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A RAND NOTE

**Simulated Central Region Conflicts at  
Nominal Parity and Low Force Levels**

**William G. Wild, Jr., Robert D. Howe,  
Paul K. Davis**

**November 1989**

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An important objective of the Conventional Forces Europe negotiations is achieving a stable military balance at equal, relatively low, force levels. This Note describes simulation and gaming experiments that were part of a larger policy analysis identifying important variables affecting stability in NATO's Central Region in such a regime. Experiments focused primarily on theater parity at levels ranging from 45 to 18 equivalent divisions (EDs), despite negotiated parity in some Atlantic-to-the-Urals aggregate. Overall, it was difficult for the Pact to do well at theater parity in the range of 45-27 EDs. As force levels dropped, however, outcomes became increasingly sensitive to assumptions, particularly those regarding tactical prowess (intelligence, timeliness, mobility, etc.). This suggests that such factors may merit greater emphasis when planning for a low-force-level environment.

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## Simulated Central Region Conflicts at Nominal Parity and Low Force Levels



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## PREFACE

This Note documents simulation experiments conducted in mid 1989 as part of a study of conventional arms control options that would involve nominal parity in the Central Region at force levels at or below, even greatly below, NATO's current levels. The work was conducted for the Office of the Under Secretary of Defense for Policy and was accomplished in the RAND Strategy Assessment Center (RSAC), which is part of RAND's National Defense Research Institute, a federally funded research and development center supported by The Office of the Secretary of Defense and The Joint Chiefs of Staff. Comments and questions are welcome and should be addressed to Dr. Paul Davis, Director of the RSAC.

## SUMMARY

An important objective in the ongoing Conventional Forces in Europe (CFE) negotiations is achieving a stable military balance at equal force levels, levels far below current Warsaw Pact levels and somewhat below those of NATO. There is also increased interest in *considering* much lower force levels (e.g., 50 percent of those NATO currently has). This Note documents simulation experiments used as part of a larger policy analysis (Davis et al., 1989), exploring some of the issues that arise if one considers hypothetical conventional conflicts in Europe's Central Region with the sides having equal numbers of forces at levels ranging from 45 equivalent divisions (EDs) down to 18. It also includes some discussion of the important problem of what happens at low force levels when the attacker in fact has a theater force ratio advantage, despite negotiated parity in some Atlantic-to-the-Urals (ATTU) aggregates.

The approach used in this study was analytic war gaming over a considerable range of cases, with the purpose being exploration rather than definitive judgments. In particular, we were interested in seeing whether simulations would demonstrate the instability that has been postulated for low force levels (below the so-called "operational minimum") and in seeing how sensitive the instability was to a variety of factors such as the defender's response to both warning and early tactical intelligence, the defender's operational strategy, and assumptions about relative attrition rates and certain maneuver phenomena, notably early explosive breakthroughs. The study was considered to be part of a series that would delve more and more deeply into the maneuver phenomena likely to play a major role in conflict at low force levels. The simulations and games in this study included alternative marching strategies for the attacker, alternative assumptions about the defender's ability to maneuver in response to the attacker's concentration, the potential for explosive breakthroughs early in the war, forward line of own troops (FLOT) expansion, and alternative defender strategies. It was deliberately simplified in other respects,

however, and did not consider counteroffensives, rear-area battles, or the effects of tactical air forces--all of which are being examined in follow-on work. Instead, the purpose here was to focus on what might be regarded as the most basic elements of the problem.

The first conclusion of the work is that the defender's prospects appear quite good for equal force levels in the range of 27-45 EDs each. Certainly, the attacker's prospects appear poor. As the force level is reduced, however, simulated war outcomes for defense-conservative cases grow increasingly sensitive to the details of assumptions about scenario, strategy, force effectiveness, and other factors. At a level of 45 EDs, for example, NATO defended relatively successfully across a range of assumptions. By contrast, at 18 EDs forward defense was feasible in some cases but proved to be an unmitigated disaster in others.<sup>1</sup> In still other 18 ED cases the defender was able to deny the attacker victory and improve relative power in a way suggesting that counteroffensives to restore territory might well be possible. In these very low force level cases NATO's success depended heavily upon its tactical prowess, specifically the availability of timely and reliable intelligence, the unity of command necessary to respond quickly to that intelligence, and the ability to conduct a delaying defense to avoid catastrophic breakthroughs if necessary.

These results imply that caution should be exercised when attempting to describe the dependence of military stability on force levels. First, the fact that as force levels were reduced, outcomes grew increasingly sensitive to assumptions illustrates that military stability depends upon more than just force level. Second, the fact that NATO appears to have less room for error in tactical execution at very low force levels may itself be an important consideration when gauging military stability. We expect to understand the implications of

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<sup>1</sup>The fact that NATO's most severe problems manifested themselves at 18 EDs rather than, say, 12 or 25, depends on uncertain parameters characterizing the effect of force-to-space ratio. Our intent here was not to estimate an exact force level at which such instabilities might emerge, but rather to identify factors key to NATO's prospects in such an environment.

this issue more fully upon completion of the ongoing phase of our analysis.

As discussed in the larger study to which this effort contributed, a full assessment of the military implications for stability of alternative nominal force levels needs to depend on more than the idealized considerations treated here. We need also to consider the flexibility and maneuver capability of the defense (including the defense's command-control structure and the degree to which the various national forces can coordinate maneuver operations), as well as the possibility that the attacker could achieve a greater than 1:1 theater force ratio through superior force-generation capability or the use of "out of area" forces. With this last problem in mind we briefly explored cases pitting 27 Pact EDs against 18 NATO EDs, primarily to demonstrate that *at low force levels NATO's prospects may darken considerably if approximate parity is not maintained. This problem is exceptionally serious in thinking about deep cuts, because the Soviets have many divisions to call upon from other regions.* To achieve a large advantage in the Central Region, they could pull forces from the Northern or Southern regions of the ATTU, or they could pull forces from elsewhere in the Soviet Union. This could more than compensate for *some* unreliability of allies.<sup>2</sup> By and large, such considerations raise substantially the military risks associated with defense at low force levels, even if the "best estimate" assessment might be defender favorable or at least not attacker favorable. Simulation indicates clearly that a 1.5:1 theater-level force ratio is much worse for the defender at low force levels than at high force levels.

