit or force. Therefore, they tend to provide redundant systems and alternative modes of operation for their individual equipment. By comparison, NATO weapon system designs tend to emphasize individual weapon system performance and peacetime life-cycle cost. NATO weapon systems, therefore, tend to be designed with extensive subsystem and component redundancy to prevent single point failures within the system. However, because of space, weight, or cost considerations, redundant systems or alternative modes of operation are generally not provided.

A good example of these differences is the approach to air defense. The Soviets have a layered defense system consisting of a diverse mix of missile and gun systems using different sensors of varying types and frequency. By comparison, the U.S. Seventh Army operates only one type of major air defense missile system and a more limited mix of intermediate and point defense systems. One complex, multipurpose U.S. radar is employed for surveillance, where the Soviets might deploy several different radars.

Conclusions Regarding the Qualities of Equipment

Combat is a highly synergistic environment. Therefore, from the Soviet perspective, the comparison of the quality of one weapon system to another does not provide any conclusive evidence of military superiority. What would be significant to a Soviet general staff officer would be the overall quality of the numerous weapon system technologies that will impact the air, sea, or land battle. For example, from a Soviet perspective, the air battle will not only be affected by the overall quality of aircraft, but by the performance of the ground-to-ground missiles which can be used to attack airfields, the various air defense systems used to engage aircraft from the ground, the air-and ground-based sensors and communications systems used to detect and control aircraft, the ordnance used by the aircraft, etc. The comparative technical quality of each element contributes to the overall quality of the systems affecting the air battle. Similarly, from a Soviet perspective, the best comparison for the land battle may be a

systems for decades. It appears that, to compensate, the Soviets have on occasion changed a design to cure the symptoms or have provided for easy replacement of the system; they have not redesigned the components to eliminate the problem.

The Soviets rate vacuum tubes, resistors and other circuit elements very conservatively, which enhances their useful life and reliability. They establish easily obtainable or realistic performance goals and little performance growth potential is provided. The Soviet approach to countering new threats has been to make equipment modifications, to deploy large numbers of systems, and to introduce new, complementary systems rather than to design the original system with the necessary growth potential to handle future threats.

The construction and operation of 1960s vintage Soviet electronic systems is manpower-intensive. System checkout procedures consist of lengthy go/no-go tests involving tests leads, meter readings and stop watches. These procedures require minimal skill, but extensive operator training. Soviet designers do not appear to have adopted the current American practice of maintenance by the replacement of defective subassemblies.

Reliability and Maintainability

Reliability is a measure of probability that an item will perform its intended function under stated conditions for a specific interval of time. Maintainability is a measure of the characteristics that contribute to the ease of failure, location and repair.

The detail design and development factors which affect the reliability and maintainability of U.S. and Soviet weapon systems compare as shown in Figure 8. The characteristics shown in Figure 10 are consistent with the Soviets' attempt to achieve an assured level of reliability for a limited period of time, with minimum maintenance requirements at the organizational level. They do this by using existing technology, rating components conservatively, paying attention to quality where necessary, providing adjustability and operational flexibility and, most importantly, by establishing realistic performance goals. The result is that Soviet equipment is very reliable. The simplicity and standardization of Soviet weapon systems further enhances reliability and simplifies maintenance. The suitability of Soviet equipment for operation by unskilled personnel has been commented upon by numerous Arab military leaders who have had experience with both Western and Soviet military equipment.

Soviet weapon systems appear to be designed for use in a war environment where a limited operational life is a historical reality. Based on their technical characteristics, it has been concluded that during the initial stages of a conflict the availability of Soviet weapon systems would be high and, by U.S.

Personnel Quality

It is the judgment of almost all defense analysts that personnel quality is the single most important factor at the tactical level of combat. This lesson has been driven home time and again in the Middle East, the Falklands, and elsewhere. It is also the most difficult variable to quantify when assessing military forces that have not experienced modern combat against one another for over 40 years.

The Warsaw Pact countries have conscript, cadre based armies. Relatively few divisions or formations are fully manned. However, all Soviet divisions located forward in Eastern Europe are fully manned. Of the remaining Warsaw Pact Divisions, about 30 percent are fully manned, Category A Divisions. Most remaining Warsaw Pact ground force divisions are partially manned and could only be deployed after mobilization of recently released conscripts.

After a relatively brief period of basic training that is provided in military district depots, Soviet conscripts are distributed into units where they undergo individual training and formation. During their period of service they are trained in one specialized skill.

In the Warsaw Pact nations, military service is universal, for example, about 90% of Soviet 18-year-old males are called up for service. Academic deferments are given to engineering and scientific students, most of whom subsequently serve as junior officers. In such a system the military is truly representative of society. While the military must take low intellect, social misfits, it also is provided with the very bright and very physically fit. If the skills of these types of personnel are properly used, then the forces can reflect the best of society.

In Warsaw Pact countries, corporals and sergeants are selected from the conscript manpower pool based on their political reliability, their initial performance in the military, their vocational skills, and their educational and physical capabilities. About 15% of the total conscripts are separated out during the basic training period and sent to special non-commissioned officer (NCO) training units for a six month training course. Graduates of vocational schools because of their special training are disproportionately represented in the conscript NCO pool. After completion of the NCO course, Soviet conscripts are assigned to units as 18-year-old squad leaders, or junior sergeants. They are not skilled technicians, but rather directors of drill execution. Complex organizational maintenance is generally accomplished by junior officers who are "hands on" maintainers and not managers. These types of junior officers are usually high quality college graduate engineers. Personnel who are exempted from conscription for college education receive Reserve Officer Training Corps (ROTC) type training. They are obligated to serve 1 year, but many actually serve 2 to 3 years as technical specialists.

representative divisional slice of equipment, including the attack aircraft and air defense systems used for the land battle. The best comparison for the naval battle would probably be the overall battle group, including all off-ship sensors, command and control systems, anti-ship weapon systems, and associated platforms.

Viewed in this overall context, the technical quality of the weapon systems equipping NATO and Warsaw Pact formations is assessed to be generally similar. Neither side has been able to acquire, or maintain, clear, broad technological superiority for the air, sea, or land battle. Advantages have accrued to both sides in certain areas over a limited period of time. For example, during the late 1970s, NATO's best aircraft were decisively superior to comparable Warsaw Pact aircraft and NATO nuclear powered submarines were much quieter than their Soviet counterparts. In both areas this is no longer the case. Conversely, in the late 1960s and early 1970s, the Warsaw Pact had much better anti-ship weapon systems than NATO and a unique MICV. Today this is no longer true.

Attempting to define such advantages based on the results of Middle Eastern combat can be very misleading. There is no NATO air force in 1988, except that of the U.S., which is any better equipped to suppress ground-based air defense systems than was the Israeli air force in 1973. In 1982, Israel used light, medium, and heavy remotely piloted vehicles, disposable drones, ground-to-ground and air-to-ground radiation homing missiles, long range standoff air-to-ground missiles, various types of precision guided munitions, real time electronic surveillance systems, stand-off jammers, and tactical aircraft fully equipped with self defense electric warfare systems and decoy dispensers to defeat a Soviet style ground based air defense system in Lebanon. There is no NATO air force with this array of systems, many of which are first entering U.S. service at the present time, even though they were first developed by U.S. companies.

In 1982, the Israelis were able to suppress Syrian Air Defense Systems using technology that NATO does not have. Subsequently, its aircraft were then able to conduct attack sorties from relatively high altitude, which made them largely invulnerable to light anti-aircraft fire and man portable missiles, which the IDF/AF could not suppress. This type of attack profile was possible in the favorable environmental conditions of the Middle East. It will not be possible in European weather conditions.

One feature of the Soviet military equipment used by Warsaw Pact forces is its user friendliness, inherent reliability, and ease of maintainability at the organizational level. The Soviets ability to strike NATO's maintenance and support facilities in Europe may result in the rapid degradation of NATO equipment availability and performance capability during the initial period of combat. The standardization and simplicity inherent in Soviet systems should also enhance the ability of recently mobilized forces to rapidly deploy and enter combat.

ashore. However, because political reliability is overvalued in the evaluation of NCO candidates and because Soviet vocational high school graduates tend to be of low quality, the quality of conscript NCOs does not meet Soviet goals.

In NATO armies, which have a smaller proportion of conscripts, and a shorter period of conscription, there is less opportunity for conscripts to be trained as NCOs. There is also less sorting and pre-selection of personnel for vital jobs.

Conscripts and first term regular soldiers in most NATO armies generally receive their basic and individual training within their formations. The U.S. is the only NATO army which trains all enlisted personnel within centralized specialized schools, both for basic and advanced individualized training.

The long term regular soldiers of all NATO armies are generally trained to accomplish more than one basic skill. Non-commissioned officers are promoted based on seniority and skills. They are skilled technicians who accomplish complex organizational maintenance. They are responsible for the direction of combat-team tactics. The assignment of regular enlisted personnel to formations is not long term, but normally is based on 2-3 year assignments. Personnel are rotated between field units and depots and schools.

Most NATO armies do not use battle drill techniques. Therefore much is required of NCOs and first term soldiers, particularly in term of the maintenance of complex equipment and small unit combat tactics.

Many of these differences can be illustrated by comparing the manpower in an air force squadron. In a U.S. Air Force squadron, there will be several hundred highly specialized enlisted maintenance personnel. The squadron is dependent on numerous highly specialized maintenance systems. It is not readily mobile. By comparison, in a Soviet squadron, each plane has a designed maintenance and support truck with a crew of two, one officer and one NCO. The truck carries all necessary test equipment, spares, tools, and auxiliary equipment for the maintenance of the aircraft. The truck can rapidly redeploy to an unimproved airfield.

Within formations NATO officer assignments are relatively short. Two year rotation cycles for officers are common. A much greater proportion of Soviet officers are the graduates of highly specialized military academies than is the case in NATO. The retention rate of Warsaw Pact officers is also higher than that of the NATO average. NATO officers generally attend a one year staff college prior to battalion command. Subsequently, in the U.S., colonels generally attend a 1 year war college. The war college curriculum is primarily oriented towards strategy and geo-politics. Officers do not study the art of war, which is emphasized in equivalent Warsaw Pact schools. U.S. officers are judged to have

Relatively little is required of the Warsaw Pact soldier. Based on the lessons of World War II, the Soviets do not believe that in combat the average soldier is capable of reaching demanding skill levels. Conscripts are taught a simple battlefield task, which is learned by straightforward repetitive training. This is consistent with the fact that all tactical evolutions are conducted using battle drills. A battle drill is a straightforward pre-planned and pre-trained problem solving technique applicable to all tactical combat evolutions up to the divisional level of combat.

All regular line officers are graduates of long term military colleges, most of which provide highly specialized training. During this 3 to 5 year period of schooling, an officer cadet will receive up to 1 year of practical, on-the-job training. Within formations, Warsaw Pact officer assignments are long and stable. Five year cycles for officers are common. Officers are selected for a 2 year staff college tour at a relatively young age (about 30). This is a prerequisite for divisional command. Officers subsequently are selected for a 2 to 3 year senior staff college prior to higher levels of command.

Two of the NATO countries, the U.K. and the U.S., have regular armies in which all personnel are volunteers. Many of their personnel, even within the enlisted ranks, make the military a life-long career. The remaining NATO countries have conscription, but have a relatively high proportion of regular personnel. The two regular armies generally maintain their field formations at full strength. The field formations of the remaining NATO armies all require mobilization of reserve units to bring their formations to full strength. In NATO, only the U.S. divisions are maintained at full strength, without requiring reinforcement for effective deployment.

The quality of regular soldiers in NATO armies varies depending on economic and social conditions. In the U.S. during the late 1970s, in the aftermath of the Vietnam War, the quality of enlisted personnel was very low. In the early 1980s, civilian unemployment, improvement in military pay scales, and an improved image of the military led to a considerable improvement in enlisted personnel quality.

Conscript armies in which all citizens universally serve are more apt to fully reflect the quality of the society from which the personnel are drawn. Therefore, if personnel are carefully screened, the best and the brightest will be disproportionately represented in vital jobs. Furthermore, if NCOs are selected from the conscript pool based on their physical and intellectual talent, junior NCOs will reflect very high quality personnel, although they will lack maturity and experience.

The Soviets do, in fact, screen their personnel. For example, about 25% of the Navy's conscripts are judged to be either unfit or unreliable for duty at sea. They are assigned to menial jobs

The U.S. research has suggested that differences in combat experience will be consistent over generations. If this were true it might be possible to extrapolate World War II combat performance up to the current time. However, all European societies differ today from the societies that went to war in 1939. The assessment is that the trend will inevitably be to more uniform combat performance for all European armies, NATO and Warsaw Pact alike, given similar standards of training, quality of manpower, and unit fire power.

Conclusions Regarding Personnel

As shown in Figure 10, a much higher proportion of NATO's military personnel are regulars as compared to the personnel of the Warsaw Pact. However, in general, Warsaw Pact conscripts have a significantly longer period of service than NATO conscripts. Furthermore, Warsaw Pact personnel are also the beneficiaries of pre-military training and indoctrination. Enlisted career patterns, derived from a study of U.S. and Soviet Navy personnel, are summarized in Figure 11.

The advantage of a relatively higher percentage of regulars does not necessarily translate to more personnel experience within combat units. NATO armed forces have a lower teeth-to-tail ratio than Warsaw Pact armed forces. As a result, relatively more regulars are absorbed by the relatively large maintenance and training tail. Therefore, in the armed forces of the Federal Republic of Germany (FRG), which are 52% regular, combat battalions reportedly are about 70% conscript. Moreover, some of the "regulars" are first term enlisted volunteers, and many of the remaining regulars are used in headquarters and support units. A Soviet battalion will be about 75 to 80% conscripts, 5% regular NCO, and 15 to 20% regular officers. Its distribution of personnel is not very different from that in a FRG battalion. Therefore, in combat, Warsaw Pact conscripts will generally face NATO first term volunteers of comparable or lesser military experience.

There are also significant differences between NATO and Soviet officer career patterns, which are summarized in Figure 12. These data were derived from a study of U.S. and Soviet naval officers. It is more likely that a Warsaw Pact officer will be a graduate of a military academy than will be the case in NATO. The Warsaw Pact officer will have much more specialized training and longer, more stable assignments. There also will be less turnover within the Warsaw Pact officer corps.

The Soviets understand that the quality of forces will vary from country to country. The tactical effectiveness of a division is a function of its size, the quality of its weapon systems, and the quality of its personnel. The Soviet assessment of the effectiveness of NATO divisions, as a percentage of the effectiveness of a Soviet division, is shown in Figure 13. This measure of effectiveness reflects the Soviet assessment of both the

the least field experience of NATO officers. They are not held in high professional esteem by their European or Warsaw Pact counterparts.

Great victories occur when armies shatter. Armies shatter when the social cohesiveness of formations fails. Most European armies consist of socially cohesive groups, or reflect a regimental system that generates cohesive subunits. The military forces of the U.S. and the Soviet Union, which are the primary nations of NATO and the Warsaw Pact, do not reflect cohesive social groups.

The U.S. military has a significant proportion of women, blacks, and Hispanics within its enlisted ranks. Its regular officers are disproportionately from social environments which have little or no social and interpersonal relations with one another. During World War II, the U.S. military did not shatter, even under the worse of conditions, but it was a segregated army, based primarily on cohesive regional formations. Will the diverse cultural groups within today's U.S. military remain cohesive when faced by the shock of combat?

The Soviet Union is comprised of many mutually antagonistic nationalities. In formations filled with conscripts, these various nationalities are integrated; however, their senior leadership is primarily Slavic (Russian, Byelorussian, or Ukrainian). The mix of nationalities within a formation tends to reflect the mix of nationalities within the military district providing conscripts to it. Cadre units fleshed out by a military district during war will reflect even a more homogeneous mixture of nationalities.

In World War II, the Soviet soldier was recognized for ruggedness and toughness, but often brought few technical skills into the Army. He reflected a peasant society which had just undergone forced urbanization. Forty years of Sovietization, urbanization, and improved education have improved the Soviet soldier's educational level and technical skills, but in general he still reflects the qualities of an austere, village-oriented society.

Recent studies conducted in the United States by the Historical Evaluation Research Institute have shown that the relative combat performance of defense forces around the world has varied considerably. This general hypothesis has been confirmed by research conducted by the Defense Operations Evaluation Center in the United Kingdom. The U.K. research indicated that the performance of various armies degraded far more when on the defense, that when on the offense. In fact, the British studies indicate that when on the offensive the combat qualities of various defense forces around the world did not degrade differently under similar circumstances. Therefore, the side that takes the offensive, which will be the Warsaw Pact, may suffer less degradation in personnel performance than the side fighting defensively, NATO.

The question of the adequacy of Warsaw Pact training and tactics remain unaddressed. There is every evidence to suggest that Warsaw Pact battle drill tactics may be too rigidly applied and too inflexible for the fluid modern battlefield. There is equal evidence to suggest that the training of Warsaw Pact troops is rigorous and thorough. If NATO has any advantage in the area of personnel quality it may lie in the area of small unit tactics. This is an area that deserves further study.

The Operational Level of Warfare

The Soviet perspective is that the application of a consistent military doctrine (defined herein as the way a nation is organized to make war), provision of centralized control over the Warsaw Pact by the Soviets, and the ability of Soviet commanders to maneuver forces at the operational level of war will be decisive in a European campaign.

Except for the Seventh Army, all NATO forces require some degree of mobilization in order to enter combat. In several cases National Corps need to be deployed in their sectors. The decision to mobilize and, subsequently, deploy is a national political decision for each member state of NATO. It is unlikely that the decision to mobilize and deploy will be made in a consistent manner.

If they are deployed, the national army corps and associated air force will each hold a slice of the line. A recently retired NATO four star general has said that this ensures that each NATO nation will share an equal burden of combat. This is only true if the Warsaw Pact does not concentrate its forces and, therefore, attacks across a broad front. Of course this is a preposterous assumption. In fact what it does ensure is, if all Corps are deployed, that one Corps, most likely the Belgian, will be destroyed in the first 72 hours of combat and will suffer a disproportionate share of NATO casualties during this period.

More likely, because the Soviets need to achieve surprise to achieve their goals, it ensures that if one Corps does not deploy, there will be a natural gap in NATO's front line for the Warsaw Pact to exploit. As shown in Figure 15, the Soviets have created a terminology and concept for war fought on a grand scale. In World War II, German forces achieved decisive tactical victories with exceptional exchange rates. Yet, whole German armies and army groups were swept up, enveloped and destroyed at the operational level. From the Soviet perspective a division fights battles using pre-planned battle drill techniques, meeting objectives set by higher headquarters. It is only at the higher level where command initiative (creativity) is exercised. Thus, while the U.S. Army reforms into ever larger and more unwieldy divisions, the Soviets have begun a reorganization into a flexible Brigade/Corps structure.

quality of personnel and the firepower of divisions. Soviet divisions are judged to equal the effectiveness of U.S. and FRG divisions, and to be twice as effective as Italian divisions. The divisions of other NATO countries are judged to be 70 to 80% as effective as a Soviet division.

As shown in Figure 14, a British division is only 50% of the size of a Soviet division. It also has inferior weapon systems. But it is judged by the Soviets to have 80% of the effectiveness of a Soviet division. Thus, the Soviets have adjusted the overall effectiveness of a British division by a factor of 1.6 in order to reflect the quality of British personnel relative to Soviet personnel.