At the same time, as discussed also in the larger study, there are many facets to "stability" and it is by no means clear that overall stability is necessarily reduced as force levels are reduced. In the extreme of very low force levels, for example, neither side could seize

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<sup>2</sup>Since this Note was written, nearly all of the Eastern European members of the Warsaw Pact had major political upheavals. The baseline of a cohesive Warsaw Pact now appears quite obsolete, which mitigates the concern reported here. We will discuss this in more depth in a future report.

and occupy large areas unless one assumed not only a military victory at the level of battles involving only a small portion of the geographic area and the population, but also the political collapse of the defender. Also, in a post-CFE reductions world, Soviet military movements pulling forces from other areas might alone be regarded as a basis for war, which would fundamentally alter reasonable scenario assumptions. One should therefore be cautious in overdrawing the implications of purely military analysis. Indeed, further analysis of these difficult issues must be conducted on a global scale and with a wider range of scenarios than has been traditionally considered. Such analysis is under way.

## ACKNOWLEDGMENTS

We would like to acknowledge many useful discussions with RAND colleagues Kenneth Watman and James Wendt, who are doing closely related work under Army sponsorship. Kenneth Watman reviewed the Note and contributed to some of the concepts and terminology presented here. James Wendt has examined Soviet options for using "out of area" forces in the Central Region.

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## I. INTRODUCTION

The progress of recent discussions regarding conventional arms control has made it likely that conventional force levels in NATO's Central Region will be significantly reduced. An agreed goal is parity at force levels below current NATO force levels. Increasingly, there is talk in some quarters about reductions to levels *well* below current NATO levels (e.g., to 50 percent). This prospect has generated considerable concern within NATO because it is not clear how parity would reshape the Central Region defense environment or at what force level parity should be established. Though arms reductions will shrink Pact forces, the territory that NATO must defend will remain unchanged. Hence, even if parity is achieved, there is concern that force levels may fall so low as to compromise the defender's force-to-space density. This Note documents simulation and gaming experiments conducted in support of a study examining NATO's capacity to defend at low force levels assuming current Soviet concepts of operation.<sup>1</sup>

Most of the work described here assumed parity of NATO and Warsaw Pact forces and used the RAND Strategy Assessment System (RSAS) to evaluate potential combat outcomes at levels of 45, 36, 27, and 18 equivalent divisions (EDs) each. In some important excursions we relaxed the assumption of parity *at the time of conflict*.

Although this analysis is a "first cut" of work largely completed in Spring 1989, it presents some important issues. We are therefore publishing the interim analysis so that these issues can be considered by other workers on a timely basis.

The Note is organized as follows. Section II explains our modeling approach, states important assumptions, and describes the philosophy behind the choice of cases examined. Section III presents results for

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<sup>1</sup>The larger effort is described in Davis et al. (1989).

those cases and discusses them. Section IV reviews the findings and summarizes lessons to be drawn from them.<sup>2</sup>

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<sup>2</sup>The detailed documentation of data and model assumptions used for this study exists in the form of an unpublished internal note. This provides all information needed to reproduce the results, although actually doing so will in the future require resurrecting an archived version of the program and data.

## II. APPROACH TO MODELING OF LOW FORCE LEVEL COMBAT

### THE COMBAT MODEL

The prospect of low force level combat challenges many aspects of current military thinking on the structure and tactical use of forces. It should not be surprising to find that it likewise challenges current methods of combat analysis. Current techniques and models of combat for NATO's Central Region were developed over a number of years in which force levels for each side steadily increased. The type of combat represented in these models is predicated on the availability of large numbers of mechanized forces. Such models assume that war between the two alliances would be characterized initially by a continuous line of contact along the forward line of own troops (FLOT), where high-intensity warfare ensues as the attacker attempts to assault and penetrate the opposing front and develop a situation in which he can exploit the mass and mobility of his forces. This assault phase of warfare involves what, from a higher-level point of view, can be described as head-on-head "attrition battles."<sup>1</sup>

This view of warfare will need to change if arms control agreements succeed in their stated aim of achieving parity at levels below (perhaps considerably below) current NATO force levels. In such a regime both the nature of combat and the manner in which forces are organized and equipped could change dramatically. Hence, assessment of potential future warfare requires new analytic tools designed with such an environment in mind. Work is under way to develop such techniques, and in the present analysis we took a first step in that direction by employing current tools--cautiously--both to obtain some preliminary insights and to provide information on the limits of the tools themselves. In this analysis we employed the current Central Region model of the RSAS<sup>2</sup> to evaluate potential combat outcomes. As discussed

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<sup>1</sup>Nonetheless, as described in Davis (1988), for example, successful attrition warfare by the defender requires a great deal of *tactical* maneuver and should not be visualized as static.

<sup>2</sup>See Bennett et al. (1988).

in the broader study to which this contributed (Davis et al., 1989) this model is more applicable, and hence its insights more generalizable, than we expected.