As previously noted and as shown in Figures 13 and 14, FRG and U.S. divisions are judged by the Soviets to equal their divisions in effectiveness. FRG divisions are about 75% of the size of a Soviet division. U.S. divisions are about the same size as Soviet divisions. This means that the Soviets have assessed German personnel quality as being higher than the quality of U.S. personnel. The Soviet assessments appear consistent with independent judgments that British divisions contain the best trained personnel in NATO and that U.S. personnel quality often lags the quality found in NATO conscript armies.

Many Western observers might conclude that the Soviet may have underestimated the quality of the Netherlands' divisions and overestimated the quality of Belgian and Danish divisions. The Soviet assessment indicates that they think they have considerably improved the quality of their forces relative to the West over the last 40 years. Only the test of combat will prove if they are right.

The Soviets compare the moral, or social cohesion, of their forces to cast iron. Cast iron is hard, but brittle. Historical evidence suggests that personnel quality in combat is based on cultural factors that are consistent for generations. If so, like cast iron, Soviet forces may shatter if all goes wrong in combat. Hence, the Warsaw Pact may be more vulnerable to a preemptive spoiling attack by NATO than the West realizes. Having the strategic initiative, being on the offensive, could prove to be a decisive advantage to the Soviets.

Based on the estimated quality of enlisted personnel within the ranks, enlisted personnel experience levels, and officer training and capability, the case cannot be made for the qualitative superiority of NATO personnel. NATO does have more experienced NCOs. However, Warsaw Pact tactics, manning, maintenance, and training practices do not require a pool of regular NCOs. Well trained, experienced, technically qualified NCOs are vital to NATO armies for the maintenance of equipment and the direction of small units commanded by relatively inexperienced junior officers.

- The quality of Warsaw Pact and NATO personnel at the tactical level appears to be more comparable than is generally perceived.
- The Soviets have concluded that certain NATO formations have significantly less combat potential than other formations because of differences in personnel and equipment quality and table of organizational strength.
- The Warsaw Pact is superior to NATO at the operational level of warfare because its forces are based on a common national organization for war, because of centralized Soviet control over all Warsaw Pact forces, and because the Soviets have better planned for war at the operational level.

NATO spends more on defense than the Warsaw Pact. It has more men under arms. Yet every indication is that it cannot defend itself for more than 15 days without resorting to the use of nuclear weapons. How can this be rectified? The strategy proposed for three decades has been, "superior quality to offset superior numbers". But the results of this study indicate that this strategy has failed. The case cannot be made that NATO has qualitatively superior forces.

If the BAOR is compared to the Soviets 3rd Shock Army which it faces across the NATO Warsaw Pact frontier, it can be shown that, although it has the same slice of manpower, it pales by comparison in firepower (Figure 16).

Accurate cost data for Soviet military forces is difficult to obtain. Therefore, it is not possible to compare the total annual cost of the BAOR to the annual cost of the 3rd Shock Army. However, it is interesting to compare the cost effectiveness of the British Army to a Soviet analogue, Israel, which has a defense force that is organized in conceptually similar manner to that of the U.S.S.R. Moreover, Israel uses military equipment equal to, or better than, that for most NATO countries, has more sustainability than most NATO countries, has a large force structure, and a nearly European standard of living. As shown in Figure 17, the U.K. has spent well over twice as much to achieve about one-fourth the "bang" achieved by Israel. If the Soviet analogue is compared to NATO armies it becomes obvious that all of NATO's participating countries are financially inefficient in defense (Figure 18).

Conventional deterrence to a Soviet threat is possible in Europe within acceptable fiscal levels only if the NATO countries counter the Soviet cadre-mobilization threat with their own cadre-mobilization forces. A limited, fortified belt along the front would be needed to buy the time needed for mobilization against a preemptive Warsaw Pact surprise attack.

Attempting to offset decisive numerical inferiority by technological superiority is a strategy doomed to failure. There

Warsaw Pact equipment is often single purpose. Highly specialized subunits have been developed. These specialized subunits are used, like chess players, by the operational commander in order to achieve specific objectives. The emphasis on the operational level also influences Soviet tactics. Commanders will reinforce success, not failure. Therefore, artillery is not called upon from lower echelons, but allocated by higher echelons. A tank battalion caught in a killing zone may not be provided with artillery or air support in order for it to escape a trap. The commander may permit it to be destroyed. The artillery and air support that could have saved the tank battalion may be used by the commander to assist the progress of another battalion that has been weakly opposed. Subsequently, those who destroyed the first battalion, may be enveloped and destroyed by the forces that exploit the successful penetration which occurred elsewhere. Therefore, microanalysis of World War II combat results on the Eastern Front, concentrating on the results of individual small unit battles, would provide a misleading conclusion relative to the performance of the opposing forces.

The lack of understanding within NATO of warfare at the operational level, NATO's lack of operational reserves, and the inability of Army commanders to maneuver corps are major weaknesses. Supreme Allied Command Europe (SACEUR) has only a limited ability to switch or maneuver forces other than air power on a North-South axis. Therefore, NATO forces, which have yielded the strategic initiative to the Warsaw Pact, are candidates for envelopment. The Soviets have the option of concentrating their forces against the weakest corps or where the force/area ratio is most favorable to them, achieving high rates of advance against an enemy without operational reserves and enveloping the strongest national corps.

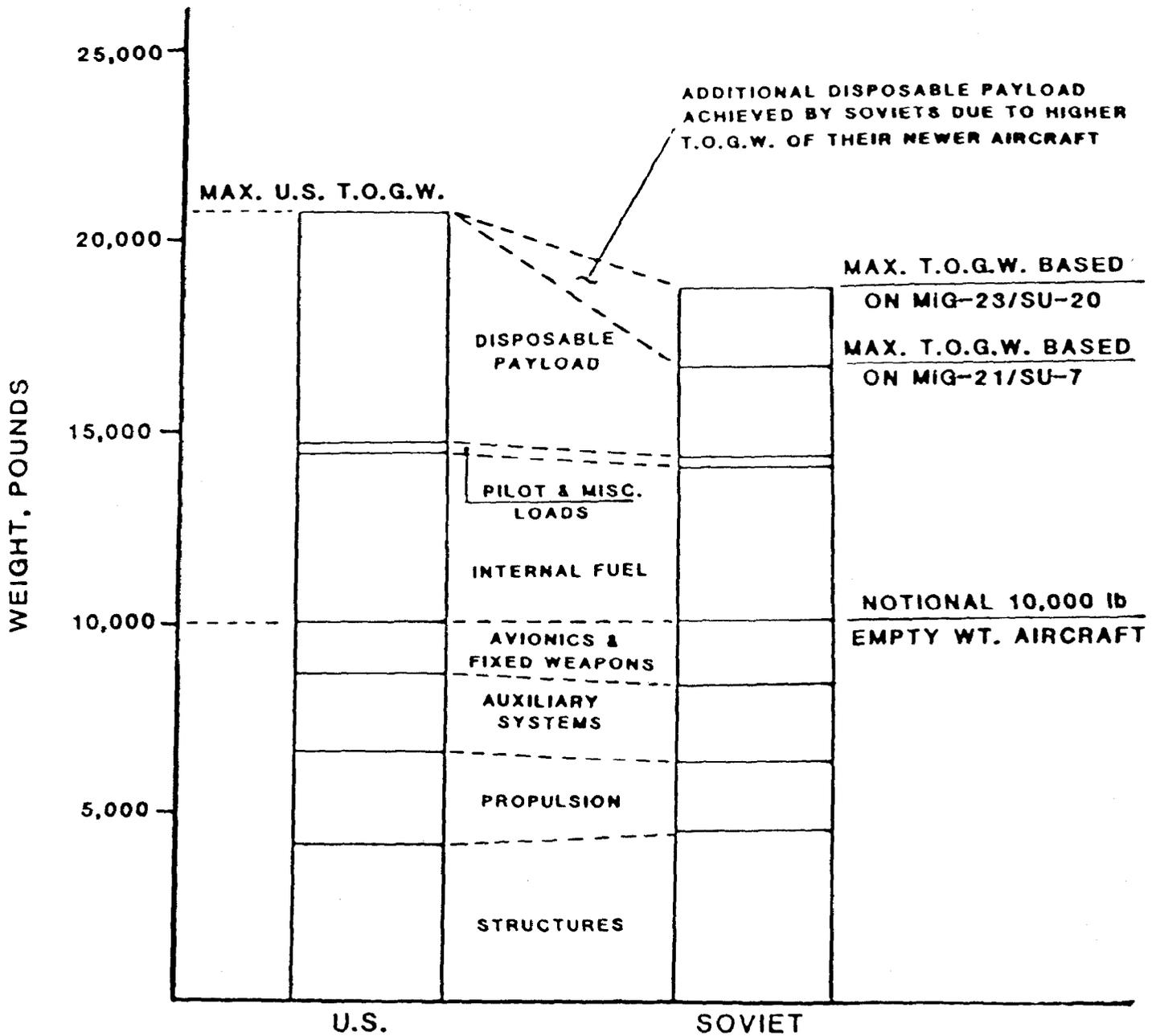
Conclusions Regarding the Operational Level of Warfare

At the theater or operational level of warfare the Warsaw Pact is clearly superior to NATO. This superiority stems from the application of a consistent military doctrine within the Warsaw Pact, the centralized control exercised by the Soviet Union over all Warsaw Pact forces, and the organization and understanding of war at the operational level within the Warsaw Pact.

Net Assessment

The results of this study have indicated that:

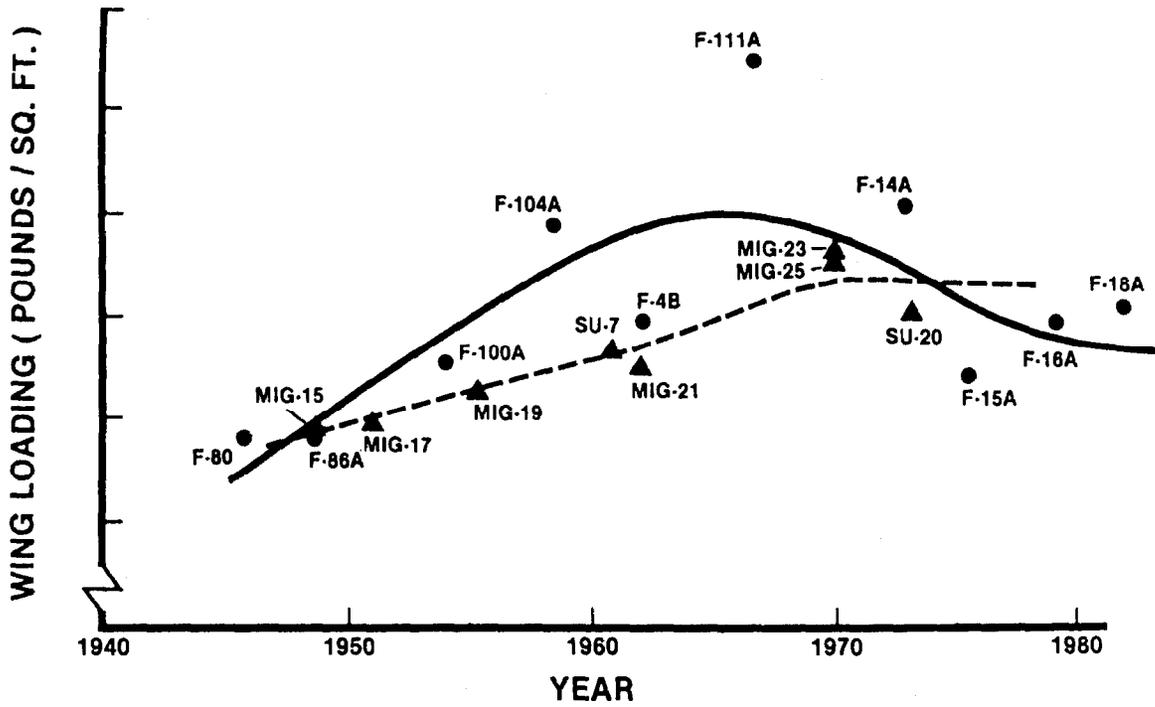
- The technical quality of all the military equipment used by the Warsaw Pact and NATO for the land, air, and sea battles is generally similar. Neither side has been able to maintain consistent, broad-based technological superiority over all the elements affecting the land, air, or sea battle. Warsaw Pact equipment is more user friendly, reliable, and simpler to use and maintain at the operational level than is comparable NATO equipment.



Aircraft Weight Allocations

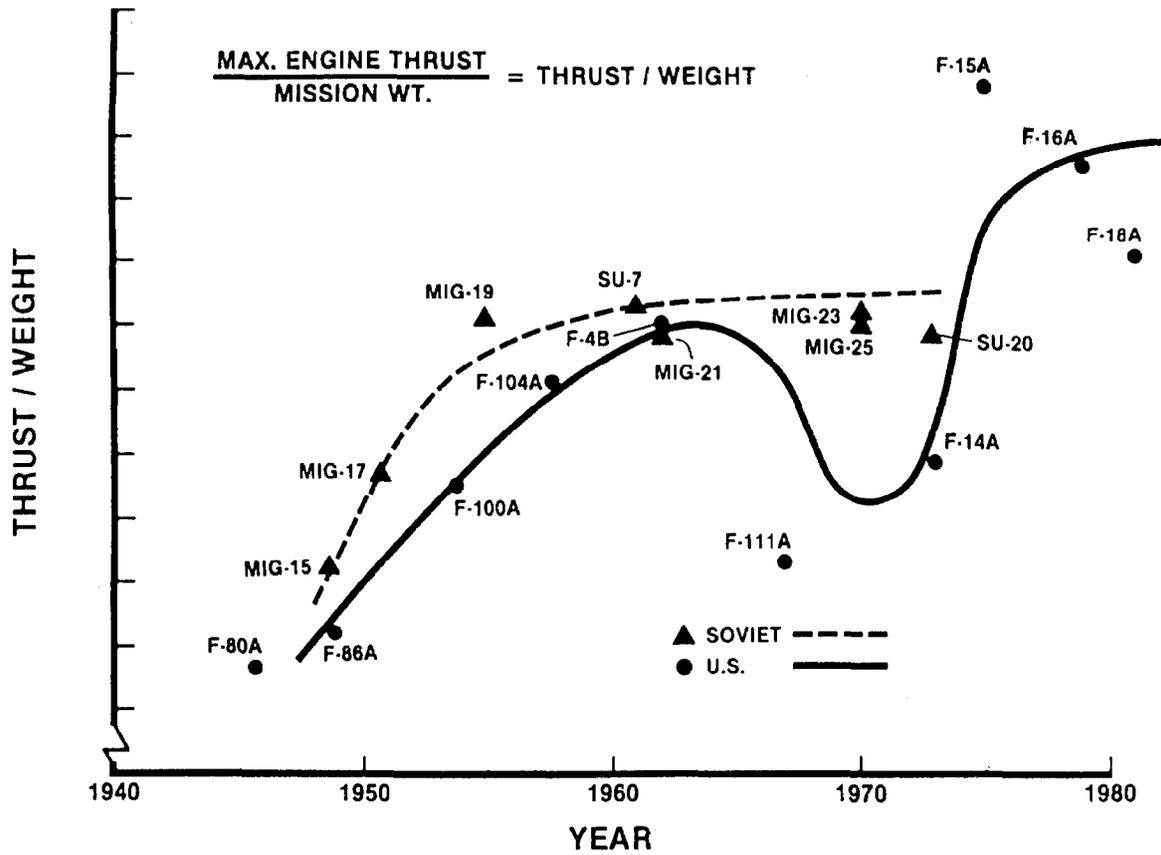
Figure 1

is no evidence to suggest that NATO can achieve and maintain broad-based technological superiority.