## FACTORS INFLUENCING COMBAT OUTCOMES

We cannot in general expect to characterize "combat outcomes at parity" simply. Rather than ask "what happens at parity?" we must ask "what happens when we have parity at 45 divisions, at 18, etc." We suspect that parity at very low force levels would look different from parity at higher levels, if for no other reason than that the ability to maintain a defensive "operational minimum" would at some point be compromised. This term "operational minimum" has been coined to describe the defender's need to cover adequately the terrain he is expected to defend. That is, although the size of the defender's forces relative to the attacker is one prime issue of concern, at some point the size of the defender's forces relative to the ground he is expected to defend becomes an equally critical concern--i.e., defender *density* becomes critical (at least when attempting forward defense). Although arms control may be expected to reduce the size of the threat, it is unlikely to reduce the amount of territory that must be defended. Such issues of defender force-to-space density are explicitly represented in the RSAS and exerted special influence in this analysis.

Force level, of course, is not the only factor we would expect to influence combat outcomes. Even when a force level has been specified, it is not always possible to characterize a "combat outcome for parity at x EDs." To understand the nature of the situation at each force level, we need to consider the various ways in which the war might be fought (strategies, force deployment and employment, etc.) We need also to examine various ways of representing the battle ("modeling" assumptions about attrition, terrain effects, etc.). From consideration of such factors, a range of outcomes can be generated. That range may be so narrow as to constitute a virtually single outcome, or it may be very wide and sensitive to the factors examined. Listed in Table 2.1

Table 2.1

ILLUSTRATIVE VARIABLES OF ANALYSIS

Scenario	How much warning time will the defender receive and use? At what rate will forces on each side mobilize? What will allied participation be on each side? Will invasion routes include the Austrian corridor?
Attacker Strategy	How many main thrusts will the attacker employ? * Where will these thrusts be focused? *
Defender Strategy	Will defender attempt to hold forward? * Will defender strategy permit an orderly delay to river lines if needed? * Will defender counterattacks be employed?
Force Deployments	How will attacking forces be initially deployed on main-thrust and other axes? * What degree of counter-concentration will the defender achieve by D-day? * What percentage of forces will be held in reserve? Where will reserves be positioned?
Force Employment	What are the effects of maldeployments? *
Defensive Barrier Preparations	How much terrain preparation will the defender achieve? * Where will prepared defenses be located?
Inherent Defender Advantages	What exchange ratios can the defender attain? * What degree of benefit will he receive from terrain? *
Force to Terrain	How do different types of forces (tanks, infantry, etc.) use and cover various kinds of terrain (open, forested, etc.)?
Airpower	How will the air battle be represented?

are *some* of the important factors to be taken into account. The present Note addresses those marked with asterisks.<sup>3</sup>

## DESCRIPTION OF BASELINE CONDITIONS

Base cases at all force levels in this analysis shared similar assumptions about force structure, force deployment and employment, etc. These baseline conditions and the rationale behind them are explained below.<sup>4</sup> In general, assumptions were chosen for purposes of analytic clarity and definitely not as "best estimates." Such an approach was deemed appropriate, since we were interested not so much in predicting the most likely combat outcomes at some specified force level, but rather in understanding how outcomes change with force level and with NATO's mode of operation in defense-conservative scenarios. (Just how much meaning there would be in "best estimates" of this radically different future regime was also open to question.)

### The Combat Forces

This analysis focused on ground-force combat with the intent of first understanding it in isolation from the airwar (which we are examining in ongoing work). Given the general belief that NATO air forces are and will remain much better qualitatively than those of the Warsaw Pact, this narrowing is likely to be Pact favorable. However, even that is not certain, because Pact helicopters can be a major source of massed firepower, especially since Pact doctrine treats helicopter regiments as higher-level maneuver assets that can be massed on main-thrust axes. Past work by Davis and Howe indicates this might be a "war winning" factor, depending on helicopter effectiveness and vulnerability. Also, even qualitatively inferior air forces can be

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<sup>3</sup>See Davis (1988) for a broader discussion of uncertainty analysis and its importance. It, in turn, draws upon a classified balance study by Davis and Howe completed in 1988.

<sup>4</sup>One unusual feature of this work analytically was our "stripping down" of the relatively sophisticated RSAS models to focus on essentials. For readers who are also RSAS users it may be comforting to know that such simplified operations are quite feasible, despite the complexity of the baseline RSAS.

locally dominant at critical times in a main-thrust offensive, e.g., in delaying reserves long enough for first echelon forces to break through defenses. Thus, we ignored air not because it is unimportant, but because we wanted to focus on minimum essentials of the problem (and because uncertainties dominate air-effectiveness analysis).

Ground forces in this analysis were "generic" in character. The NATO forces were composed of identical "brigades," each given a strength of one-third ED. There were three brigades per NATO division. Pact forces consisted of identical "brigades" as well, though each Pact "brigade" was rated at one-quarter ED strength and there were four brigades per Pact division. We avoided using named units or detailed Tables of Organization because we wanted to illuminate basic issues and because the nature of future forces is highly uncertain. For the case of parity at 45 EDs, for instance, we had 135 identical NATO brigades and 180 identical Pact "brigades."

All forces on a side, in addition to being of the same size and composition, were assumed to behave as though they were of a single nationality and to follow common doctrines. This simplifying assumption was deliberate but it had the effect of eliminating interoperability problems and making all forces "fungible," which is an interesting bounding case, but very definitely not a best estimate of future reality. If one assumed politically cohesive Pact forces, then the generic force approximation could overstate NATO's likely prospects. Given Pact internal problems, however, it may be as optimistic an assumption for the Pact as it is for NATO.

Finally, we emphasize that this analysis focuses on firepower and units, not manpower density. As discussed in Davis et al. (1989), the ability to defend at a given ED level might depend on the size of units in terms of manpower, especially at force levels below, say, 36 EDs. Although disagreements exist on the numbers here, it is clear that the simulations can exaggerate defender effectiveness at low force levels unless one assumes the units have been properly tailored and manned to an unusually high level, or unless one believes that defender frontages have increased significantly by virtue of modern weapons and C3I. We assumed in this analysis that one of these two conditions was met.