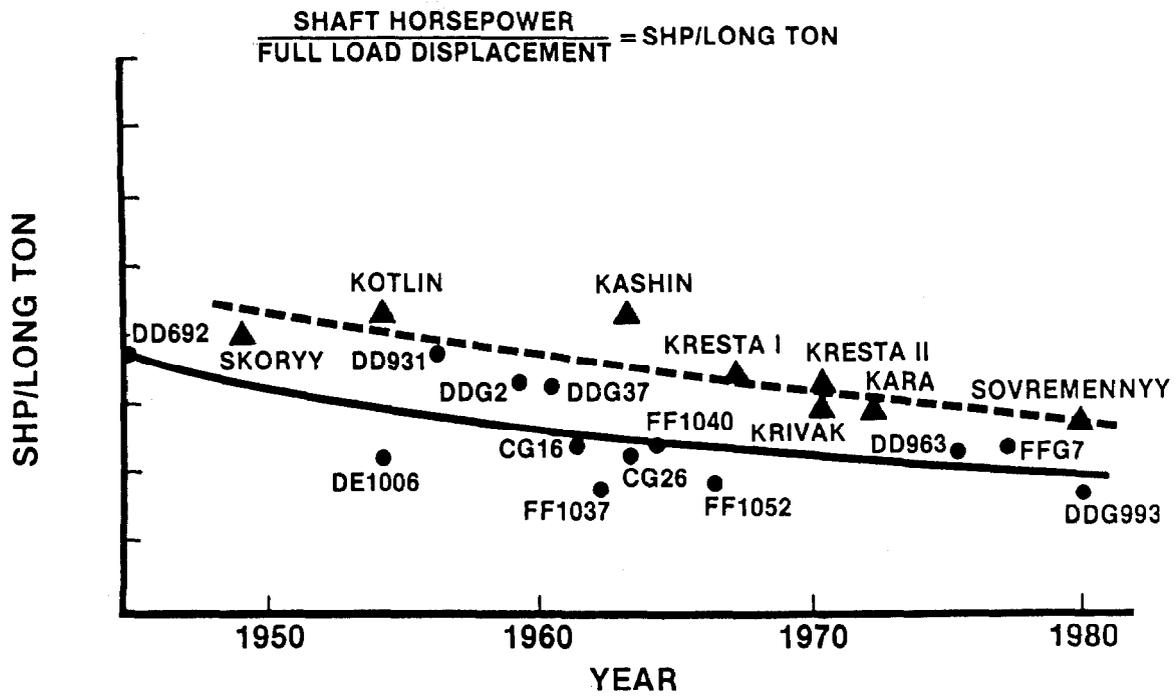
Aircraft Wing Loading

Figure 3



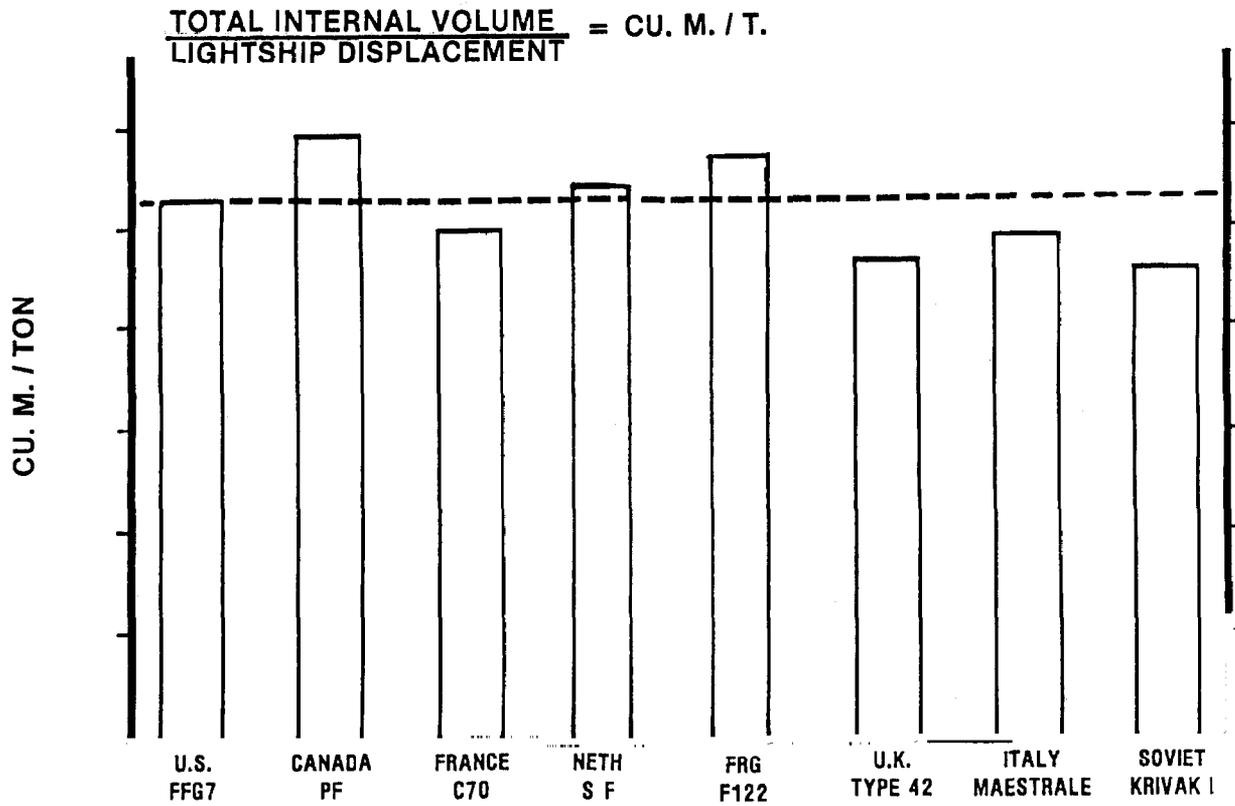
Jet Engine Thrust to Weight Ratios

Figure 2



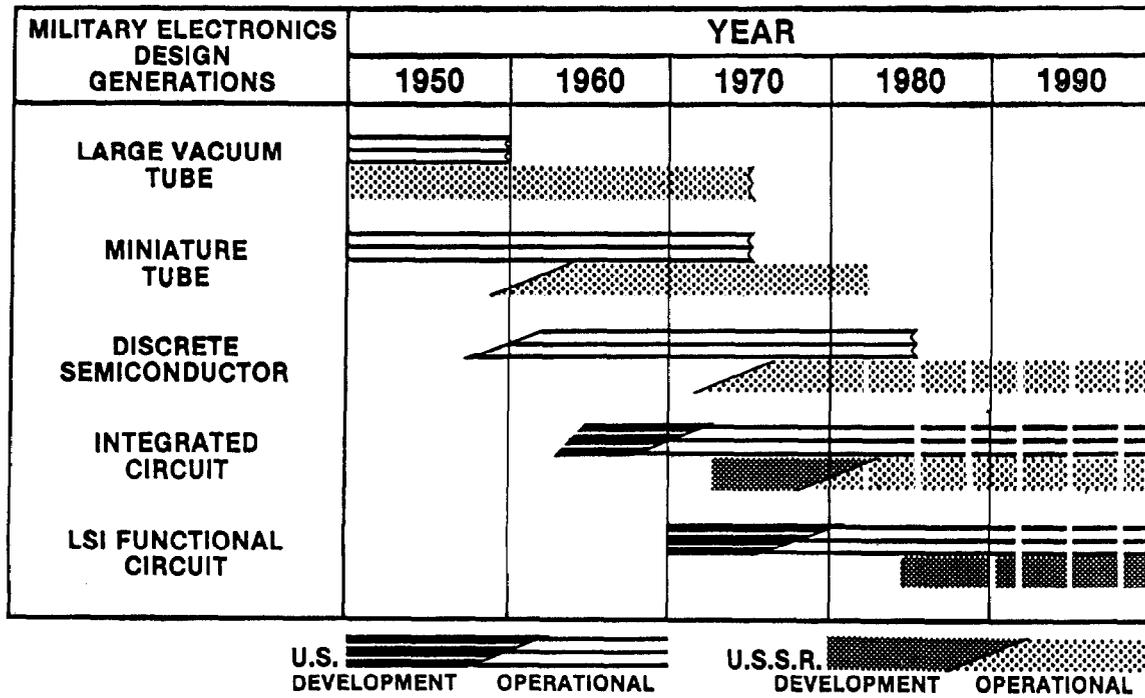
Installed Power of U.S. and Soviet Ships

Figure 5



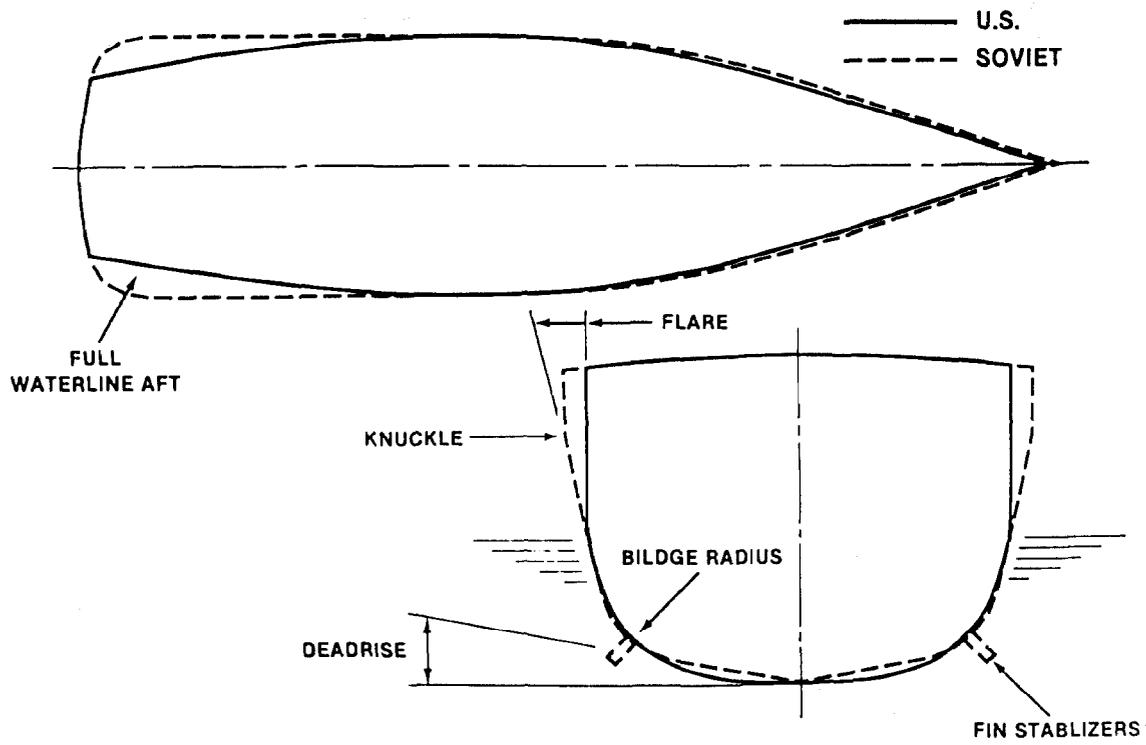
NATO and Soviet Frigate Specific Volume

Figure 4



Military Electronics Design Generations

Figure 7



U.S. and Soviet Hull Formations

Figure 6

APPENDIX IX

APPENDIX IX

<u>Item</u>	<u>U.S.</u>	<u>Soviet</u>
Time between overhauls	Long	Relatively short
Organizational Maintenance	Extensive	Limited
Part replacement	Extensive	Limited
Service life	Long	Limited
Maintenance skill level	High	Low
Special test & maintenance equipment	Extensive	Limited
Reliability	Adequate, long periods	Excellent, shorter periods
Changes & modifications	In the field	At the depot

Factors Affecting Reliability and Maintainability

Figure 9

APPENDIX IX

APPENDIX IX

<u>Item</u>	<u>U.S.</u>	<u>Soviet</u>
Complexity	High	Limited
Subsystem accessibility	High	Limited
Number of parts	Large	Low
Derating of equipment	Relatively low	Relatively high
Changes and modifications	Numerous	Limited
Tolerances	Tight	Open
Specifications	Stringent	Less stringent
Performance	Optimized	Adequate

Reliability and Maintainability Detail Design Factors

Figure 8

<u>Item</u>	<u>NATO</u>	<u>WARSAW PACT</u>
First Term	8-15 mos.	18-24 mos.
Pre-military Training	None	Extensive
Specialist Schools	> 50%	< 50%
NCO's		
Type	Regular	Conscript
Selection	Time-in-Grade, Skills	Selection from Conscripts based on Skills
Scope of Training	Theory Specialized Practical	Specialized Practical

NATO and Warsaw Pact Enlisted Career Patterns

Figure 11

<u>Country</u>	<u>Enlisted</u>	<u>Length of Service</u>	<u>Percent Regular</u>
<u>Warsaw Pact:</u>			
U.S.S.R.	Conscripts	24/36 mos.	28
Czechoslovakia	Conscripts	24/36 mos.	41
GDR	Conscripts	18/36 mos.	47
Hungary	Conscripts	18/24 mos.	45
Poland	Conscripts	24/36 mos.	41
<u>NATO:</u>			
U.S.A.	Volunteer		100
France	Conscripts	12 mos.	45
Belgium	Conscripts	8/10 mos.	68
FRG	Conscripts	15 mos.	52
Netherlands	Conscripts	14/17 mos.	54
U.K.	Volunteer		100
Denmark	Conscripts	9 mos.	72
Canada	Volunteer		100

NATO and Warsaw Pact Force Composition

Figure 10

<u>Country</u>	<u>Capability as a Percent of a Soviet Division</u>
U.S.A.	100
West Germany	100
United Kingdom	80
France	70
Netherlands	70
Belgium	70
Denmark	70
Italy	50

Soviet Estimate of NATO Divisional Effectiveness

Figure 13

<u>Item</u>	<u>NATO</u>	<u>WARSAW PACT</u>
Pre-military Training	None	Extensive
Scope of Training	General	Specialized
Sources	10% Academy	> 50% Academies
Retention Rate	< 50%	> 90%
Rotation	2-3 years	4-9 years
Maintenance/Repair	Hands Off	Hands On

NATO and Warsaw Pact Officer Career Patterns

Figure 12

<u>Level</u>	<u>Type of Conflict</u>	<u>Command Responsibility</u>	<u>Sector</u>
Strategy	Strategic Operation	General HQ	Theater
Operational Art	Operational-strategic	Army Group	Strategic Sector
	Operational	Army	Operational Sector
	Operational-tactical	Corps	Operational Sector
Tactics	Battle	Division	Tactical Sector

The Terminology of Operational Art

Figure 15

<u>ELEMENT</u>	<u>USSR</u>	<u>TANK DIV.</u>		<u>UK</u>
		<u>USA</u>	<u>FRG</u>	
MANEUVER BN.	17	16	13	10
MBT	331	360	264	185
APC	162	180	144	180
ATGM LAUNCHER	223	480	186	160
ART, INCL. MRL & MRTR	180	112	118	72
EQV. FIREPOWER	BASELINE	1.0	0.75	0.50
DIVISIONAL QUALITY	BASELINE	100	100	80
IMPACT OF PERSONNEL ON EFFECTIVENESS	BASELINE	1.0	1.33	1.60

Impact of Personnel on Quality

Figure 14

COUNTRY	<u>ARMY BUDGET</u> TOTAL MANEUVER BNS.
United States	11.1
United Kingdom	3.9
Federal Republic of Germany	1.7
France	1.4
Italy	2.4
Soviet Analogue (Israel)	1.0

SOURCE: Institute of Strategic Studies

Comparative Cost Effectiveness of NATO Ground
Forces versus Soviet Analogue

Figure 17

Figure 15

ITEM	<u>(3 SHOCK ARMY)</u> BAOR
MANPOWER	SAME
TANKS	2.5
ARTILLERY	6.0
INFANTRY	1.5
LOGISTICS LIFT	1.5
SUPPORTING ARMS	MORE
TOTAL COST OF KIT	1.15

SOURCE: Strengthening Conventional Deterrence in Europe - Soviet Operational Concepts, C.N. Donnelly, pp. 105-137.

BAOR versus 3rd Shock Army

Figure 16

**HOW MUCH IS ENOUGH FOR THEATER WAR?:
THE SOVIET MILITARY APPROACH TO SUFFICIENCY
OF CONVENTIONAL FORCES IN EUROPE**

by
John G. Hines

<u>ITEM</u>	<u>U.K.</u>	<u>ISRAEL</u>
Total Maneuver Battalions:	114	198
- Regular	74	45
- Reserve	40	153
Percent Heavy Battalions	39	74
Tanks	1,100	4,200
Self-propelled Artillery	275	1,100
Armored Fighting Vehicles	5,000	9,000
Annual Cost	\$9 x 10 ⁹	\$4 x 10 ⁹
Cost/Unit	4.725	1.0

SOURCE: Institute of Strategic Studies

Cost Effectiveness of U.K. Ground Forces versus Soviet Analogue

Figure 18

The General Staff materials and open-source books and articles consistently reinforce each other in the content and thrust of their explanations.

Sufficient for What?

A great deal has been said and written in the Soviet Union in the past two years about "new thinking" in the area of military doctrine. The Soviets have stressed the defensive nature of their doctrine and have established publicly the goal of maintaining forces of levels that are no more than "sufficient" to ensure defense of the USSR. Much has been written and said in the West about these new Soviet pronouncements. Reactions range from effusive gushing about a major Soviet shift from an offensive to a defensive orientation to charges that these declared changes are the opening move of a long-term strategic deception plan. Most defense analysts have adopted a cautious "wait-and-see" position pending more concrete demonstration of change.

While caution is advised, it is possible, perhaps, to make a preliminary assessment of the significance of these changes for Soviet military assessments of the adequacy of the military balance in Europe. To do this, it is necessary to distinguish the theoretical, ideological content of Soviet military doctrine from its more practical military technical applications.

Let us look first at the political level. Soviet military doctrine is established by the politburo, not by the military. Changes in emphasis in military doctrine would be expected to reflect politburo concerns and priorities which may or may not be fully supported by purely military assessments. It is clear that the political leadership considers worsening stagnation of the Soviet economy to be one of the greatest, if not the single more urgent, problem facing the USSR. The state of the economy is seen to be ideologically embarrassing, politically dangerous, and a long-term threat to national security because of the declining ability of the Soviet technology and production base to support development and deployment of increasingly more sophisticated weapons in competition with the West. There would seem to be powerful incentives, therefore, for the political leadership to carefully reexamine military policy to seek ways to develop doctrinal support for resource savings in the military sector.

Consistent with these concerns, the changes in emphasis that have occurred to date in Soviet military doctrine are manifest only at the political theoretical level and they bear directly on resource allocation for military forces. Specifically, at the level of policy and ideology, a declaratory policy of defense is as old as the Soviet Union. Recent restatements of this long-standing doctrine differ, however, in two related ways. First the prevention of war is explicitly declared to be a doctrinal

HOW MUCH IS ENOUGH FOR THEATER WAR?:

THE SOVIET MILITARY APPROACH TO SUFFICIENCY
OF CONVENTIONAL FORCES IN EUROPE

Soviet military assessments of force balances appear to differ significantly from our own. The most important difference, perhaps, is the seriousness and thoroughness with which the Soviets evaluate force balances in the context of various military operations in which opposing forces actually would engage in the event of war. Planners in the West tend to judge the balance of forces in terms of inventories of weapons or various force packages deployed against opposing force packages in the context of a very limited number of set-price scenarios. The models and games we use to test force requirements tend not to give adequate consideration to how forces would actually fight at the tactical, operational, and strategic levels of warfare. The Soviets, in contrast, make the forecasting of variants of future operations and warfare in general the basis of their military doctrine. Soviet military planners judge sufficiency based on the anticipated performance of current and future forces in executing these operational variants in the context of present and forecasted alternative force balances.

This paper briefly describes the operational context in which Soviet military planners make their assessments to include: assumptions, basic planning objectives, and general norms by which they would judge sufficiency of forces for theater war. The approach is illustrated with a description of operational-strategic encirclement, a type of scenario the Soviets consider to be the basic form of military operation in modern theater warfare. In this context, Soviet perceptions of their own and NATO's strengths and weaknesses are examined followed by an assessment of the implications of the probable Soviet assessments for Soviet and NATO military planners.

Many of the sources on which the analysis is based are open Soviet publications. Other references, however, include lecture materials from the Voroshilov General Staff Academy in Moscow and writings from the General Staff's publication, Military Thought. The Voroshilov Academy is the senior Soviet military (operational-strategic) academic institution described in the Soviet Military Encyclopedia as the "military-technical center for research of problems of Soviet military science and military art."¹ In addition to being a military research center, the academy trains generals, admirals, and other senior officers in military science.

¹"Voyennaya akademiya general 'nogo shtaba vooruzhennykh sil SSSR imeni K. E. Voroshilova," Sovetskaya voyennaya entsiklopediya (Soviet Military Encyclopedia, hereafter SVE), Vol. 2, (Moskva: Voenizdat, 1976), p. 172.

complex and stressful conditions with a well-armed enemy.³
(Emphasis in original)

Recent military theoretical discussions tend to reinforce Yazov's characterization of the relationship of offense and defense in a future war and certainly support the view that, only through the offensive will military objectives be achieved once war has begun. In a 1987 book, Lenin's Military Theoretical Heritage and Problems of Modern Warfare, Doctor of Philosophical Science G. G. Lukava explained that defense serves the purpose of supporting the offensive in various ways. Specifically, "...defensive actions make it possible to gain time, [and] to economize in forces and means in some directions in order to create conditions for the offensive in other, more important directions..." Lukava uses Lenin's words to make clear the distinction between the relevance of the concept of defense at the general ideological level of warfare and its use at the more practical operational level where wars are actually fought. Lenin, according to Lukava, established the principle that while "...the socialist state conducts and will conduct only defensive wars... these wars are defensive as far as their political aims are concerned, but not in the method of their conduct..."⁴

The statements of Yazov and Lukava about the need to be able to attack successfully and decisively in the conduct of war and the temporary and supporting role of defense are very similar to high level military pronouncements made repeatedly since the end of

³Soviet Minister of Defense, General of the Army D. T. Yazov, Na strazhe sotsialisma i mira (On Guard for Socialism and Peace), (Moskva: Voenizdat, 1987), p. 33. Deputy Defense Minister, Marshal of the Soviet Union V. G. Kulikov offered a slightly less ambitious version of this requirement in August of 1988, "...In the course of the strategic defense, considerable attention must be devoted to the preparation of the counteroffensive, because defense alone cannot assure the crushing repulsion of the aggressor." He made clear the force development demands posed by this requirement by repeating the general staff formula that the socialist bloc "intends to do all that is necessary to ensure that the armed forces represent a powerful military organization." (Emphasis added.) V. G. Kulikov, Doctrina zashchita mira i sotsialisma, (Doctrine of Defense of Peace and Socialism), (Moskva: Voenizdat, 1988), pp. 79 and 84.

⁴G. G. Lukava, "Voyenno-teoreticheskiye vzglyady V. I. Lenina i sovetskaya voyennaya nauka" (the Military-Theoretical Views of V. I. Lenin and Soviet Military Science) in A. S. Milovidov, Voyenno-teoreticheskoye naslediyeye V. I. Lenina i problemy sovremennoy voyny (Lenin's Military-Theoretical Heritage and Problems of Modern War), (Moskva: Voenizdat, 1987), pp. 251, 252.

objective.² The Soviets have never been especially eager to initiate war if it would entail significant risks to the stability or survival of their own system. Formally establishing war prevention as an objective, however, suggests the possibility that fewer forces might be required to prevent war than would be needed to wage one successfully.