## Mobilization and Initial Deployments

In general, the number of in-theater forces available to each side over time would be largely a function of the mobilization and deployment scenarios chosen. Our immediate interest, however, was in the nature of combat when equivalent forces are brought fully to bear. For this reason all forces were assumed to be present in theater and fully deployed by D-day. We are examining other cases in follow-on work.

In baseline cases NATO deployed two-thirds of its forces evenly across nine Central European axes (the eight current corps sectors plus LANDJUT), and split the remaining one-third evenly between the Northern and Central Army Group reserves. No forces were pulled off an axis once committed.<sup>5</sup> The Pact deployed one-third of its forces evenly across the nine axes, and applied the remaining two-thirds to the chosen main thrust axes in each case.

Figure 2.1 shows the result of this scheme, which has the Pact fully concentrated but NATO forces distributed in a completely balanced fashion. This initial posture would correspond to a significant intelligence or command-control failure on the part of NATO. That is, the "baseline" was deliberately conservative in this respect. We shall discuss results of both baseline cases and excursions.

## Attacker and Defender Strategies

This analysis focused on combat in which the Pact employed a strategy similar to what one might expect it to use today (large-scale concentration for attempted breakthroughs on some of NATO's corps sectors), but consolidated onto fewer axes of thrust because, at parity, only one or two main axes (of corps size) could achieve high force ratios (Davis et al., 1989). NATO's plan of defense in baseline cases was that of meeting the attack at the InterGerman Border (IGB) and defending forward there.

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<sup>5</sup>This assumption is important in that it implies that, at least for the duration of the first critical campaign, the attacker could tie down proportionately large numbers of defenders away from the main axes and hence ensure attaining and maintaining favorable ratios on the selected axes. This assumption is attacker favorable and makes the results conservative from the defender's point of view.

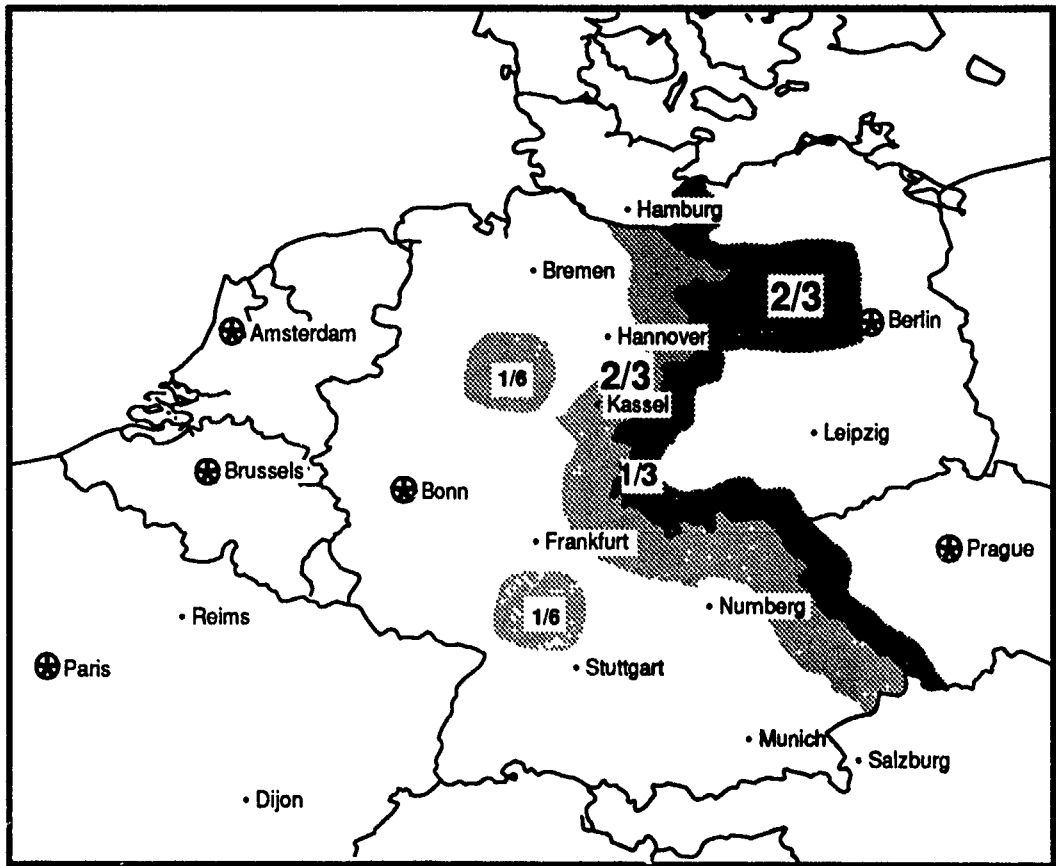


Fig. 2.1—Initial postures

Alternative Pact strategies are under study, but there are no quick or magical ways for the Pact to change doctrine and find new tactics that would be more effective. We do, however, expect that low force level combat would be characterized by a more extensive use of operational maneuver. In this respect the RSAS Central Region model, designed to be sensitive to many maneuver-like issues of combat, enabled us to take some first steps toward such issues. Of greatest import in the present analysis was CAMPAIGN-MT's ability to take into account "breakthrough" phenomena. During the breakthrough phase of combat, the attacker's advance speeds up dramatically, and his attrition drops to negligible levels while that of the defender increases significantly. Breakthroughs may occur naturally in the simulations (if defender

density drops too low and the defender is nonetheless ordered to hold ground), or they may be scripted by the analyst to occur at times of his choosing. Hence, it is possible to posit a breakthrough resulting from the success of some local maneuver tactics, and see the effect that breakthrough might have. This is a useful measure of defensive robustness.<sup>6</sup>

### **Defensive Barriers**

NATO was granted only limited defensive barriers in baseline cases. Making very conservative assumptions about time granted to the military for preparing defenses at the IGB, no barriers were constructed there. Making similarly conservative assumptions about the prompt availability of engineering resources, barriers at the Weser-Lech River line were limited to a maximum of 5 km.