The second difference at the political level is that recent statements about defense are coupled to an apparent determination to redefine the relative force levels that would be "sufficient" to satisfy doctrinal objectives. Some within the Soviet establishment call for aggressive support of efforts to build down multilaterally, and even unilaterally, to force levels that would be much lower than they are today.

At the more practical military-technical level of Soviet military doctrine no change is discernible to date. The Soviet military must still meet the traditional doctrinal requirements to forecast accurately the nature of future war and to ensure that the forces and the state would be prepared to fight such a war successfully should it occur. The Soviet military leadership makes it very clear that to meet this requirement it must be able not only to defend, but also to attack decisively. Defense Minister Yazov, promoted by Gorbachev himself over several more senior officers, presumably because he holds views about national security that are close to those of the General Secretary, wrote a pamphlet shortly after his appointment in the summer of 1987 in which he made clear the limitations of defensive operations in meeting Soviet doctrinal security requirements. He declared that, while defense is the "main type of military action for repelling aggression...,"

It is impossible to achieve crushing defeat of an aggressor with defense alone. After an attack has been repelled, the troops and naval forces must be able to carry out a decisive offensive. The transition to the offensive will take the form of a counteroffensive which will have to be conducted under

²Marshal of the Soviet Union S.F. Akhromeyev, "Watching Over Peace and Security," Trud, February 21, 1988; Foreign Broadcast Information Service, Daily Report, Soviet Union (hereafter FBIS), February 22, 1988, p. 86. Marshal Akhromeyev specified that, "This is the first time [preventing war] has become part of the content of our military doctrine."

that could radically alter the "correlation of forces" in the course of an operation.⁶ This assessment bolsters Soviet expectations of their own defense to some extent but at the same time greatly complicates planning for offensive operations against NATO. The latter perception has been reinforced by NATO's demonstrated resolve to modernize its forces beginning in 1977 together with its ability to overcome internal political opposition and deploy Pershing II and cruise missiles beginning in 1983.

Finally, the Soviet military seem to be reluctant to assume that they will receive timely mobilization authorization from the politburo⁷ in the event of a crisis. They likewise seem to have only moderate confidence that they will dictate the timing and conditions for the outbreak of hostilities. Such conservative planning assumptions tend to force the military into making provisions for mobilization and deployment under threat of attack or under attack⁸ which creates a need for a rapid, effective

⁶Col. Stanislaw Koziej, "Anticipated Directions for Change in Tactics of Ground Troops," Przeglad Wojsk Ladowych (Ground Forces Review), No. 9, September, 1986, pp. 6, 7. Translated by the U.S. Army Soviet Army Studies Office (SASO), January 20, 1987. See also Gen-Lt N. Petrov and Col. B. Andreev, "Printsipy vedeniya sovremennoy voyny" (Principles of Conducting Modern War), Zarubezhnoye voyennoye obozreniye (Foreign Military Views), No. 1, January, 1980, p. 15.

⁷M. A. Gareyev, M. V. Frunze-voyenny teoretik: vzglyadi M. V. Frunze i sovremennaya voyennaya teoriya (M. V. Frunze-Military theoretician: The View of M. V. Frunze and Modern Military Science), (Moskva: Voenizdat, 1985), p. 240. General Gareyev argues that "...Early strategic deployment of the Armed Forces prior to the start of war, regardless of all the benefits in purely military terms, is not always feasible because of military-political considerations." He reinforces his point by declaring that even mobilization, and certainly strategic deployment of forces is "tantamount to a state of war" which would be extremely difficult to reverse. He concludes that the Soviet armed forces must therefore be more flexible and "provide for the organized deployment of troops (forces) under any conditions of the initiation of war by the imperialist aggressors."

⁸See John J. Yurechko, The Initial Period of War: Soviet Strategy for the First Stage of the Next World War, in manuscript, 1987. Yurechko does an excellent job of tracing the evolution of Soviet views of the critical "initial period" in response to changes in weapons technology, new operational concepts, and political constraints.

World War II. The military then seem to believe that they face the same requirements they have been held to for decades. Soviet forces must be "sufficient" to deal decisively with NATO under very unfavorable conditions. First, as a minimum, they must be able to hold NATO away from Soviet territory even in a short-warning attack to allow time for mobilization and movement of Soviet reserves. Second, they must have the capacity, once mobilized, to "crush" mobilized NATO forces. From the perspective of the Soviet military, therefore, the major effect of the recent change in emphasis in military doctrine is that they must be prepared to meet long-standing military-technical objectives with the prospect that they may have fewer resources with which to do it in absolute terms and, possibly, less of a relative advantage in forces vis-a-vis NATO.

The Growing Importance of Defense - The Military Reasons

The Soviet military must plan against the contingency that a crisis might escalate to war even if both sides initially might seek to avoid hostilities. They also plan against the possibility of a NATO surprise attack even though the possibility of such an event is difficult, if not impossible, for Westerners to imagine. In developing concepts and plans to engage and to prevail in such a war the Soviets see themselves confronted with a far more complex set of possible scenarios both for the outbreak of war and for its prosecution than was the case a decade ago.

Many factors apparently contribute to this expectation. First they believe that, in the context of strategic and theater nuclear parity and Warsaw Pact tactical nuclear superiority, nuclear weapons are much less likely to be used than was the case in the 1970's. While the Soviet military believe that nuclear use greatly complicates the conduct of offensive operations, assumption of their use reduced planning options to a very simple few related to strikes, survival, and exploitation. Defense was not considered relevant in theater nuclear operations.⁵ To conduct theater strategic conventional operations the Soviets had to dust off operational concepts such as the integration of offense and defense, encirclement, and massing of forces and fires that served them so well in the middle and final periods of the Great Patriotic War against the Nazis and the Japanese.

A second factor complicating Soviet planning scenarios was the increasing lethality, range and sophistication of the conventional weapons of war. Soviet military scientists believe that these new weapons are blurring traditional distinctions between offense and defense. The defender can now choose the time for initiation of battle in the attacker's depths and can impose attrition in depth

⁵B. V. Panov, et al., Istoriya voyennogo iskusstva (History of Military Art), (Moskva: Voenizdat, 1984), p. 462.



Figure 1a
Correlation of Forces Distribution

defense adequate to "gain time" for mobilization and a subsequent "crushing" counter offensive.

It might be argued, then, that Soviet military appreciation of the growing complexity of theater war and the greater role of conventional defense in both theater offensive and defensive operations has grown out of a number of operational, technical and political concerns and predates current theoretical discussions of sufficiency and the primacy of defense by eight to ten years. The potential resource restriction implications of the politburo's imposition of sufficiency and war prevention as the standards (however ultimately defined) against which force requirements would be established threatens to further exacerbate uncertainties in Soviet military planning for the initiation and conduct of a future war in Europe.

Military Calculations of Sufficiency - the Operational Context

The operations-based method by which the Soviets calculate the adequacy of regional force balances appears to lead to wartime possibilities that would ameliorate if not offset completely many of the negative military trends they have noted in Europe. The most disturbing conclusion to come out of application of the Soviet methodology goes directly to the heart of the question of how much is enough to attack in a theater war. Based on extensive research in operations from their own military history, Soviet military historians and military scientists have concluded that parity to a 1.5:1 force advantage across the entire theater is sufficient to enable Soviet forces to achieve 3-4:1 force advantage on a few (2 to 4) Front or Army breakthrough sectors 20 to 40 kilometers in width, and tactical advantages within those sectors of 4-7:1⁹ (see Figure 1a). The principle involved is described as the "uneven distribution of troops along the front for the purpose of concentrating forces for the main thrust on the decisive sector".

The Soviets give the Greeks credit for discovering the concept and acknowledge that they had to relearn it themselves in the course of their war with the Nazis. While most Western defense analysts are

⁹Major H. F. Stoeckli, Swiss Army, "Soviet Operational Planning: Superiority Ratios vs. Casualty Rates," study published by the Soviet Studies Research Centre, Royal Military Academy, Sandhurst, p. 5. Stoeckli's research indicates that the Soviets would seek 4 to 7:1 superiority in the breakthrough sector but accept an overall superiority of 3 to 4:1 at Army and Front level. Superiority at theater level might be as low as 1.25:1. See also Figure 1b from the Lecture Materials from the Varoshilov General Staff Academy, "Army Offensive," date of information, mid-1970's. Note that the "general" correlation of forces could be as low as 1:1 in most weapons systems but that the Soviet advantage on the "main sector" should be 3 to 4:1.

The Main Operation - Encirclement

The remainder of this paper will discuss some of the more important aspects of how the Soviets would plan for and execute operations within the context of the theater strategic operation. Specifically, I will focus on Soviet thinking about developing large-scale operational-strategic encirclement of large groupings of NATO forces. Encirclement is the type of operation the Soviets favor most and which they believe would be most productive of rapid results in a future war against NATO.¹¹ The operation is very complex and requires concentration of considerable forces and fires on those axes destined to be the arms of the encirclement's embrace. Most assessments give the Soviets a 1.5 to 2.5:1 advantage in Europe--even with reinforcement by both sides.¹² For penetration on encirclement axes, the Soviets believe they need to achieve at least a 4:1 to 5:1 advantage in selected sectors. The paper will examine how the Soviets would attempt to meet this requirement in Europe. Specifically I will review some of the main factors that influence the Soviet planners' decision in selecting "the main axis" in a given zone of attack, how they determine the force requirements for the penetration sectors selected, and how this determination is related to the speed with which they believe they must defeat NATO. The findings provide a disturbing, but perhaps helpful, look at how carefully the Soviets consider the relative capabilities and deployment of the various NATO national corps in planning large scale encirclement.

As part of any solution, in some very large sectors the Soviets would not mount a full scale operational attack but would only attempt to fix forces with attacks on a tactical scale (to the depth of opposing divisions)--sufficient perhaps to get opposing divisions and corps to commit their reserves. Depending upon the extent of mobilization by both sides, the Soviets might even defend in some sectors to make forces available for the main attack. I

11v. A. Matsulenko, Operatsii i boyi po okruzheniye (Encirclement Operations and Battles), (Moskva: Voenizdat, 1983), pp. 226; Also see, General of the Army P. Lashchenko, "Sovershenstvovaniye Sposobov okruzheniya i unichtozheniya krupnykh gruppirovok protivnika po opytu velikoy otechestvennoy voyny" (Perfection of Methods of Encirclement and Destruction of Large Enemy Groupings Based on the Experience of the Great Patriotic War), Voyenno-Istoricheskiy Zhurnal (Military Historical Journal - hereafter Vizh.), No. 2, February, 1985, p. 31.

12The International Institute for Strategic Studies (IISS), The Military Balance 1988-1989, London: IISS, 1984, pp. 233-237. Evaluating the data using qualitatively weighted values does not change the characterization of balance significantly for the purposes of this discussion.

familiar with the concept of massing forces and fires in selected attack sectors, few have considered the total organizational and operational context within which forces are massed. Massing normally involves a redistribution of available forces from inactive or less important sectors to the main attack sectors. Most neglected in the West is serious research to determine how few forces are required in non-main-attack sectors. The Soviets cite extremes in their own history that are surprising. In one operation the Red Army massed the equivalent of 6 divisions on a main attack sector 10 km wide and over the remainder of the Front left one battalion per 10 km to defend secondary sectors.

Soviet enthusiasm for the benefits of this approach to offsetting marginal to nonexistent force advantages on a theater scale is disturbing. Soviet military scientists cite examples such as the Moscow counteroffensive in which the overall correlation of forces was negative, 1:1.5 but where "victory" was achieved through redistribution of forces to the flanks of the opposing Nazi force grouping. To protect massed forces from enemy air strikes the Soviets massed air (sometimes 100 percent of the air available) and up to two thirds of available ground-based air defenses in the sector of the main attack.

Many of the instances of the creative application of the principle of mass cited by the Soviets are counteroffensive operations such as those at Moscow and Stalingrad. This is instructive in light of Soviet planners conservative expectations of an initial defensive phase in any war in central Europe. In the event of any war in Europe the Soviets might very well defend or at least not attack decisively until overwhelming force advantages were available on selected attack axes. To conserve forces and thereby help to ensure success in the long-term, the Soviets believe they must either defend, or attack at a high rate of advance (at least 40 km per day). Soviet operations research tells them that the most costly and ineffective operation is one that advances slowly providing the defender the opportunity to establish repeatedly new lines of defense and extract high losses from the attacker as he is required to continuously repeat costly breakthrough operations. A second consideration that might inspire the Soviets to defend for some period of time would be the availability of exploitation forces from the Western U.S.S.R. Successful breakthroughs made possible by redistribution of forward-based forces will run out of steam if not reinforced.¹⁰ Mobilization and movement of strategic reserves become critical factors in determining the timing of a major offensive in central Europe. Should the Soviets attack with fewer reserves for other reasons (to achieve surprise), they might have decided on seizing shallower objectives (200-300 km).

¹⁰P.T. Kunitskiy, "Massirovaniye sil i sredstv na napravlenii glavnogo udara," (Massing of Forces and Means on the Direction of the Main Attack), Voyenno-Istoricheskiy Zhurnal, (Military Historical Journal-hereafter Vizh.), No. 4, 1987, p.11.

This is the classic operational-strategic encirclement. The primacy of this method under nonnuclear conditions was noted in a 1968 Military Thought article. Referring to World War II, the author explained that:

"... Encirclement and subsequent destruction of large enemy groupings was frequently the main task of all offensive operations and such operations were considered the most effective method of defeating the enemy. This is how it was in the last war when the threat of using nuclear weapons was absent.¹⁷

Enthusiasm for the subject of large-scale encirclement is very much in evidence in recent years. In 1983, the chief editor of the Soviet Military--Historical Journal since 1967, authored a book dedicated to the subject of large-scale encirclement. The entire final chapter was comprised of conclusions concerning the relevance of World War II encirclement operations to "modern conditions." The author prefaced his conclusions with the statement that:

Above all it should be emphasized that such operations, which were organized principally by the Stavka of the supreme High Command and the General Staff, were the most decisive form of conduct of offensive action by the armed forces. This was determined by their great effectiveness and ability to achieve results.¹⁸

He reinforced his point by noting that during the war the Soviet Army conducted 15 major strategic encirclements that resulted in the almost complete destruction of more than 200 divisions. He made clear the relevance of the World War II experience by noting that today, as it was during the war, the encircled enemy would have to be destroyed sequentially because, "One must take into account in this regard, that the use of only conventional means of destruction does not allow achievement of it [destruction of the enemy] simultaneously."¹⁹

In an enthusiastic and unusually frank article published in 1984 in Military Historical Journal, the former commander of the Carpathian

¹⁷Major General S. Shtrik, "The Encirclement and Destruction of the Enemy During Combat Operations Not Involving the Use of Nuclear Weapons," Voyennaya Mysl' (Military Thought), No. 1, January, 1968, FPD0093/68, 22 May 1968, in Selected Readings from Soviet Military Thought, U.S. Government Printing Office, Washington, D.C., 1982, Part 1 (hereafter, Shtrik, "Encirclement"), p. 188.

¹⁸Matsulenko, Encirclement, p. 225.

¹⁹Ibid., p. 228.

will also review then how the Soviet Front would defend against an attack by all or part of a NATO corps.

Should the Soviets choose to attack they would seek to advance rapidly to the depths of NATO's defenses and to quickly destroy NATO forces. To accomplish this the Soviets would execute the strategic offensive operation in the Western TSMA. As it is explained by the authors of the 1984 History of Military Art, in the early sixties Soviet planners expected that "the main component of the operation had become the nuclear strikes of the strategic rocket forces"¹³ and that essentially the SRF had the leading role in the armed forces. Under these conditions distinctions between strategic offense and strategic defense disappeared. They point out, however, that

...This related only to nuclear war; strategic offense and strategic defense were retained as types of strategic action with the use of only conventional means of destruction. In these operations the main role belonged, as before, to the ground forces.¹⁴

As Soviet military planners came to revise their view of the likely nature of future war and to moderate their earlier overdrawn expectations of the military utility of nuclear weapons, they began to return to the precepts of the initial post-war period (1946 through 1952) with allowances made for nuclear-threatened dispersion. During the immediate post-war period, "It was considered that the objectives of war would be achieved by large formations [armies, Fronts] of forces of all branches of the armed forces with the ground forces playing the main role."¹⁵ How then, would the Soviets rapidly advance and destroy forces when nuclear use was not a likely and certainly not a desirable option? Under these conditions:

The strategic offensive operation, as in the war years, had to be accomplished with groups of Fronts... The principal methods for conducting the operation were considered to be: encirclement and destruction of the enemy, cutting up his strategic groupings and fragmenting strategic fronts with the subsequent destruction of isolated enemy groupings.¹⁶

¹³Panov, History, p. 462.

¹⁴Ibid.

¹⁵Ibid., p. 447.

¹⁶Ibid.

In the Stalingrad operation...the absence of overall superiority of our forces over the NAZI-fascists required the Soviet command to create powerful strike groupings. Despite a certain risk, they put together a daring concentration of the largest possible numbers of forces and means on the axes of the main strikes of the fronts at the expense of sharply weakening secondary axes. As a result, on the axes of the main strikes of the Fronts were concentrated up to 70% of the infantry troops, up to 80% of the artillery and all the tanks of the combined-army. In this way a decisive advantage (2 and even 3 to 1) was achieved over the enemy on the penetration sectors.²¹

The Soviets note proudly that this "risky" operation executed with essentially a 1:1 force ratio across the Front resulted in the encirclement and defeat of 22 enemy divisions and numerous separate units, a total of 330,000 enemy troops, far greater than the combined strength of the U.S. Fifth and Seventh Corps and the German III Corps in the Central Region of NATO.²²

Offense and Defense in the Encirclement Operation

The exploitation of the advantages of combining offensive and active or passive defensive actions in a single operation to achieve a larger overall objective is very much in evidence in current Soviet thinking. The 1984 Soviet book on tactics, revised for the first time in almost twenty years, explains that:

The defense can be a forced posture of an intentional posture. It is used in those situations when the offensive is impossible or inadvisable, but also when it is needed as a method of economizing forces and means in some sectors to provide for the offensive on other, more important sectors.²³

Application of the concept at the higher, operational (Army/Front) level of warfare is evident in the General Staff Academy materials. In the lecture materials on operational art, for example, we learn that "Army defensive operations may become necessary in different stages of a Front offensive operation, or, it might be an

²¹Matsulenko, Encirclement, p. 61.

²²Lashchenko, "Encirclement," pp. 21, 22.

²³Lieutenant General V. G. Reznichenko, ed. Taktika (Tactics), (Moskva: Voenizdat, 1984, hereafter, Reznichenko, Tactics, 1984), p. 45.

military district, General of the Army P. Lashchenko, wrote several pages on the subject of "perfecting methods of encirclement and destruction of large enemy groupings." After reviewing World War II experience he devoted several concluding paragraphs to exhorting his readers to recognize the need to improve command and control and use of "mobile troops," aviation, and airborne/air assault forces in carrying out large-scale encirclements "in a future war."²⁰

At first consideration, operational-strategic encirclement appears to be an especially ambitious operation. One might conclude that growing Soviet interest in this type of strategic offensive operation is evidence of tremendous Soviet confidence in the quality of their forces and their great numerical superiority over NATO. While it is true that successful encirclement operations require considerable forces with excellent mobility, the encirclement operation could actually be demonstrated to be an excellent means of making the most efficient use of attacking forces that lack the numerical force superiority to attack successfully in any other way. It is impractical and costly to attack everywhere along an enemy's front. Forces and fires must be concentrated in selected sectors to achieve a penetration. An intelligent attacker concentrates to penetrate the weakest sectors and then exploits initial success by rapidly moving deep into the enemy's defenses. But what are his objectives and what is the risk of his rapid advance when the strongest components of the defending enemy are still largely intact and combat capable? The attacker must somehow use his success against the weakest components of the enemy's forces to help him defeat and destroy his strongest formations. To do this, he must take advantage of his presence deep in the enemy's defenses to quickly attack and disrupt the stronger enemy forces where they are weakest--in their flanks and rear. The attacker must quickly separate the stronger enemy from his combat and logistics support and inhibit his reconsolidation into a stable defensive line. This is the essence of the encirclement--defeating the strongest parts of a defending enemy by attacking his weakest parts and thereby defeating the entire defending force. Clearly, execution of a major frontal attack on the enemy's strongest forces is wasteful of combat resources and time and requires far greater numerical superiority than does execution of encirclement operations.