### **A NATO-Conservative Baseline**

Overall, our assumptions resulted in a distinctly conservative baseline for NATO, *except* for assumptions about NATO forces being fungible and essentially equivalent in capability. The baseline was characterized by

- No NATO counter-concentration before D-day.
- NATO's strategy of defending forward.
- Only limited zones of prepared defenses.
- No lateral movement of units across corps sectors.
- No tactical aircraft played.

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<sup>6</sup>In the present analysis the Pact maneuver operations included turning movements but did not overstep axis boundaries (e.g., no encirclements). Similarly, NATO could not maneuver around and counterattack the flanks of the advancing thrust. These tactics, as well as other more maneuver-rich strategies, are being addressed in follow-on work. Some of this, including encirclements and counterattacks, can be accomplished with gaming using the current Central Region model, but we are also experimenting with a network model based on the RSAS' CAMPAIGN-ALT (S-Land) methodology (Allen and Wilson, 1987).

## SUMMARY OF BASELINE AND EXCURSION CASES

The baseline case described above was simulated at force levels ranging from 45 EDs to 18 EDs.<sup>7</sup> In response to the results of those cases, appropriate excursions were then conducted. At force levels where NATO performed well in the base case, the defense was tested for robustness against sudden Pact breakthroughs and assumptions about defender advantage in combat (i.e., assumptions of lower exchange ratios or reduced terrain benefits). Where NATO performed poorly in the base case, we examined steps NATO could take to improve its prospects. These entailed either allowing NATO to counter-concentrate before D-day on axes of impending attack, granting greater availability of prepared defenses, or allowing NATO to conduct a delaying defense back to prepared defenses at river lines.

Excursions will be discussed in more detail in the next section. Below, in Table 2.2, we simply summarize the variables altered and their settings for the various cases. (We include here only those cases of primary interest, though a large number of supporting cases were also examined. Some of these supporting cases are alluded to in the text.)

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<sup>7</sup>The precise assumptions and procedures used are on file so that the simulations can be reproduced by other analysts if necessary.

Table 2.2

SUMMARY OF SIMULATION CASES REPORTED

Force Levels	NATO Defense	Pact Attacks	Scripted Breaks	Exchange Ratios	Terrain Advant.	NATO Barriers	Early NATO Counter-Concentration
45,45	Defend Forward	NE I, FRG I	No	Standard	Yes	Limited	None
45,45	Defend Forward	NE I, FRG I	day 30	Standard	Yes	Limited	None
45,45	Defend Forward	NE I, FRG I	No	75%	Yes	Limited	None
45,45	Defend Forward	NE I, FRG I	No	Standard	No	Limited	None
45,45	Defend Forward	NE I, FRG I	No	Standard	Yes	20 max	Yes
36,36	Defend Forward	NE I, FRG I	No	Standard	Yes	Limited	None
36,36	Defend Forward	NE I, FRG I	day 30	Standard	Yes	Limited	None
36,36	Defend Forward	NE I, FRG I	No	75%	Yes	Limited	None
36,36	Defend Forward	NE I, FRG I	No	Standard	No	Limited	None
36,36	Defend Forward	NE I, FRG I	No	Standard	Yes	20 max	Yes
27,27	Defend Forward	NE I, FRG I	No	Standard	Yes	Limited	None
27,27	Defend Forward	NE I, FRG I	day 30	Standard	Yes	Limited	None
27,27	Defend Forward	NE I, FRG I	No	75%	Yes	Limited	None

Table 2.2 (Continued)

27,27	Defend Forward	NE I, FRG I	No	Standard	<input type="checkbox"/> No	Limited	None
27,27	Defend Forward	NE I, FRG I	No	Standard	Yes	<input type="checkbox"/> 20 max	<input type="checkbox"/> Yes
<hr/>							
18,18	"	NE I	No	Standard	Yes	Limited	None
18,18	<input type="checkbox"/> Delay Weser	NE I	No	Standard	Yes	Limited	None
18,18	Defend Forward	NE I	No	Standard	Yes	<input type="checkbox"/> 20 max	None
18,18	"	NE I	No	Standard	Yes	Limited	<input type="checkbox"/> Yes
18,18	"	NE I, FRG I	No	Standard	Yes	<input type="checkbox"/> 20 max	<input type="checkbox"/> Yes
<hr/>							
27,18	Delay Weser	NE I FRG I	No	Standard	Yes	Limited	None
27,18	Delay Weser	<input type="checkbox"/> NE I FRG I BE I	No	Standard	Yes	Limited	None
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### III. COMBAT OUTCOMES IN CENTRAL EUROPE AT LOW FORCE LEVEL PARITY

As the previous section has explained, our preliminary simulations of Central Region combat at parity examined cases at force levels of 45, 36, 27, and 18 EDs. In the following presentation of results, we focus on

- Characterizing NATO's prospects at each force level.
- Understanding how combat outcomes, and the factors driving those outcomes, change as a function of force level.

#### PARITY OF FORCE AT 45 EQUIVALENT DIVISIONS

In developing the Pact attack plan we sought to be consistent with Soviet doctrine and practices. The Pact was using economy of force measures to maximize the forces available for the main thrusts. At force levels of 27 EDs and above the available force was sufficient to support two main thrust attacks but given the overall force parity it was felt that these two attacks would be relatively close together to limit NATO's options in responding and, if possible, keep the forces in NATO's Central Army Group (CENTAG) from being a factor in the outcome.

The chosen plan, depicted graphically in Fig. 3.1, consists of an attack on the extreme north of the Netherlands Corps sector and an attack on the boundary between the FRG I Corps sector and the UK I Corps sector. These attacks converge on crossings of the Weser in the vicinity of Bremen and merge to form a turning movement, with Brussels and the channel ports of the BENELUX countries as the objectives and the seacoast providing flank security. Applying this strategy in the RSAS put the main attacks on axes 2 and 3, which are the Netherlands Corps sector and the FRG I Corps sector, respectively. (Pinning attacks on other axes are shown by small arrows.)

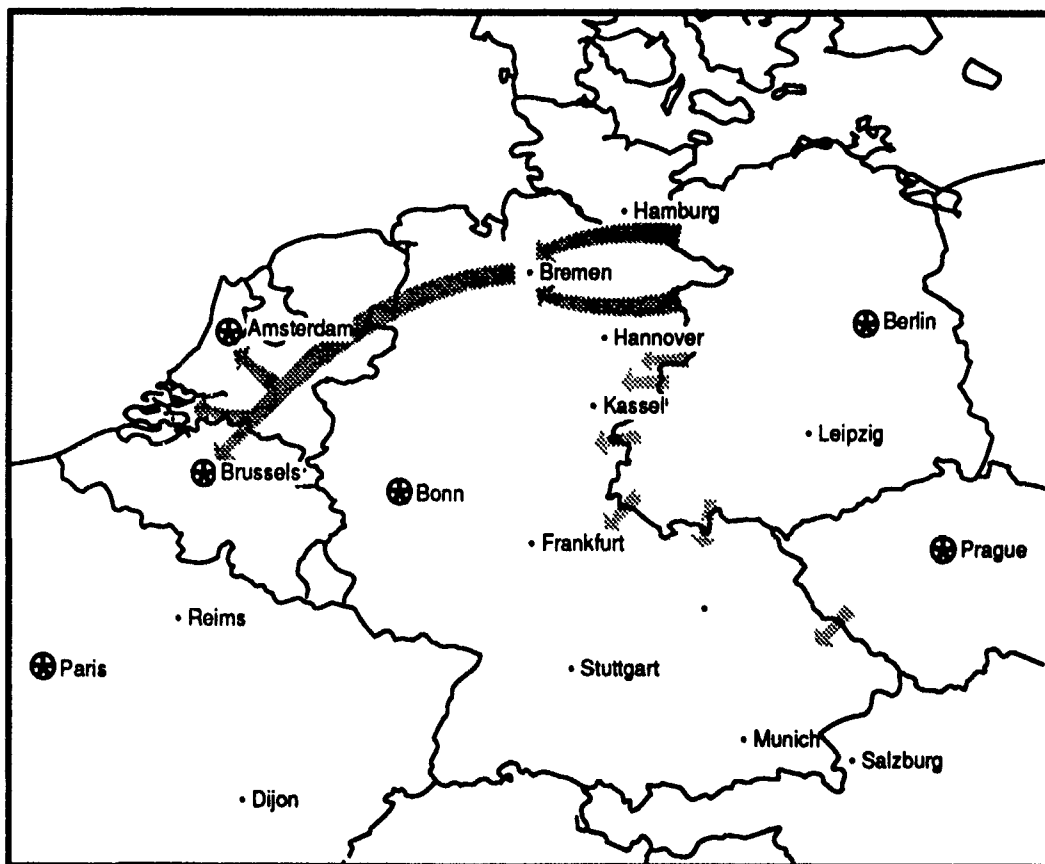


Fig. 3.1—Pact attack strategy at 45 EDs

Attacking on more central axes such as the Belgian Corps sector would have provided the Pact more options but would also have exposed the attack to more defensive options.<sup>1</sup>

<sup>1</sup>Other Pact strategies might involve having 3-5, rather than 1-2, main-thrust sectors, but such attacks would involve very small sector widths (e.g., 20 km). These would be much more vulnerable to counterattack, interdiction, and other problems than would the strategy used in this study, but they would have the advantage of making large-scale envelopments more feasible *if* the breakthrough operations went well. Although it is usually assumed by NATO officers that a corps can handle up to a 3:1 ratio, even if the attacker has a much higher ratio on a subsector (e.g., 20 km), some analysts believe that Soviet movement would be so rapid as to turn a local breakthrough into a corps-level breakthrough quickly. As with so much in this work, truth would depend sensitively on relative defender and attacker mobility and related command and control.

### **The Base Case**

In the base case, the Pact attack advanced most quickly along FRG I axis, with forces on NE I axis frequently falling back to reduce their exposed flank.<sup>2</sup> By D+19 the Pact had reached the Weser River on FRG I. Once there, however, NATO's assumed 5 km of prepared defenses enabled it to wear down the attack with particularly favorable exchange ratios (3.5:1), and by D+30 a stalemate had resulted.

This constitutes a fairly successful outcome for NATO. As Fig. 3.2 shows, the Pact penetration was relatively narrow and far short of its objectives along these two axes. Further, the final force ratio favored NATO, making possible a counterattack or perhaps a negotiated withdrawal.

### **Testing the Robustness of NATO's Defense**

In the base case, the force ratio advantage that the Pact amassed was insufficient to overcome the assumed defender advantages enjoyed by NATO. But how robust is that result? How would it be affected by alterations in the model inputs that drive it? Might it change if the Pact achieved early tactical successes not predicted by the model? We turn now to excursions that address these issues.

**Analyst-Scripted Pact Breakthrough.** In the first test of the robustness of NATO's defense, we directly altered the results of early combat by "scripting" an early breakthrough of Pact forces to reflect, for example, some local success in maneuver tactics. Although less likely to occur once NATO reserves had reached the main thrust axes, such a breakthrough was plausible close to D-day, when NATO had only a few divisions on these axes with which to stem the attack.