Soviet authors repeatedly cite the successful encirclement of Paulus' Sixth Army west of Stalingrad as an example of how properly executed encirclement operations can enable an attacker with forces only equal to those of the defender to still defeat and destroy him. The Soviet analysis of that operation is instructive:

²⁰Lashchenko, "Encirclement," p. 31.

Figures 1b and 3 should aid understanding of how this uneven distribution of force is made. "General" force ratios in Figure 1b correspond to force ratios across the entire "zone of advance" in Figure 3 whereas the main sector force ratios in Figure 1b relate to force advantage for the "strike grouping attack sector" in Figure 3.

Figure 1b provides general guidelines to Soviet Front and army commanders concerning the range of desired force ratios for the conduct of offensive operations. The norms indicate that in secondary sectors the Soviets will generally accept parity or a 1.5:1 advantage in maneuver and fire support capability and at least a 1.5:1 advantage in air support. In the sector of the main attack, however, maneuver and direct fire support components in the attacking strike grouping must have at least a 3:1, and preferably a 4:1, advantage over defending forces whereas indirect fire support systems should have a 3-5:1 advantage over enemy systems.²⁷ To calculate force ratios on the main axis, Soviet planners are required to consider forces opposing the attacking Front strike grouping throughout the depth of its mission, which might be 250-350 km.²⁸

To achieve a high, perhaps 4:1, force advantage for his strike grouping, the Soviet commander must take forces from other, secondary, sectors across his entire area of responsibility. If his secondary sectors are left with at least a 1.5:1 advantage, an active defense in those areas might be possible. A 1:1 force ratio may require a less active and perhaps even passive defense. With a 1.5:1 advantage in secondary sectors, the Soviet commander would probably choose to make an uneven distribution of his forces on his secondary axes so he could defend with minimum forces (1:1.5) in some subsectors and attack actively at least to tactical depths in others with a ratio of 2:1 or better. With sufficient forces, commanders in secondary sectors might even attempt tactical encirclement of the enemy as General Lashchenko noted was often the case in World War II.²⁹ If concentration of forces on chosen attack sectors excessively weakens the secondary sectors everywhere, then the commander must achieve the requisite force ratios in the attack sectors at less cost to secondary axes. He can do this by narrowing the penetration sectors of the attack, by acquiring additional forces from his own higher commander's resources, or by fire strikes to weaken the opposing enemy grouping.

A 1978 Soviet article that assessed the contribution of fire support to the success of attacking forces tends to confirm these

²⁷Lecture Materials, "Army Offensive," pp. 34-36.

²⁸ibid., pp. 9, 31, 44.

²⁹Lashchenko, "Encirclement," p. 8.

integrated part of a Front's offensive operation" (emphasis added).²⁴ More specifically, "Defensive operations may... become necessary to ensure economy of force and facilitate the concentration of forces on axes where the offensive operation is to be undertaken..."²⁵ Viewed from a theater strategic perspective we have the direct statement that "The Front's defensive operation on the important axis of the western theater of war usually constitutes a component part of strategic offensive operations, and it is conducted in support of the attack by the main grouping of friendly forces" (emphasis added).²⁶

In applying the offense-defense principle to encirclement we can look upon the Stalingrad operation as extreme, but successful, example of what makes this type of operation work. In most sectors of the line of engagement of the opposing forces the attacker defends (or, more likely, attacks with limited tactical objectives to deceive the enemy as to the true nature of the operational-strategic plan). The attacker borrows forces from these active or passive defensive zones to build a sizable force advantage on selected attack sectors in collections of forces and fires called "strike groupings." The force advantage achieved must be sufficient to ensure a rate of advance in the attack sector adequate to enable the attacking strike grouping to cut off the enemy's retreat before he can escape from the intended encirclement.

To make such an operation work, Soviet planners must consider several factors. The most important decision is the selection of those sectors where they will concentrate strike groupings to penetrate the enemy's defenses and advance deep on converging axes to cut off his retreat. In selecting the attack axes he must at the same time determine the rate of advance the attacking strike groupings must achieve to prevent the enemy's escape from the closing circle. Knowing the desired rate of advance allows him to calculate exactly how much force he must concentrate on the attack axes and hence how many forces will be left in secondary zones to defend or to carry out only tactical-level attacks. If forces are inadequate for the defensive or offensive missions in any sector, then he can resolve the problem in various ways. For example, if the correlation of forces in the attack axes is inadequate he can take greater "risks" as was done at Stalingrad, and borrow more forces from defensive sectors or he can reduce the width of the attack sector to increase the concentration of forces.

²⁴Lecture Materials from the Voroshilov General Staff Academy, "Operational Art" (hereafter, "Lecture Materials, Operational Art"), p. 25.

²⁵Lecture Materials, "Operational Art," pp. 25, 26.

²⁶Lecture Materials, "Front Defense," p. 4.

data.³⁰ The graph in Figure 2 is derived from Table 1 in the article. The vertical axis represents the probability that the attack by the supported maneuver unit will be a success and the horizontal axis the force ratio of attacking Soviet tanks to defending enemy forces (antitank weapons, artillery, etc.), after Soviet fire support systems have "adjusted the force ratio" through attrition of defending forces. According to the author "...reliable success can be achieved when there is a ratio of 5:1 or more in favor of the attacker..."³¹ which results in a "... .92 or greater probability"³² that the attacking unit will achieve its objectives. This might lead one to conclude that the Soviets would strive for a 5:1 force ratio on the main strike axis (after calculation of the effects of initial preparatory fires) at least to the depths of the immediate tactical objective (12-18 km). A lesser advantage of 4 to 4.5:1 might then be acceptable as the attacking force advances to deeper objectives. In any case, Soviet planners can be expected to be very conservative in calculating force ratio requirements - especially for the axes of the main attack.

Executing the Encirclement - the Offensive

An operational-strategic encirclement operation would be carried out by a group of Fronts within a Theater of Strategic Military Action (TSMA) under direction of the high command of forces in the TSMA. An operational scale encirclement would be planned and executed by a single Front or army whereas a tactical encirclement would be accomplished by a tactical level unit such as a corps, division or regiment. This paper focuses on the operational-strategic scale encirclement. In such an operation the actions of Fronts directed by the High command in the TSMA to generate "strike groupings" to encircle the enemy will be examined as the offensive component of the encirclement and the actions of the Front directed essentially to hold in the middle by encircling at tactical depth or defending will be examined as the defensive component of the operation.

This discussion relates to an encirclement executed on two attack axes by two different Fronts that are separated by a "defending" Front in between. Other variants exist. Two adjacent Fronts might execute the encirclement in which case their "outside" armies execute the encircling attacks and their "inside" armies share the holding mission. In still a third variant, a Front executes a deep single envelopment to trap a defending enemy against a natural obstacle such as a sea coast or mountain range. The attacking

³⁰General-Lieutenant of Artillery Yu. Kardashevskiy, "Tvorcheski planirovat' ognevoye porazheniye tseley" (Plan Fire Destruction of Targets Creatively), Voyenniy Vestnik, No. 7, July 1978, pp. 64-67.

³¹Ibid., p. 64.

³²Ibid., p. 67.

Figure 1b

Correlation of Forces in Main Attack Sectors and Secondary
(Active/Passive Defense) Sectors

(Indicated as Relative Superiority over Opponent, X:1)

FORCES AND MEANS	LAST OPS OF WWII		CONCEPTS OF 1943-1953		WITH NUCLEAR EMPLOYMENT		WITHOUT NUCLEAR EMPLOYMENT	
	GENERAL	MAIN SECTOR	GENERAL	MAIN SECTOR	GENERAL	MAIN SECTOR	GENERAL	MAIN SECTOR
MOTORIZED RIFLE BATTALIONS	1.4-5.5	3.0-4.5	1.1-1.5	3.0-4.0	1.0-1.5	2.0-3.0	1.0-1.5	3.0-4.0
TANKS & SELF PROPELLED ARTILLERY	1.1-6.0	4.5-9.0	1.5-2.0	3.0-4.0	1.0-1.5	2.0-3.0	1.0-1.5	3.0-4.0
ARTILLERY	1.5-6.5	4.2-8.5	1.5-2.0	3.0-4.0	1.0	1.5-2.0	1.0-1.5	3.0-5.0
AIRCRAFT	2.0	3.5	1.5	2.0	1.0	1.0	1.5	2.0

Source: "Lecture Materials from the Voroshilov General Staff Academy, Army Offensive"

Front may or may not be assisted by a second Front fixing enemy forces immediately along the coast.³³

The encirclement operation itself involves two major, normally, overlapping phases; the establishment of the encirclement, and the destruction and/or capture of the encircled enemy force. The combat force that is formed to penetrate enemy defenses and lead the formation of a "pincer" of the encirclement is called a "strike grouping" (udarnaya gruppirovka).³⁴ "Strike grouping" is simply the way Soviet planners identify that group of Front forces intended to advance on the Front's main axis and usually comprises the larger part of the Front's combat capability to include tanks, artillery and missiles, air assault forces, helicopters, fighter-bomber aircraft (from the Front's air army) and mobile logistics support. In terms organization for combat the strike grouping would normally include a first echelon, an operation maneuver group consisting of an army corps (slightly larger than a division) or a small army (2 to 3 divisions), a second echelon or reserve, and most of the Front's air army. Exactly how much of a Front's total combat capability goes into the strike grouping depends on the kinds of considerations discussed above. The most important consideration is the rate of advance the planners believe they would need to cut off the enemy's retreat. This, in turn, would determine the force advantage the "strike grouping" would require.

As suggested earlier, the width of the Front's penetration sector where the strike grouping will attack may vary depending upon the force ratios required in the penetration sector and across the Front's entire zone of responsibility. The Front's entire zone of responsibility may be from 300 to 400 km wide³⁵ - whereas the strike groupings penetration sector would be no narrower than 20 to 25 km³⁶ --and might be as wide as 50 km³⁷--in which case it could include two or more subsectors (See Figure 3). The forces

³³Lashchenko, "Encirclement", p. 23.

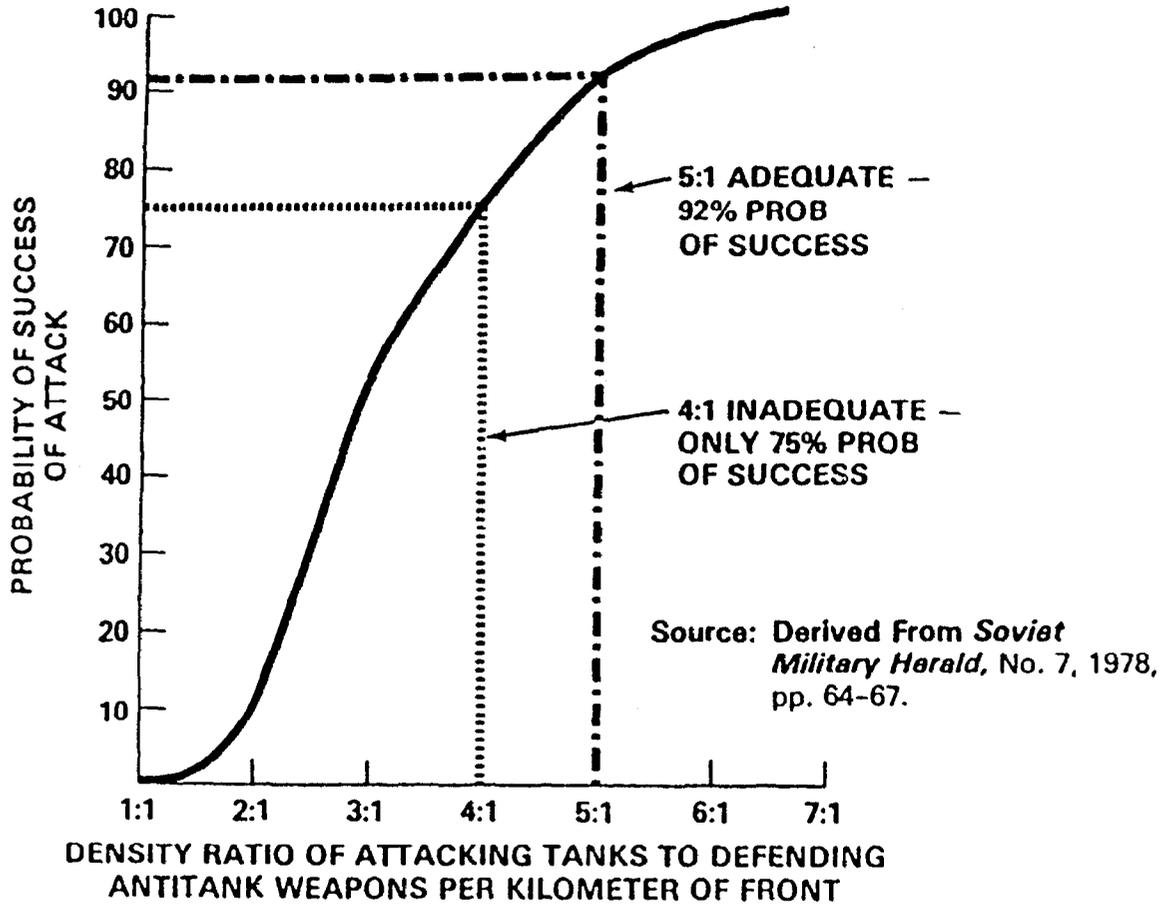
³⁴Udarnaya gruppirovka (Strike Grouping), SVE, Vol. 8, (Moskva: Voyennizdat, 1980), p. 172. The obsolete term is "strike group" (udarnaya gruppa), defined in the same source. Soviet operations research literature and recent historical studies on encirclement and its relevance to modern conditions consistently use the modern term, "strike grouping".

³⁵Lecture Materials, "Operational Art," p. 24.

³⁶Lecture Materials, From the Voroshilov General Staff Academy, "Command and Control at Front and Army Levels" (hereafter lecture Materials, "Front Command and Control"), p. 43.

³⁷Penov, History, p. 449. Panov indicates that individual penetration sectors would no exceed 20 km even when the total width of all penetration sectors was 50 km.

**FIGURE 2.
ATTACK SUCCESS PROBABILITY AS FUNCTION OF
CORRELATION OF FORCES**



comprising the strike grouping would converge on the penetration sector and advance on several routes trying to avoid a dangerous level of force concentration until they are within the enemy's nuclear safety fan. The first echelon divisions of the first echelon (normally combined-arms) army of the strike grouping would strive to penetrate opposing first echelon divisions. Once defending divisions have been penetrated (ideally no later than by the end of the first day), the operational maneuver group (OMG) would be committed to quickly advance, under air cover and in conjunction with air assault and airborne forces, to those objectives that would both prevent enemy withdrawal and inhibit the approach of reserves from the depths. The OMG in such an operation would be the Front-subordinated OMG or the Army-subordinated OMG--not both. It is likely that an army OMG would be committed in those sectors where a Front-subordinated OMG would not be available.³⁸ Early commitment of an Army-subordinated OMG against initial encirclement objectives and subsequent commitment of a Front-subordinated OMG against deeper raid objectives is also possible (See Figure 4). Second echelon divisions of the first echelon armies would then be committed to exploit the success of the first echelon and develop and strengthen the inner front of the encirclement. Once the OMG, in conjunction with airborne and air assault forces, has secured or destroyed the routes of withdrawal of the encircled enemy, it would proceed to develop the outer front of the encirclement and attack toward deeper objectives.

Soviet planning seems increasingly to rely rather heavily on certain types of forces (air assault, airborne and OMGs) being able to exceed in their mobility, the mobility of the defending enemy. In some regions, the mission that drives this requirement to be able to outmaneuver the enemy is that of preventing the enemy force from withdrawing behind a major water obstacle--such as the Rhine in the central region. The General Staff Academy lecture materials on Front troop control attest that, "The most important tasks are to destroy the enemy forces before they manage to withdraw to the river line and establish a defense on the river."³⁹

The 1983 book on encirclement operations cited the Yassko-Kishinevskiy encirclement operation as an especially valuable example of the rate of advance being driven by the presence of a major river to the enemy's rear and the utility of mobile units in ensuring the operation's success:

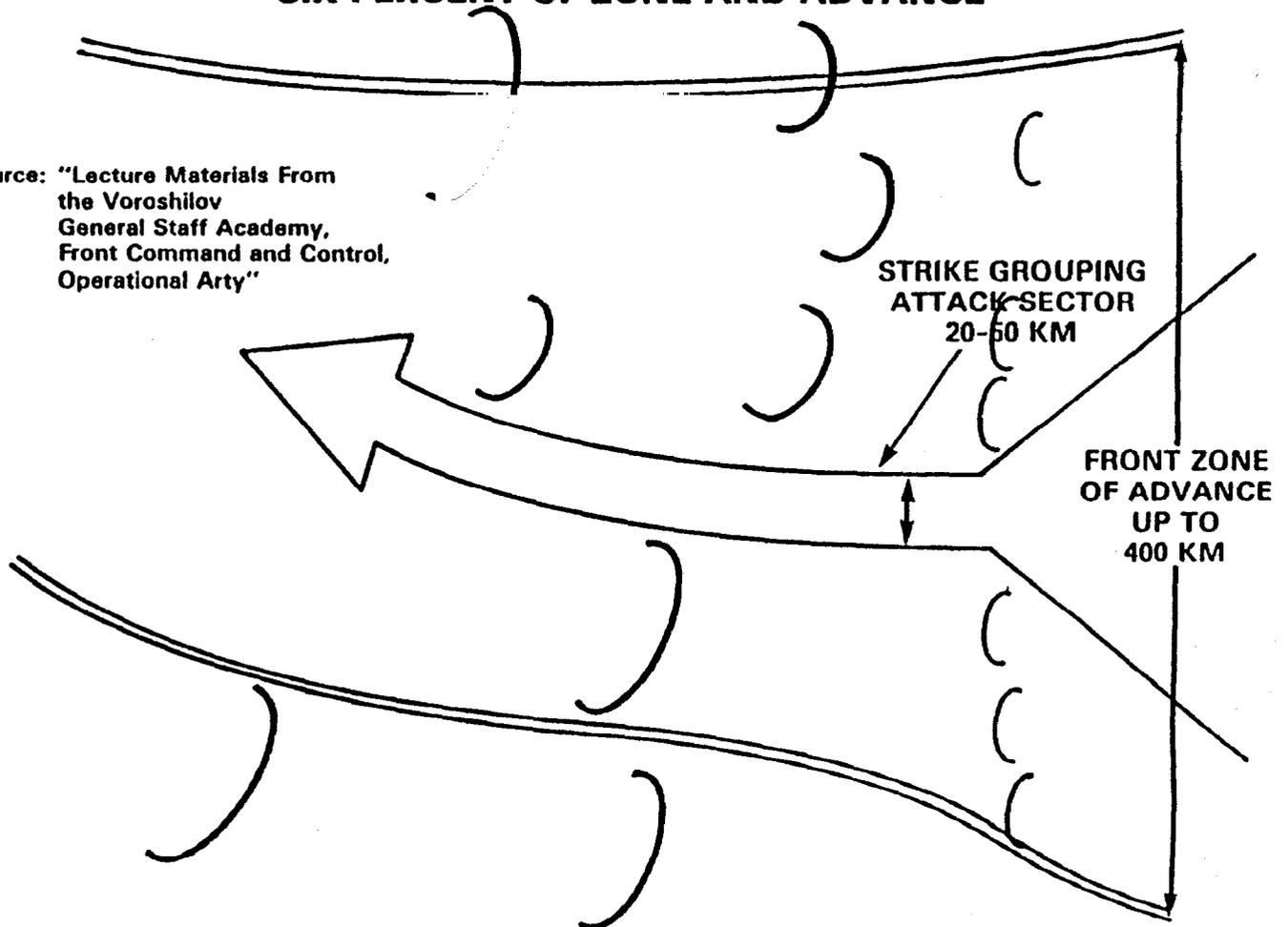
The average distance of the forces being encircled from the closest crossing point of the river Prut was about 100 km. The enemy was able to begin withdrawal from positions northeast of Kishenev no earlier than the second day of the Soviet forces' offensive. Consequently,

³⁸Ibid.

³⁹Also see Lecture Materials, "Army Offensive," p. 121.

**FIGURE 3.
THE FRONT ATTACK SECTOR –
SIX PERCENT OF ZONE AND ADVANCE**

Source: "Lecture Materials From
the Voroshilov
General Staff Academy,
Front Command and Control,
Operational Army"



the rate of advance of our rifle regiments had to average no less than 20 to 25 km [a day], but our mobile large units (soyedinenoye) had to average 35 to 40 km, which was what was actually achieved in the course of the operation. Moreover, our rates of advance did not permit the enemy to develop any kind of countermeasures.⁴⁰

In this instance the "mobile" units moved out ahead of the less mobile units at a rate of advance that would allow them to cut off enemy withdrawal in time.

In summarizing the roles of the various forces in the encirclement operation General Lashchenko made very clear that the mobility differentials of the mobile group were not only a function of its more mobile equipment (today, primarily a large complement of helicopters) but of its mission which was not to destroy large enemy groupings but to avoid them in the interest of quickly getting to the primary objectives such as river crossing sites, mountain passes and road junctions. Although the General uses the term "mobile group" in this particular statement, it is the most thinly disguised reference to an OMG this writer has seen in the Soviet press. [Lashchenko's use of the plural assumes at least a two-Front encirclement.]

The initial stage of the encirclement was normally the penetration of the enemy's defenses in several sectors. The combined-arms large unit (soyedineniye) played the leading role in this. Then the mobile groups of the armies and Fronts were introduced into the penetration and they, with air support, quickly advanced into the depth of the enemy's defenses and were the first to lock the ring of the encirclement and, after transferring [responsibility for] the inner front [of the encirclement] to large rifle units (soyedineniye) and large formations (obyedineyiye), they rapidly developed the offensive on the external front. They engaged in battle with enemy reserves and especially with enemy garrisons only in those situations when it was necessary for successful maneuver in achieving the encirclement. The combined-arms large units followed the mobile groups, thickened the ranks of the formations around the encircled group and, at the same time, inhibited or prevented the encircled group's movement out of the encirclement (emphasis added).⁴¹

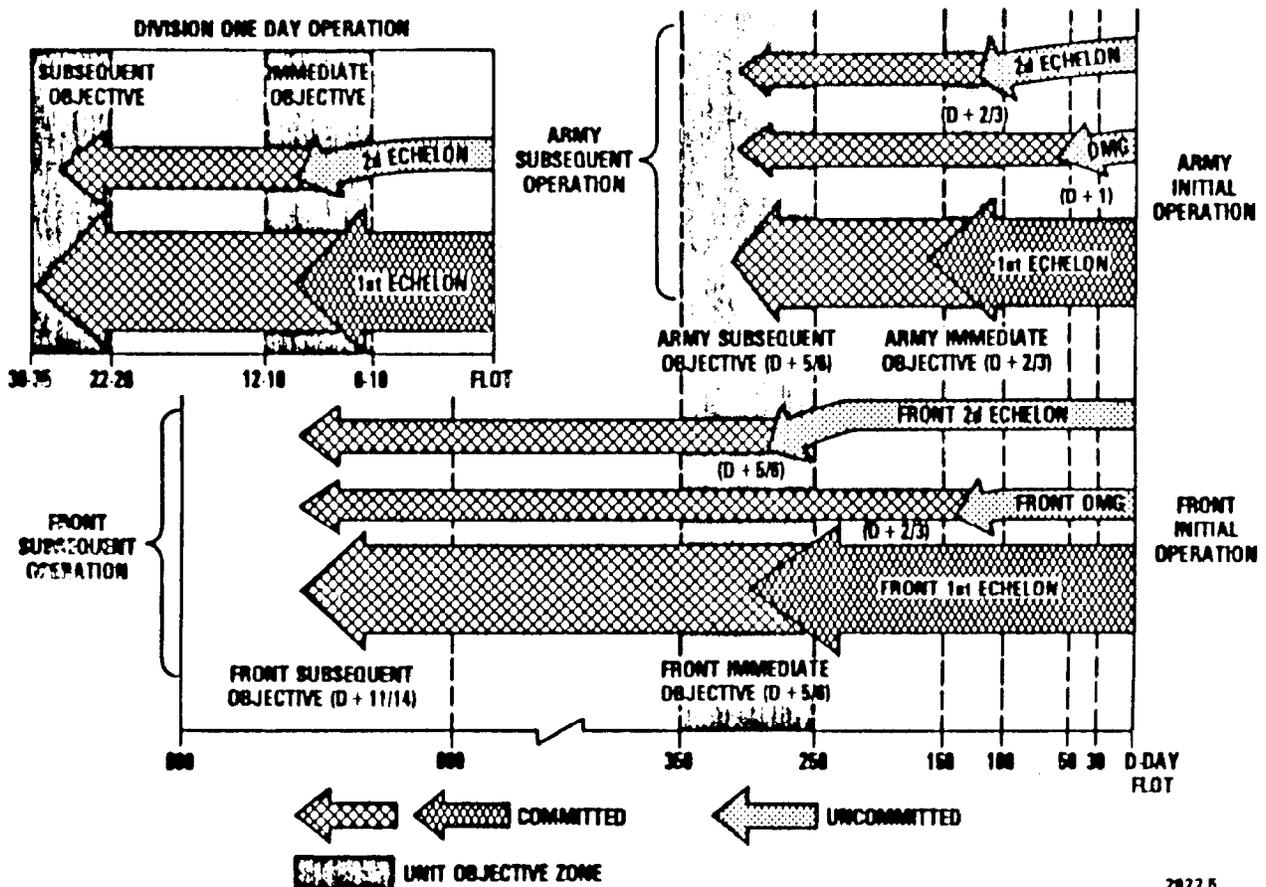
Lashchenko and other authors applying World War II lessons to modern conditions basically agree on the missions various forces would perform and what the requirements would be in a future war.

⁴⁰Matsulenko, Encirclement, pp. 61, 62.

⁴¹Lashchenko, "Encirclement", p. 26.

Figure 4.

FRONT OFFENSIVE PLANNING FACTORS



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Sources: "Lecture Materials from the Voroshilov General Staff Academy: Operational Art, Front Command and Control, Army Offensive." Also, see B.V. Panov, ed. History of Military Art, Moscow: Voenizdat, 1984 and V.A. Matsulenko, Encirclement Operations and Battles, (Moscow: Voenizdat, 1983) and John G. Hines and Phillip A. Petersen, "The Soviet Conventional Offensive in Europe," Military Review, No. 4, 1984.

General Lashchenko drew a special lesson from one aspect of World War II experience which he thought might be especially relevant in a future war. He noted that the encircled German forces were sometimes defeated not where they were encircled but in the course of their attempts to break out of the ring. Such attacks tended to speed up the enemy's destruction process. The General concluded that this might be a frequent occurrence in a future war "insofar as the probable enemy, to all appearances, will dispose of mobile troops, strong in terms of both firepower and striking power, and will render the encircled large units the aid of large forces dropped in by air."⁴⁸

Framing the Encirclement - The Defense

Selecting secondary axes and allocating adequate resources to their active or passive defense may be almost as important to the overall success of the encirclement as proper selection and weighing of the primary axes of attack. Secondary axes are established opposite the strongest enemy forces with the assumption that the enemy might attempt to attack in those sectors. Depending upon the correlation of forces, the Front in a secondary sector may have to be largely passive relying for security on at least three layers of defense and a mobile reserve (See Figure 5) or it might be so active that opposing forces are convinced, for some time at least, that they are on the axis of the main attack.

Even when the Front is forced initially to defend, it would actively seek opportunities to counterattack and thereby make a greater contribution to the overall effort to encircle a large group of the opposing enemy forces. In the lecture materials on the Front defense we learn that even when the enemy has succeeded in making some penetration of Soviet defense...

The most favorable conditions for the Front's counterattack will be available when the Front's defending troops maintain their combat capabilities and firmly hold the defensive positions at the flanks of the penetrating enemy and when the enemy attack at the Front line is delayed by friendly troops, the enemy is suffering heavy losses and has committed its immediate reserve.⁴⁹ In this scenario, the Front on a secondary axis, defending perhaps at a 1:2 disadvantage, could still make a major contribution to the overall encirclement operation by drawing out and inflicting losses on the strongest enemy formations. Moreover, if the enemy has committed even his "immediate reserves" as the price of whatever success he has enjoyed, those reserves would no longer be available for his flanks and

⁴⁸Ibid., p. 31.

⁴⁹Lecture Materials, "Front Defense", p. 82.

The second echelon of the encircling Fronts (perhaps an army per Front) would focus primarily on exploiting beyond the encircled force toward subsequent Front objectives, following the lead, in many cases of Front or Army OMGs.⁴² First echelon armies, especially their reserve or second echelon divisions and fire support, would be expected to quickly fragment and destroy the encircled enemy.

Rapid destruction of the enemy is an extremely important phase since the encircled force is typically the enemy's strongest. In the absence of considerable pressure, the encircled enemy is a tremendous threat to the flanks and rear of the Soviet strike grouping that has succeeded in penetrating weaker enemy sectors adjacent to the encircled force. Therefore the encircling Fronts' first echelon armies would strive to keep pressure on encircled forces at the same time that their second echelon armies develop the offensive.⁴³ The Soviets do not believe they would need to maintain a continuous Front around the encircled enemy but would need only to control main routes of withdrawal. This would free forces to attack, split, isolate, and destroy the encircled enemy in detail.⁴⁴ Lashchenko warns that if the destruction phase is done half-heartedly it can result in failure enabling the enemy to escape and establish a second line of defense. It must be a major, fully coordinated attack over several axes on a scale worthy of the being called an "operation".⁴⁵

Matsulenko cautions that the destruction process will take time, that it would have to be done sequentially rather than simultaneously because of the use of only conventional weapons for the operation. Lashchenko seems to have a little more faith that "modern weapons and military technology" can nonetheless provide for "the total defeat of enemy groupings of forces in short periods of time."⁴⁶ This, of course, assumes the availability of a great deal of artillery, missile, and air power to quickly reduce the encirclement. As the General noted, in commenting on World War II experience, if the enemy were able to retain or achieve superiority in the air, both the encirclement and destruction phases of the operation were seriously threatened with failure.⁴⁷

⁴²Matsulenko, Encirclement, p. 230.

⁴³Ibid., p. 227.

⁴⁴Shtrik, "Encirclement", p. 190

⁴⁵Lashchenko, "Encirclement", p. 26-27.

⁴⁶Ibid, p.31.

⁴⁷Ibid., p. 30.

rear, soon to be attacked by powerful "strike groupings" launched by Soviet Fronts against weaker neighboring formations. In succeeding tactically, the enemy would have accelerated, perhaps, his operational-strategic demise.

A more likely, and certainly preferred case for the Soviets is one in which they at least enjoy parity with the enemy on secondary axes. This would enable the Soviet commander to defend very lightly (1:2) in some sectors and perhaps to attack in others. In any case, a 1:1 force ratio allows the Soviet Front to extract a higher price from the enemy for whatever success he might enjoy and thereby contribute that much more to the success of the overall encirclement operation. The General Staff lecture materials on Front defense explain that:

Defensive operations may...be assumed when the defending forces are in parity with those of the enemy or even superior to the opposing enemy troops. In such cases, the aim of the defense will be to inflict casualties on the enemy by defensive action, followed by initiation of an attack against an already-exhausted enemy in the manner of operation conducted in the salient at Kursk in 1943. In modern conditions, without the employment of nuclear weapons, such a development is not excluded (emphasis added).⁵⁰

As the encirclement closes and begins to take its toll on enemy combat power, command and control cohesiveness, and logistics support, the "defending" Front can then initiate more aggressive attacks in conjunction with encircling Fronts in the destruction phase of the operation.

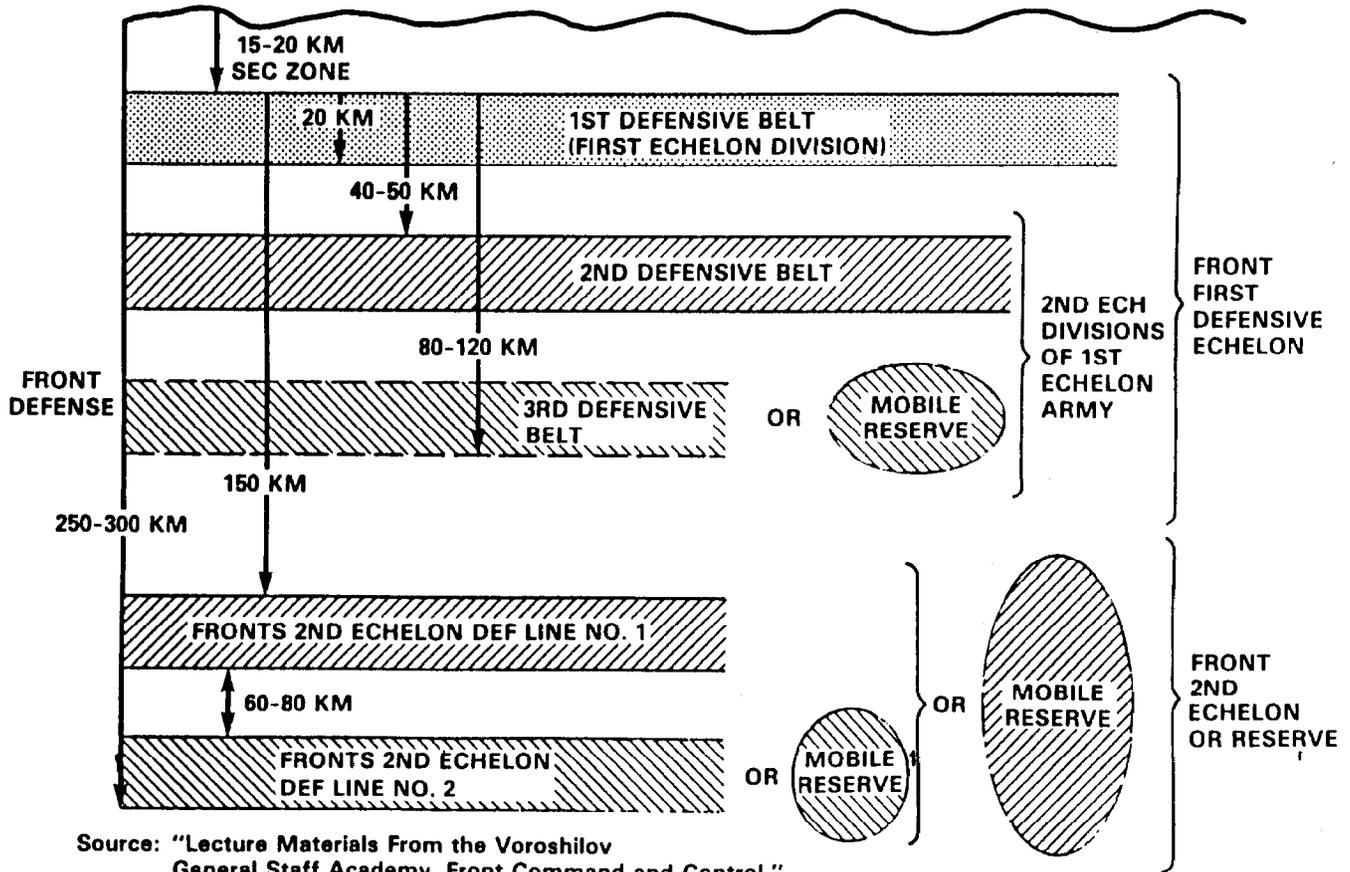
One might ask how the Front on the secondary axis would respond to a major enemy penetration followed by sustained success. Initially, the Soviet Front commander would attempt to contain the penetration in his first tactical and then first operational defensive echelons (See Figure 5). His first operational echelon (1st echelon defending armies) would be 100 to 120 km deep and consist of two division defensive belts deployed in depth plus an immediate operational reserve or three defensive belts in the first echelon zone. If his Front is defending lightly, then the commander is more likely to use two division belts and a mobile reserve. The Front's second echelon defense would begin at about 150 km⁵¹ in depth and, depending on the size of the second echelon or reserve, consist of one or two defensive belts or a mobile reserve which would defend to a depth of 250 to 300 km.⁵²

⁵⁰Ibid., p. 3.

⁵¹Lecture Materials, " Front Command and Control", p. 22.

⁵²Ibid.

FIGURE 5. FRONT DEPLOYMENT FOR DEFENSE



Source: "Lecture Materials From the Voroshilov General Staff Academy, Front Command and Control."

Source: "Lecture Materials From the Voroshilov General Staff Academy, Front Command and Control"

overall defense by extracting the maximum benefit from its combat potential in a multi-layered combination of mobile and "pocket" defensive positions supported by long-range, accurate weapons system.

Implementation-Western Theater of Strategic Military Action

There almost certainly exist in the files of the General Staff a well-developed Soviet plan for encirclement of "large groupings" of enemy forces in the Central Region. In planning encirclements in World War II, Matsulenko notes approvingly:

At the scale of Front, and often even on the scale of army [smaller than Front], planning was characterized by a high degree of centralization, mainly at the level of Headquarters of the Supreme High Command (Stavka, V GK). And this practice was vindicated during the war because it made it possible to quickly mass forces and means on the most important directions.⁵⁶

He noted that, in the East Prussian encirclement operation the main directions of attack that were to develop into the pincers of the encirclement were more than 200 km apart. In this instance it was especially important that the actions of the attacking formations "be strictly approved and coordinated by the Headquarters of the Supreme High Command."⁵⁷ Lashchenko noted that, execution of encirclement operations, "in a future war will demand...even more centralized and flexible, firm and continuous troop control, above all with the help of automating the troop control process." We should expect that all operations will not be run out of the V GK, but it is safe to assume that variants of the initial set of operations have been drawn up and approved at that level for execution and coordination by the more recently established High Commands of forces in the various TSMAs.

What would such a plan consist of? Where would the Soviets choose to make their main attacks and where would they establish active and passive defense? To help answer that question we might turn to the planning considerations listed under "Combat Situation" in the Soviet Military Encyclopedia. Of the many factors mentioned, let's select three that would most directly help to answer these questions: the nature and combat capabilities of the enemy, the terrain, and types of mission (the offense-defense factor).⁵⁸

⁵⁶Matsulenko, Encirclement, p. 50.