Figure 3.3 shows the results of a breakthrough scripted to occur after one day of combat on FRG I. The scripting ensured that the Pact would quickly gain at least 50 km of ground, while enjoying reduced attrition to its own forces and greater attrition to NATO in the

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<sup>2</sup>In the RSAS, what some analysts refer to as "FLOT expansion" is related to flank exposure, with the flank being treated as part of the FLOT.

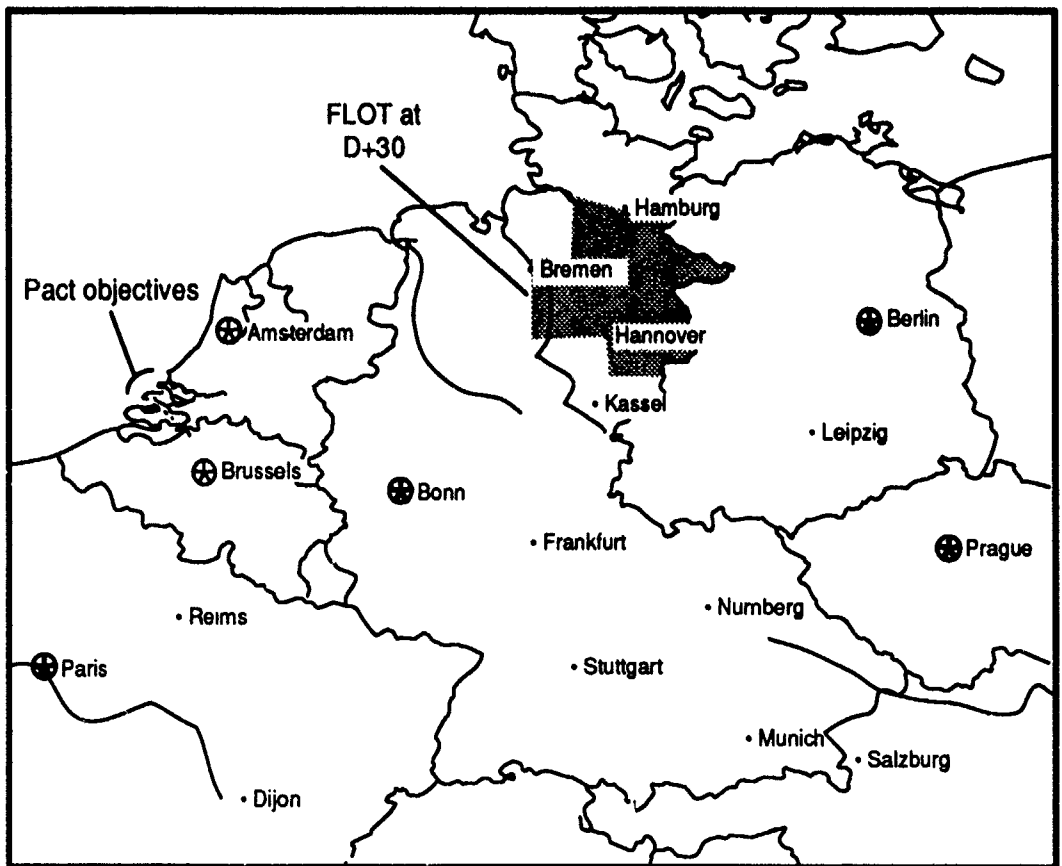
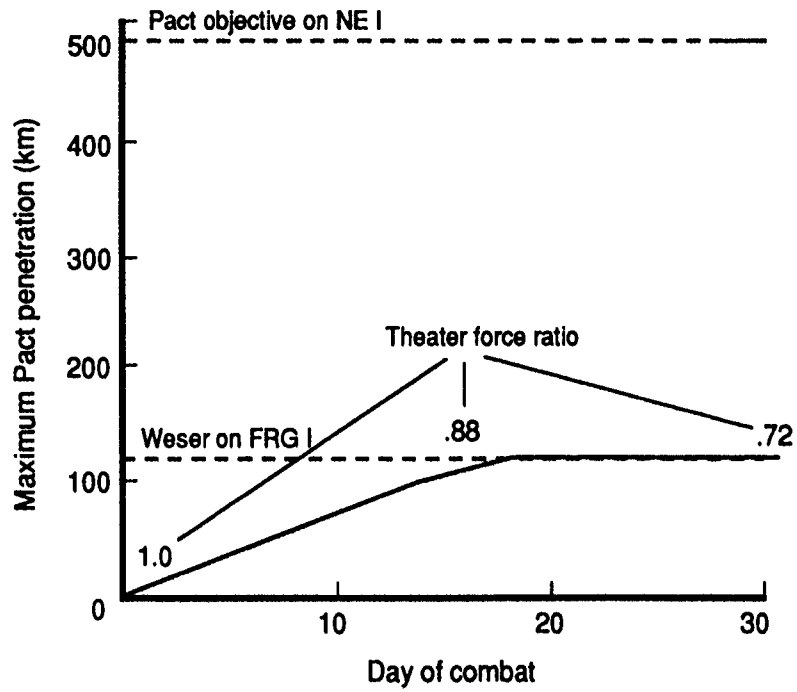


Fig. 3.2—Combat outcome in base case at 45 EDs

process. As a result, the Pact advanced more quickly on FRG I than in the base case and reached the Weser by day 9 but was still unable to breach it because of the availability of NATO reinforcements.

Interestingly, the Pact was able to do slightly better on NE I axis than in the base case. Since NATO forces there pulled back to cover the exposed flank with FRG I, the Pact gained ground more quickly on NE I than in the base case and hence was able to reach the 145 km mark on that axis before reinforcements arrived in full force to halt the advance. Overall, however, the Pact was unable to exploit the breakthrough to significant advantage because of the availability of NATO reinforcements. This suggests that Pact tactical successes not accompanied by the destruction of large portions of NATO forces may have limited impact on the overall outcome of the war.