⁵⁷Ibid., p. 58

⁵⁸"Boyevaya obstanovka" (Combat Situation), SVE, Vol. 1, (Moskva: Voenizdat, 1976), p. 514.

In Europe a Front would defend in a sector 350 to 400 km wide. Gaps between forces would be covered by fires and obstacles. Each of the Front's two mobile obstacle detachments, each of battalion size, can mine one sector five km wide and 18 sectors 2 km wide.⁵³ In addition, Front multiple rocket launchers and army subordinated helicopters would supplement the engineers with their remote mine-laying capability.

In using the Front reserve or second echelon in the defense, the basic Soviet tenet is to counterattack an inferior attacking enemy force but to defend against and inflict losses upon a superior enemy until the High Command above the Front makes additional forces available for a counterattack or counteroffensive.⁵⁴ If Soviet forces themselves become encircled they are to continue to cause the greatest possible damage to the encircling enemy rather than to attempt to breakout which would greatly dissipate the encircled formation's combat power. "Such troops are given permission to attempt breaking the encirclement, only when their actions in the encircled position prove to be useless."⁵⁵

These principles and the Soviets' well-developed concept of operational-strategic scale defense could make initial success against a Soviet Front ultimately more costly to the attacker than would initial failure. For example, an operational tactical formation such as a U.S. Corps might not want to fully exploit initial success into the operational depths of the Soviets' defenses unless there were assurances that operational and operational-strategic size reserves would follow within hours or at least within a day or two. Provision for the availability of reserves or follow-on echelons against unfavorable contingencies as well as opportunities is an integral part of Soviet doctrine and organization for combat. A Soviet Front reserve in trouble might be rescued by a TSMA reserve army comprised of two to five divisions. To attack a force thus organized without similar provisions for timely, large-scale reinforcement, could lead to the rapid dissipation of the combat power of the attacking corps. Without very large reserves the corps might better serve the

⁵³Lecture Materials, "Front Defense", p.54. Also see Lecture Materials, "Army Offensive", p.17.

⁵⁴"...When the enemy intensifies the power of its attacks and continues to exploit its attack into the depth of the defense while the Front troops suffer heavy losses, the counterattack of the Front's second echelon troops and reserves may not seem advisable. In this case, it will be better for the Front's available reserves to be employed to inflict losses on the enemy from defensive positions. The Front's counterattack will be launched later, after it is reinforced by the supreme commander's reserves," Lecture Materials, Front Defense," p. 86.

⁵⁵Ibid., p. 80.

It is clear from these various sources that Soviets consider U.S. and Dutch forces to be the extremes within the central region in terms of having the most and the least combat capability per kilometer of front, respectively. Some indication of where the other NATO national corps stand in the Soviet estimates of combat capability might be inferred from a recent Soviet book on NATO operations and combat. The book's authors characterized every NATO national corps in the central region with the exception of the Belgian and Dutch corps. All the corps were called large units (soyedineniye) which in the Soviet military lexicon is a tactical formation. (A Soviet army is considered a obyedineniye, i.e., a full-scale operational formation.) Of these tactical units only the U.S. corps was characterized as an operational-tactical large unit. The French, British, and German corps were identified only as "higher tactical" large units. Of the latter three, only the German corps is acknowledged to function in some ways as an operational-tactical large unit in that it is assigned missions within NATO of not only tactical but also of operational importance.⁶²

This and other discussions of the merits of various NATO forces strongly suggest that the Soviets consider the U.S. and German Corps to have the greatest combat capability, the Dutch and possibly the Belgian Corps the least. The potential of the British and French Corps falls somewhere in between.

Given this evaluation, the logic behind planning for large-scale encirclement leads to the creation of a scenario similar to that shown in Figure 6. This assessment is reinforced by other considerations related to the Soviet special-situation considerations of terrain and offense-defense. The sectors assigned to the U.S. corps and the German III and II Corps is perhaps the best defensive terrain in the NATO Central Region. In the Soviet assessment, then, they find NATO's most powerful corps defending the best terrain. From the perspective of a Soviet planner, three important planning considerations (combat capability, terrain and defense) strongly favor the NATO corps with the greatest combat capability. This sector is a perfect candidate for selection as a secondary, perhaps even defensive axis. This choice would be strengthened by the assessment that perhaps even better defensive terrain along the interstate borders lies opposite the U.S. and German Corps enabling the Soviets to defend rather cheaply if they chose to and thereby make more forces available for formation of strike grouping through the Belgian, British and Dutch sectors. As depicted in Figure 6, the Soviets might try to use some of the forces made available to send a "strike grouping" on a more difficult mission up the Danube through the German II Corps sector to close the encirclement of the U.S. and German Corps from

⁶²Nikolay K. Glazunov and Nikolay S. Nikitin, Operatsiya i boy (Operation and Battle), (Moskva: Voenizdat, 1973, pp. 70, 169, 258, 266.

Let's consider first how the Soviets are likely to evaluate the enemy. Matsulenko noted that in trying to choose the main attack sector, World War II Soviet planners tried to choose the shortest route to closing an enemy grouping in an encirclement - which was largely a function of how the opposing forces were deployed with relation to each other. He made a special point to emphasize and illustrate, however, that:

In the majority of operations, independent of the configuration of the frontline, that is to say independent of the disposition of forces with respect to the enemy, the main attacks were made against the enemy flanks in his weakest sectors and zones. For example, in the counterattack at Stalingrad, forces of the Southwest Front ...made the main attack on the royal Romanian forces which were far less combat capable in comparison to the main attack of the Second Ukrainian Front...came between the fortified regions Yassy, Tyrqu-Frumos against the Romanian forces, and the main attack of the Third Ukrainian Front...was made in the gap between the Sixth German and Third Romanian Armies. As a result, large forces of the fascists troops were encircled and destroyed.⁵⁹

Indications are very clear that the Soviets evaluate opposing enemy alliances in this way today. We see in the lecture materials that,

The requirements of artillery support for the breakthrough are determined by the number of targets, the width of the zone of penetration...the type of national divisions of enemy forces (divisions of different countries) and the organization of artillery groupings.⁶⁰

The Soviets are even more specific elsewhere in the lectures.

In the absence of concrete information or in peacetime, the amount of required artillery in a Front is calculated on the basis of a 20 to 25 km of front which is the width of the enemy's division defensive area. Across such a frontage, 90 to 100 pieces of artillery per one kilometer of Front (against Dutch divisions) or 100 to 200 pieces of artillery per one kilometer of front (against U.S. divisions) is considered as required....⁶¹

⁵⁹Matsulenko, Encirclement, p. 55.

⁶⁰Lecture Materials, "Front Command and Control", p.44.

⁶¹Lecture Materials from the Voroshilov General Staff Academy, "Combat Employment of Rocket (SSM) Troops and Artillery in the Front Offensive Operation", p.8.

the south. Active or even passive defense against the U.S. V and VII Corps may be seen as increasingly more appropriate as the Soviets have come to view the U.S. Airland Battle doctrine as largely offensive in nature.⁶³ Air Land Battle executed by the U.S. corps could be seen as a potential threat to a plan of encirclement if it were not contained.

The scenario in Figure 6 assumes at least two weeks mobilization. Conservative Soviet planning described earlier would lead them to prefer to have as many forces forward as the terrain would allow. They might try to achieve covert mobilization before striking rather than to try to attack unreinforced. Loading the first operational echelon would help to ensure success on the main strike axes and might allow Pact armies on secondary axes to be offensively active to tactical and perhaps even operational depths. Aggressive action on the secondary axes tends to draw off reserves from the stronger corps and speed up the encirclement process. This scenario does not exclude other scenarios involving, for example, only two Warsaw Pact Fronts. A two Front attack would normally assume a very short warning situation in which NATO defense would probably not be fully deployed.

In the NORTHAG region, terrain would not be the most important factor prompting encirclement of German I Corps. In this case, the difference in combat capabilities between the German Corps and its neighbor's would encourage the Warsaw Pact to encircle through the British and Dutch sectors rather than to engage in a more time-consuming head-on attack.

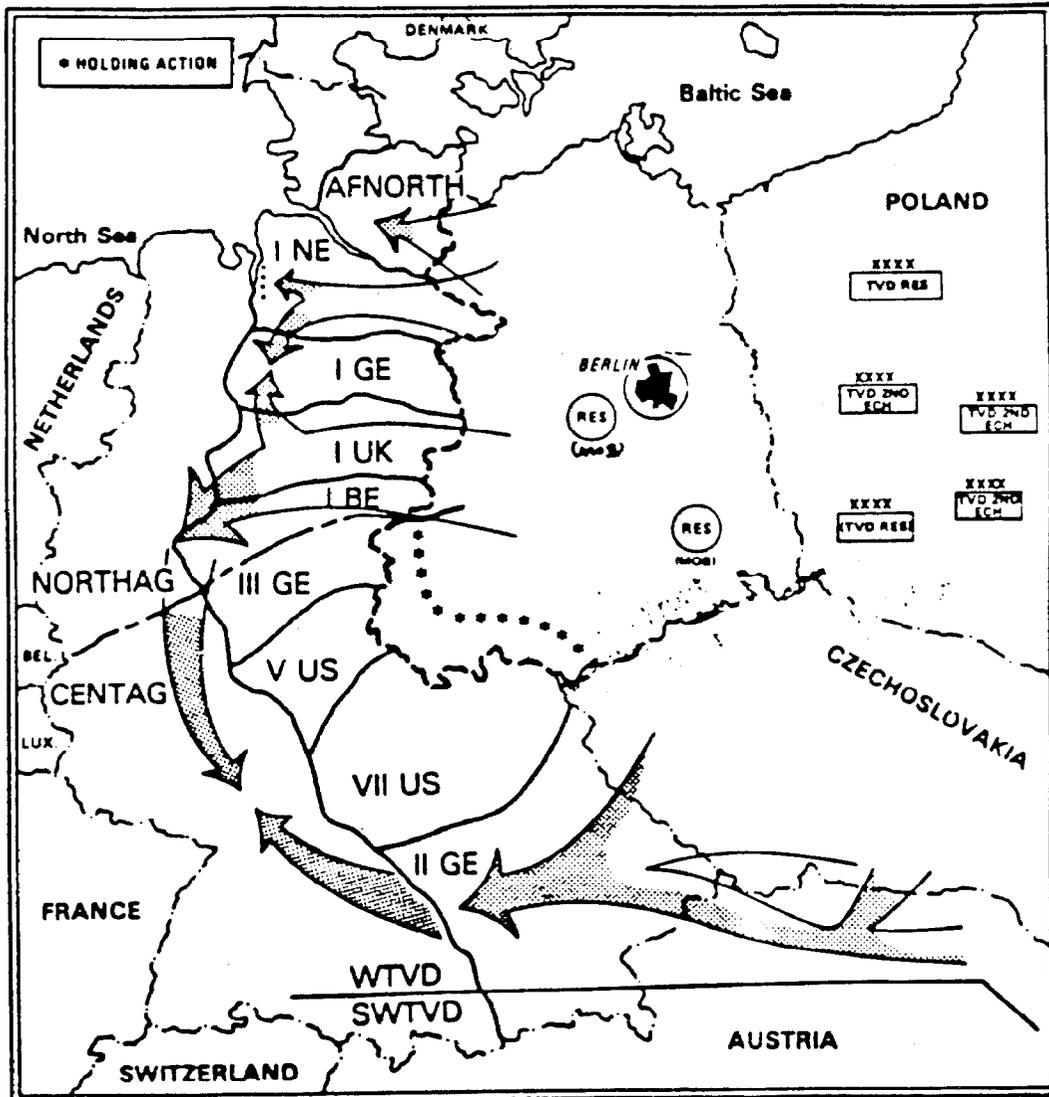
Implications for NATO

The implications of this study might be divided into the two general categories of operations and arms control. Implications in the area of operations and operational control bear directly on arms control considerations. Understanding operations in which large numbers of forces would clash helps to promote understanding of why numbers of various kinds of forces make a difference on the battlefield and hence are important at the negotiating table.

A major conclusion one might draw from this paper in the area of operations is that the Soviets seriously and "scientifically" examine the strengths and vulnerabilities of their opponents in devising plans by which to defeat them. They appear to be conservative in their estimates of their own capabilities and perhaps overly generous in their estimates of ours. This leads them to plan operations that provide a hedge against NATO achieving

⁶³V. Kozhin and V. Trusin, "Questions on the Application of Armed Forces in Operations" (According to the Views of NATO Specialists), Zarubezhnoye voyennoye obozreniye (Foreign Military Review), No. 10, October, 1983, pp. 18, 19.

FIGURE 6
 POSSIBLE WARSAW PACT ATTACK VARIANT
 IN THE WESTERN THEATER OF MILITARY ACTION (TMA)



Source: Analysis based on "Lecture Materials from the Voroshilov General Staff Academy, Front Command and Control, Operational Art;" A classified Soviet Military writing from the early 1980's; O. Ponomarev in Military Thought, No. 4, April 1976, and No. 2, February, 1977; and open sources.

- The elimination of long-range, conventional ballistic and cruise missiles whose combat effectiveness (a function of rapid target acquisition, speedy communications and terminal accuracy) is dependent on technologies in which the West is perceived to enjoy a marked advantage. The Soviet military cannot include computers and microelectronics in an arms control agreement so they must try to eliminate weapons whose range makes such technological superiority important. NATO's forecasted ability to countermass with deep-strike systems against Warsaw Pact forces seeking penetration and encirclement of NATO's corps seriously undermines Soviet military expectations of success. Ideally, NATO long-range conventional missiles would be eliminated as dual-capable nuclear systems given the relatively low popularity of nuclear weapons among many European members of NATO. The implication for NATO is that we must distinguish between conventional and nuclear deep-strike weapons both in our weapons development and at the negotiating table and seek to protect our ability to exploit an important conventional technological advantage.
- A radical, asymmetrical reduction in the number of NATO aircraft. NATO air seriously threatens the prospect of success of any large-scale Warsaw Pact offensive or counteroffensive operations. The Soviets have been planning to use conventional theater ballistic missiles to help to offset the perceived NATO advantage in airpower. They would much prefer to achieve this goal with far greater certainty of success at the negotiating table. Airpower is the next most important component of NATO's deterrent after nuclear weapons. This implies that NATO must be extremely cautious in future agreements about the removal and above all, disposition, of NATO aircraft. Some NATO air might be removed from the European theater if the Soviets were to reciprocate with a significant drawdown in tanks and artillery. NATO should be reluctant, however, to destroy airframes and the airbase infrastructure in Europe that would support NATO air operations in the event of war.
- An agreement that would leave the Warsaw Pact control and logistics infrastructure intact. The Soviet concept of the counteroffensive or offensive followed by large-scale encirclement actually permits initiation of operations with only marginal advantages over the enemy in numbers of forward-based forces. Forward armies would achieve penetration and initial exploitation through deliberate uneven distribution of available forces supported by temporary defense on the non-main-attack sectors. Decisive closure of encirclements and, especially, destruction of encircled NATO corps would be accomplished by forces moving from the Western Soviet Union. If the wartime support infrastructure is left intact in Eastern Europe, the Soviets could much more easily take advantage of their probable

success in some isolated sectors and that help them to avoid major, head-on confrontation with our strongest forces.

In defending against such a Soviet plan no one nation could guarantee the safety of its own troops much less the security of the alliance. We, as an alliance, have to recognize our weaknesses as thoroughly as do the Soviets and develop an operational-strategic concept of defense that denies the Soviet operational-strategic planners the opportunities they now see. Such a defense would require greater depth, more cohesive operational command and control and, perhaps a redistribution of national forces. It is especially disturbing that, as NATO improves its conventional and nuclear defenses, we might even achieve overall military superiority in forces and yet remain at great risk of defeat in the event of a war because we lack a cohesive operational strategy for how to best use those forces in our defense.

Another lesson to be drawn from this study is the great importance of airpower. As Lashchenko admitted, encirclement under conditions where the enemy has air superiority is essentially impossible. Air assault and airborne landing operations cannot be protected and much of the reconnaissance, fire support and protection required for the OMG would not be available. Air would not be available to interdict enemy reserves attempting to break out encircled forces nor could encircled forces be fragmented and quickly destroyed. This should be an incentive, therefore, for NATO members to continue air modernization. But, most important, it should encourage us to invest in air defense and basing facilities to better protect NATO air resources from the initial preemptive Warsaw Pact air operation that would precede initiation of encirclement operations by Warsaw Pact Fronts. Such measures could almost totally frustrate even the most elaborate Soviet plans for encirclement thereby greatly enhancing NATO's deterrence of a Warsaw Pact attack.

There are a number of conclusions one might draw about Soviet military objectives in the arms reduction process. Soviet military objectives include:

- The elimination of all theater and battlefield nuclear weapons. Despite frequent Western defense analytical deductions to the contrary, Soviet military planners have long desired to put the battlefield nuclear genie back in the bottle. They have found the prospect of battlefield nuclear use to be a great source of planning uncertainty that virtually would eliminate the possibility of the fairly predictable, large scale offensive or counteroffensive operations in which they have the greatest confidence of success. This implies that it is probably in NATO's interest to retain, in some form, the nuclear weapons that are the source of Soviet military uncertainty.

**THE IMPLICATIONS FOR FUTURE SOVIET
MILITARY DEVELOPMENTS IN EUROPE**

by
Chris Donnelly

mobilization advantage and favorable geographical position. This suggests that NATO should seek to reduce the size and redundancy of the Warsaw Pact wartime support structure and seek destruction, not just removal, of many of the tanks and artillery pieces withdrawn under any agreement. NATO might also consider allowing the removal of Soviet tanks and similar weapons to storage sites well east of the Ural Mountains in exchange for removal of some NATO aircraft to the U.S. and Canada without elimination of NATO airfields.

Perhaps the most important conclusion we might draw in the area of arms control is that negotiators must avail themselves of advice and assistance from those institutions and individuals in the defense community who have tried to understand the process and product of Soviet military assessments. The Soviet leadership is prepared to make major reductions in nuclear and conventional forces and the Soviet military are playing a direct and significant role in the arms reduction process. Hence it is extremely unlikely that the Soviets will propose or accept an agreement that does not reflect Soviet military assessments that the agreement in question favors the Warsaw Pact. We must understand the basis for those Soviet military assessments so that NATO's counterproposals and ultimate agreements will enhance, not undermine, deterrence.

When we are considering conventional arms reductions, therefore, it is wise to remember that the Soviet Army has today an excellent and proven system for

- (a) calculating the relative importance of each weapon system in both the NATO and Warsaw Pact forces. Consequently, the Soviet General Staff can identify with reasonable accuracy, for example, what deletion from our forces would hurt us most, and what deletion from their force would be of least damage to them. They can put a value on any arms reduction proposal made by us.
- (b) planning to compensate rapidly for any loss to their force by a reorganization of training, restructuring of formations, and the procurement of new weaponry. NATO, on the other hand, has no such system to make these calculations, and might therefore be at a serious disadvantage in any negotiations in conventional arms reductions.

It is this careful calculation, balancing the need for armed forces with the State's ability to afford them, that has shaped the current Soviet force structure, rendering it so excellently tailored for mobilization and demobilization. The current organization of the Soviet Forces is extremely well designed to provide very large and powerful forces relatively quickly. In Soviet eyes, NATO usually overestimates the capacity of Soviet ready forces, but consistently underestimates the Soviet ability to mobilize what we call "reserves". Only a fraction of Soviet formations are kept ready (i.e., 75% manning and 100% equipment). A few are kept with all their equipment and half manning. The bulk are maintained at 15-30% strength with most of their equipment in storage.

However, these latter ("cadre" formations) have their full complement of commanders and staff and in war need only their conscripts and some platoon commanders and technical officers to come up to fighting strength. This can be accomplished in about 3 weeks, and is regularly exercised.

Ken Brower's comments on the quality of training are most apposite here. By restricting what is required of a combat soldier and ensuring that his equipment is designed to be operated simply, the Soviets have ensured that any conscripts called from the reserve within 5 years of demobilization will be quite capable of acting efficiently. A Soviet tank driver/mechanic will do no other job for two years as a conscript. Certainly, he will not be versatile, but he will never forget how to drive a tank and, once having learned on a T-62, he will be perfectly capable of driving a T-64 if required to do so. Will a tank driver in a regular NATO army, who has just done a two year tour as a company clerk, be any better at driving a tank if war breaks out than a Soviet reservist recalled to the colors? Probably not. Yet the cost of the regular

The Implications for Future Soviet
Military Developments in Europe

It has been my aim, in this paper, to try to draw out some of the implications inherent in the main themes covered in the preceding papers. In doing this, it has not been my intent to produce a balanced "net" assessment, but to produce a Soviet perspective on what has been said. In other words, if I were a Soviet General Staff Planner, what would I conclude from what we have just learned and read? Not only is deterrence in the eyes of the beholder, but so is any political act dependent on what the political leader thinks is true. Gorbachev's policy towards the U.S. and Europe will certainly reflect in peace as well as in war what he believes to be the situation, rather than what the situation actually is.

Firstly, I would like to look closely at the concept of calculation. It is clear from the paper by John Battilega and Judy Grange that the Soviet Union has developed an "academic" framework for the study of war which simply does not exist in the West. The basis for this study of war is

1. a careful collection of data from the battlefield;
2. an expert evaluation of that data (analysis of operational experience);
3. a constant update of that data by operational experiment and testing (operational analysis and research);
4. a reduction of that data to a modern, standardized, series of calculations and norms on the basis of which future battles are planned; and
5. the standardized applications of this approach by way of regulations (determining tactics, drills and battlefield calculations) and the enforcing of rigorous training in their use.

A glance at the history of the Soviet Army will show that it has been extremely good at changing the force structure of its formations rapidly so as to accommodate changing requirements brought about by the availability of less, or new, or more equipment; losses and shortcomings; new enemy tactical concepts; and so on. There is not and never has been such a thing as a final and definitive TO & E for a Soviet division. The organizational structure is in a constant state of change, striving for improvement. The introduction of every new weapons system; any change in quality of the soldier's training; the identification of a new enemy tactic - all these will demand some restructuring of the force to achieve an ideal mix which maximizes combat power and viability.

areas after mobilization, should an amicable agreement be reached which includes some move back from the borders of East-West Germany. Although today's tanks and trucks go faster, and tactical movement is quicker, when major formations are on the move, the "law of large numbers of trucks" comes into play, and World War II experience in movement is directly relevant to today, as the example of the 3rd U.S. Corps experience shows (see Annex A). The Russians have studied this experience at great length and in great depth. As a general rule, NATO has not. It should also be remembered that what we have just described is not an OR function, not the preserve of war gamers and scientists in the Soviet Army, but it is an operational function, the responsibility of the Commander and his Chief of Staff at every level.

In his reference to equipment, Ken Brower's drew attention to the quality and effectiveness of Soviet weapons systems. Despite the overall poor economic performance of the U.S.S.R., and the fact that its technology lags that of the West, Brower shows that the Soviets can produce comparable weapons systems in half the time and at half the cost of NATO. In all but a few cases, Soviet weapons are as effective in battle as ours, and in many cases they are more effective.

The Marxist view, that in the event of a war victory will go to the side with the stronger economy, has now been amended in Soviet doctrine. In a war, the nation which can mobilize its assets for war quicker and more effectively will, in the Soviet view, stand the best chance of winning. The implications of what Ken Brower has said about the Soviet system is that, in a future war between the Warsaw Pact and NATO, it could well be the Warsaw Pact which could do this.

The procurement of equipment offers the advantage of technological surprise which, in Soviet eyes, the West often throws away. Compare the development of Explosive Reactive Armour (ERA) with the development of NATO anti-tank missiles to defeat conventional armour (see Annex B). NATO only deployed sufficient anti-tank missiles to be tactically effective after a means to defeat its shaped-charged warheads had been developed. We now appear to be seeing the second generation of Soviet ERA before NATO has fielded a means to defeat the first generation. The fact that a technical solution is on the laboratory bench will be of little comfort to a soldier of the 5th U.S. Corps if war breaks out tomorrow. The cry of 10 years ago, such as, for example, "the DIVAD will drive the HIND helicopter from the battlefield" is now too painful to contemplate. Yet from a Soviet point of view, the gap in NATO between what is technically available and what is actually fielded is staggering. It pushes the Russians further in the direction of concluding that, if war is thought likely, necessary, or inevitable, there is even more value in surprise attack and quick victory, before the weapons can be put into the hands of the soldiers. The implications of Ken Brower's paper remind us that the term "quality of forces" does not mean the technical

soldier is very much greater than that of the conscript, as Ken Brower's paper shows.

Cadre formations have an almost full permanent complement of regular officers, all of whom, as we have noted, have had a long period of military training. Moreover, technical maintenance of Soviet equipment is done by officers and regular non-commissioned officers (praporshchiks), not by conscripts. In this way, the Soviet armed forces can field and maintain technically complex equipment, not relying on conscripts to service it. This is how they ensure that the formation can be readied for war in a relatively brief 3 weeks. In this system, the Soviets have a means, therefore, of increasing or decreasing the size and readiness of their formations. They can agree to a force reduction as part of an arms reduction agreement, safe in the knowledge that this can be accomplished by reducing a Division from 14,000 men to 7,000 or even 3,000, but that same division is capable of regeneration in a few weeks. Some European countries have a similar system (Switzerland, Sweden, Norway), but the U.K. and the U.S. do not. The implications of what has been identified so far are that we may have to consider the development of such a system.

In terms of taking the formations to war, the implications of the Battilega/Grange paper is that the Soviet Commander has an effective means of measuring the combat capability of his force by testing it and comparing its performance (both the individual performance of soldiers and the performance of sub-units) to a standardized and established set of norms. The system of socialist competition in training achievement and the extensive technical metrology together allow the commander to determine with reasonable accuracy what his troops can do. At the highest level, this system allows him to assess the competence of his Warsaw Pact allies. Once he has a "mathematical" value for his forces he can complete the equations which he has available to determine their strength relative to the strength of the enemy and thereby calculate the casualties and likely outcome of any engagement.

Knowing the size and quality of his force should prevent the Soviet Commander at every level from making an incorrect assessment and consequent serious mistakes. This is particularly important in determining the real correlation of forces as outlined by John Hines. As NATO has no such system of evaluation, NATO commanders must assess their force by "feel", "intuition", and experience. Whilst these are all very valuable qualities, their value depends on the ability of the commander. In Soviet eyes, this "educated guesswork" is a poor substitute for their system of calculations.

A good example of the value of approaching the subject from the Soviet point of view is to take a wartime and peacetime example of a NATO force and subject them to a Soviet assessment, using operational experience to predict rates of movement in a future committal to battle. This will be very important in calculating the Soviet (and NATO) capacity to move forces forward from war

The U.S.S.R. can and has enforced on the Warsaw Pact nations a standardized Soviet concept for war, and the U.S.S.R. provides the complete command structure for the Warsaw Pact in war. The U.S. cannot do this for NATO because of the kind of alliance NATO is.

As a result, NATO must try and counter the operational concepts that John Hines has described, but, unless complete mobilization has taken place, NATO operational commanders have no significant means to affect the battle other than air power. Even if NATO is fully mobilized, the technical means of command and control do not yet exist to enable COMNORTHAG and CINCENT to exercise operational command.

The Soviet assessment of NATO's reliance on air power to provide operational impact across corps boundaries is interesting in view of Soviet arms control proposals to cut NATO air power. It is this NATO reliance on air power, too, which has resulted in the Soviet development of the air operation as the first stage of a conventional assault, to destroy NATO air forces and command and control assets on the ground in the first hours of a war. NATO's reliance on runways and a few repair facilities adds, in Soviet eyes, to the vulnerability of NATO air power to a preemptive decapitating strike.

The further implications of what John Hines has to say is that NATO is out-thought at the operational level in terms of what to do. There is as yet very little training for operational commanders in NATO (in marked contrast to the U.S.S.R.) and little opportunity for them to exercise operational command, even in war games.

Moreover, the impact of national budgeting problems can be seen to exacerbate the problem of NATO's lack of operational cohesion. As U.S. corps get stronger, other corps, by Soviet calculations, get relatively weaker as procurement schedules are slipped to save money. But there is no way in NATO armies to calculate the effect of this on military strength and to demonstrate this effect to NATO politicians. The gap between strong and weak corps in NATO is widening, providing more and more opportunities for the Soviets to implement the concepts of operations, particularly the encirclement that John Hines has drawn our attention to. The lack of a NATO operational concept means that there is no military way to compensate for this disparity in strengths and no second line or reserve to reinforce the weak sections of the NATO line should a Soviet surprise attack be launched.

As it stands the current NATO deployment does, in Soviet eyes, provide for a reasonable density of forces. The ratio of force to space (the density of forces) is just as important as the ratio of force to force (the correlation of forces) although this is rarely reflected in journalistic reports. Lowering the density of forces will, by Soviet calculations, make a Soviet rapid advance and manoeuvre easier. The implications of John Hines' work on Soviet concentration of assets are that it is in the Soviet interest to

performance of a weapon but the ability of the operator to use it in a battle. Procurement policy is of critical importance in this, the Soviet procurement system is very impressive in the way it understands this fact.

To produce equipment which cannot then be used to its full potential is to waste money. It is generally recognized that to maintain a pilot's skills to enable him to exploit the features of an F-16 takes 250 flying hours a years. Yet some European countries, such as Belgium, have spent so much of their defense budget on procuring aircraft that they can only afford 160 flying hours per man per year, and cannot, moreover, afford to fit the chaff and flare dispensers that the Soviets consider essential for protection against low level SAM's. From a Soviet standpoint, this would not be considered a sensible procurement policy. There are certain elements of the Soviet procurement system that are worthy of our evaluation, although they will not be easy to introduce, not the least because our pride will often not let us admit that we have something to learn.

The critical elements of the Soviet procurement system are:

1. A doctrinal approach to war and weapon acquisition whereby concepts are developed.
2. A General Staff system to override or mitigate conflict between arms of service and to provide authority in the system.
3. The Design Bureaux System to provide continuity and institutional memory, and to apply state standards of production.
4. The provision of "Military Representatives": permanent project officers who provide the link between the designer, the producer, and the soldier.

There are, of course, many other differences between Soviet and Western procurement systems, not the least of which is the difference between capitalism and socialism, the profit motive and "norm fulfillment", but the above 4 features are ones from which we could actually learn, and perhaps copy certain elements.

John Hines, in his paper, draws our attention to the development of Soviet military thought at the operational level of war and reminds us that here is an area where NATO is, in Soviet eyes, particularly weak. Before it is protested that the U.S. has developed a concept of the operational level of war, we should remind ourselves that this is only in the last 6 years (the Soviets have been training officers for this since 1926), and that, whatever the achievements of the U.S. and other NATO countries in this (and they are truly commendable) the U.S. provides only 25% of NATO forces, whereas the U.S.S.R. provides over 50% of the Warsaw Pact forces. Moreover, there is no "Warsaw Pact doctrine" independent of Soviet doctrine.

dictator, and since taking office he has had a constant struggle to clear away opposition, keep new opposition from forming and to overcome apathy or resistance, both in the hierarchy and in the country at large.

But it should not be too difficult to accept that, within the broad Soviet ideological framework, there are different ideas and interpretations, and we must confuse resistance with opposition and with the expression of different opinions. Also we must remember that the Russians are not perfect and do make mistakes.

Gorbachev is, by his own definition, a Leninist and therefore his foreign policy is determined by the needs of his domestic policy. Soviet Foreign policy by definition includes Military Policy, Arms Control Policy, and any other dealings with the West. It is my opinion that Gorbachev would like to reduce the burden of defense on the U.S.S.R. in order to improve the national economy. However, expressing the Soviet defense expenditures in terms of GNP blurs the essential difference between the Soviet system and ours. In the U.S. or U.K., Presidents, Congresses and Prime Ministers can cut defense spending with a stroke of the pen. Gorbachev cannot, because he does not buy his defense system in cash. The whole society is oriented towards preparing for defense, and the system operates on priority allocation which is not so easily or efficiently altered. Nor is there any obvious and immediate benefit to be gained by switching allocation of resources, because the civilian economy is simply not geared to cope with either a rapid expansion or alterations in its methods of operating.

Gorbachev's biggest problem is in the area of high technology assets and R and D. Hence, it would be of most value to divert resource from the virtual military monopoly of these facilities into intensive basic research and civilian applications. To this end, in arms control negotiations, it is in his prime interest to prevent Western investment in military high technology and at the same time ease Western restrictions (COCOM) and improve the flow of Western technology and finance into the U.S.S.R.

The improved relations that would accompany arms control agreements of any kind, and that would be consequent on any Western perception of Soviet compromises (for example, by withdrawing from Afghanistan or from supporting certain Latin American regimes), would all contribute to the same end. Any reduction in NATO nuclear weapons, and especially a "Third Zero" option would reduce the Soviet need for conventional forces, not increase it, because a NATO without battlefield nuclear weapons poses much less of a conventional threat to Eastern Europe and the U.S.S.R. A NATO non-nuclear invasion Eastwards is simply not credible in Soviet eyes.

To sum up, all these considerations, both military and political, constitute a force which is moving Gorbachev in the same direction. To this must be added a further thought. Only as little as a year or so ago, the Soviet military press constantly inveighed against

lower the density forces on both sides because this would facilitate rapid advance.

At present, NATO should be able to create a density of force (see Annex C) which would slow a Soviet advance and preserve the cohesion of NATO defense. This would allow time for NATO to plan the use of nuclear weapons because an early and effective strike would neutralize the Soviet advantage. Nuclear weapons are the only weapons NATO can use to hurt the U.S.S.R.; the Soviets do not want to see them used at all on a future battlefield.

If the U.S.S.R. could, by negotiation, reduce forces on both sides of the East-West German border by, say, 25%, and prevent the building of any compensatory defensive fortifications, this would make it very difficult for NATO to create what the Soviets calculate to be an effective density of defense, but it would in no way hinder the Soviet ability to concentrate force on the main axes as John Hines has described.

One of the major problems in this question of arms negotiations is the public and media perception that 3:1 is essential in the attack overall. Furthermore, the way the military balance counts numbers is extremely important. It is not, in Soviet eyes, the overall figures that matter so much, but what the ratio is in those areas when the Soviet forces would be attempting to achieve their rapid gains. The whole issue of numbers is a very complex one, and simplistic descriptions of it are certainly going to be misleading. A good deal of public diplomacy is essential if NATO, and especially European publics, are going to understand the issues involved in arms reduction. NATO's unwillingness to enter into doctrinal discussions with the Warsaw Pact has already caused political problems in some countries, yet it is an uncontroversial fact that most NATO governments invest far less effort in trying to understand the Soviet Union and explain the issues involved in arms control to their publics than does the U.S.S.R. This is a sensitive issue, because no NATO government will wish to be accused of conducting propaganda as the Soviets do. But the rights on the issue, the media success of Gorbachev and his policies in the West is a good example of the payoff the correct sophisticated Soviet approach attracts.

Of course there are other implications for the future of East-West military agreements that do not stem from the above factors, but are political or economic in nature, and these must be added to an assessment for it to be balanced.

The Soviet Union is today once again in a position of having to catch up and overtake a competitor. But unfortunately for the Soviet Union, it is in the throes of social and economic stagnation. Yet economic decline is not the cause of Soviet problems but a symptom. The cause is political, and political reform is essential before economic reform will be possible. However, there are strict limits to Gorbachev's power. He is not a

ANNEX A

AN EXAMPLE OF MILITARY HISTORY USED AS
OPERATIONAL ANALYSIS BY III (U.S.) CORPS

	(a) Battle of the Bulge 1944	(b) Exercise "Certain Strike" (Reforger) 1987
Divisions	3+	2+
Vehicles	11,800	11,00
Distance	250 km	150 km
Warning Order	96 hrs	72 hrs
Movt. Begins	H-80	H-60
Routes	4	7 down to 4
March Unit	30 Vehicles	24 Vehicles
Vehicle Interval	50 m	50 m
March Unit Gap	3 mins	5 mins
Serial	1-5 March Units	1-6 March Units
Serial Gap	8 mins	15 mins day 30 mins night
Speed	25 mph (day) 15 mph (night)	20 mph (bridge 100) 15 mph (60-70 bridges)

NATO's technological progress. SDI & CDI were the constant targets of Soviet invective, which was at times almost hysterical. I am of the opinion that this reflected a real fear of the West's potential to achieve a "technological breakthrough" and to develop new "ET" weaponry.

Whilst it is still a genuine fear, and the Soviet opposition continues, there is no longer any hysteria. It is no longer such a burning issue which might be a block to an arms control agreement. It would appear that the U.S.S.R. has begun to take a much more realistic view of NATO's ability to introduce such weaponry in meaningful quantities. In other words, they seem to have stopped painting us as ten feet tall in terms of technology, and they are now seeing us for what we are. For sure, the Soviet army has plenty of problems of its own - training, morale, minority nationalities, automating the C3 system, and so on. However, this new found "glasnost" in military assessment means that the Soviet leadership is up a much realistic net assessment. Whilst on the one hand, this will certainly reduce the national Soviet fears of the possibility of a Western attack, it also means that Gorbachev can take a more sanguine view of western military capabilities. He and his colleagues will no longer be so frightened by what NATO might do if they assess that NATO will probably not (say in the area of developing new weapons) take action for political reasons. In other words, if the King has no clothes, the Soviet leadership is now in a position to note the fact.

ANNEX C

SURVIVAL CHANCES OF TANKS VS LONG-RANGE
ANTI-TANK TACTICAL DEFENSE, ACCORDING TO
GEN KARDASHEVSKIY

Tanks per km front	Anti-tank Weapons per km of front			
	5	10	15	20
15	0.50	0.02		
20	0.75	0.10	0.01	
25	0.92	0.30	0.05	
30	0.98	0.50	0.10	
40	1	0.75	0.35*	0.1

In order to illustrate the meaning and the implications of Kardashevskiy's data, let us first consider the case of 20 tanks per km facing 5 anti-tank weapons. The model suggests that the tanks have a survival chance of 75 percent, or that 5 of them (25 percent) will be destroyed during the battle. This means that the average efficiency of an anti-tank weapon is equal to 1 for a tank superiority of 4 to 1 (statistically, each anti-tank weapon destroys one tank, but two or more missiles will be required to achieve this score). If the number of anti-tank weapons, the model predicts a drastic change in the chances of survival for the AFV's.

ANNEX B

EXPLOSIVE REACTIVE ARMOUR (ERA)

Israel Commences Development	1974	
Soviets Commence Development	?	
Israeli Army deploys	1978	
Soviets Commence Production	1979 1980	(?) NATO ATGW Max Deployment
Israeli Army Uses in Battle	1982	
Soviet Army Deploys	1984 1986	West initiates programme to defeat reactive armour
	1987	French produce LT ATK Anti-ERA
Next Generation ERA Deployed	1989	EST ISD TOW B to defeat 1st Generation ERA



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