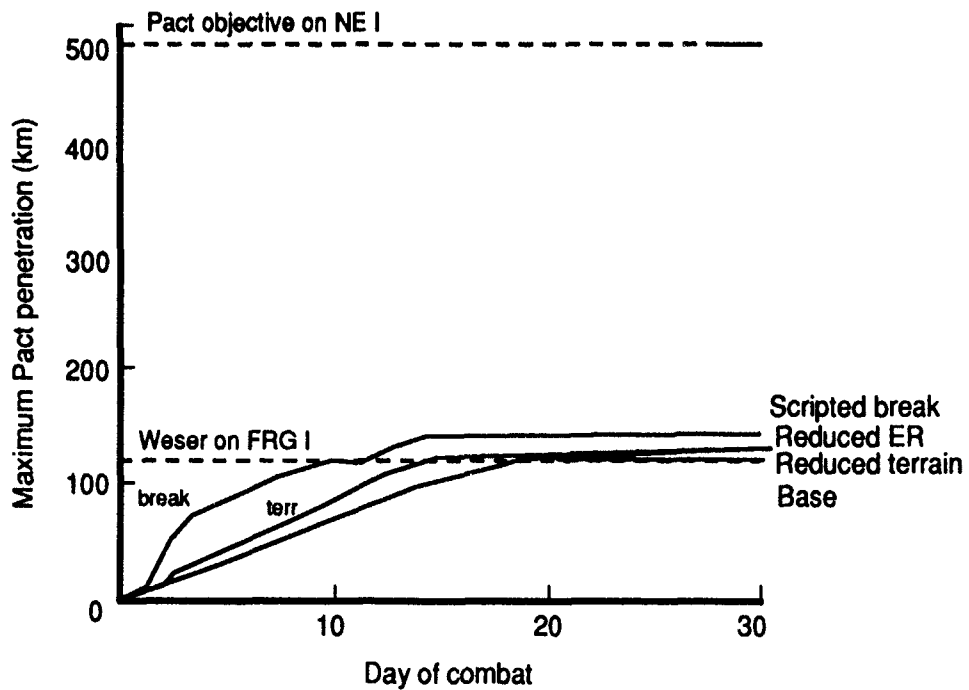


Fig. 3.3—Testing NATO robustness at 45 EDs

**Reduced Defender Advantages.** The scripted breakthrough provided a test of robustness against unexpected Pact success early in the war. We also examined robustness against more generally Pact-favorable conditions in excursions that reduced the degree of defender advantage granted NATO in the model.

In the first such case, we reduced exchange ratios (for all types of defenses and force ratios) by 25 percent. Figure 3.3 shows that NATO held fairly well in this case as well. The benefits to the Pact of reduced exchange ratios accrued gradually as the war progressed and were most notable in combat at the prepared defenses of the Weser on FRG I--where the attack had stalled in the base case. In this case, with attrition to the Pact not quite as heavy, and with more Pact forces surviving, the attack moved through the Weser defenses, but still stalled about 10 km past that line.

In a second case, we removed one of the advantages that terrain offers the defender in the RSAS. Terrain is assumed to give the real-world defender advantages in positioning and natural cover that work against the attacker.<sup>3</sup> In the RSAS this is represented by a reduction of the effective force ratio by a terrain-dependent amount, which in turn reduces defender losses, increases the exchange ratio, and slows attacker movement to some extent.<sup>4</sup> Figure 3.3 shows that when NATO operated without this terrain advantage, the Pact reached the Weser more quickly than in either the base or reduced attrition cases but was still unable to breach it.

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<sup>3</sup>Terrain is also reflected in RSAS estimates of movement rate and of the number of forces on the FLOT. In rugged terrain, fewer forces can be put on the FLOT than one would expect from geographical frontage alone. See Davis et al. (1989) for details.

<sup>4</sup>Because this terrain effect is a direct influence on the force ratio in the RSAS, neutralizing that effect can also be thought of as similar to increasing the Pact/NATO force ratio by about 25 percent from the base case in this analysis.

### **Summary of Parity at 45**

NATO defenses held fairly well at 45 EDs, stalling the Pact attack at the Weser River line--well short of the attack's objectives. The superior force ratio that the Pact had massed on the main-thrust axes was not enough to overcome the inherent defender advantages enjoyed by NATO. This result obtained not only in the NATO-conservative base case, but in cases even more favorable to the Pact in which Pact forces were granted an early breakthrough, exchange ratios were reduced by 25 percent, or NATO was denied the advantages of terrain.

### **COMBAT OUTCOMES AT DECREASING FORCE LEVELS: 36 AND 27 EDs**

In baseline cases, which were quite conservative in some respects (e.g., no prepared defenses at the IGB, and no preferential defense of key sectors), NATO's defenses continued to hold fairly well as force levels decreased. Those defenses appeared increasingly likely to fail, however, under very Pact-favorable conditions.

#### **Base Cases**

At 36 and 27 EDs we again modeled a Pact attack mounted along the current NE I and FRG I Corps axes. At both force levels the attack progressed much as it had at 45 EDs, stalling at the Weser on FRG I axis.

At 27 EDs we examined also a single-thrust attack along the strategically important NE I axis, to see if the Pact might gain by consolidating its now less plentiful forces. Shoulder space constraints, however, still limited the rate at which those forces could be brought on FLOT, and the relatively difficult trafficability of the terrain on that axis slowed the attack, allowing NATO reinforcements to arrive and stall the advance short of the Weser. Figure 3.4 hence depicts only results of the more effective double-thrust strategy, which essentially widens the FLOT and allows more of the Pact's force advantage to be employed. (Double-thrust attacks proved to be uniformly more effective for the Pact in 27 ED robustness excursions as well.)

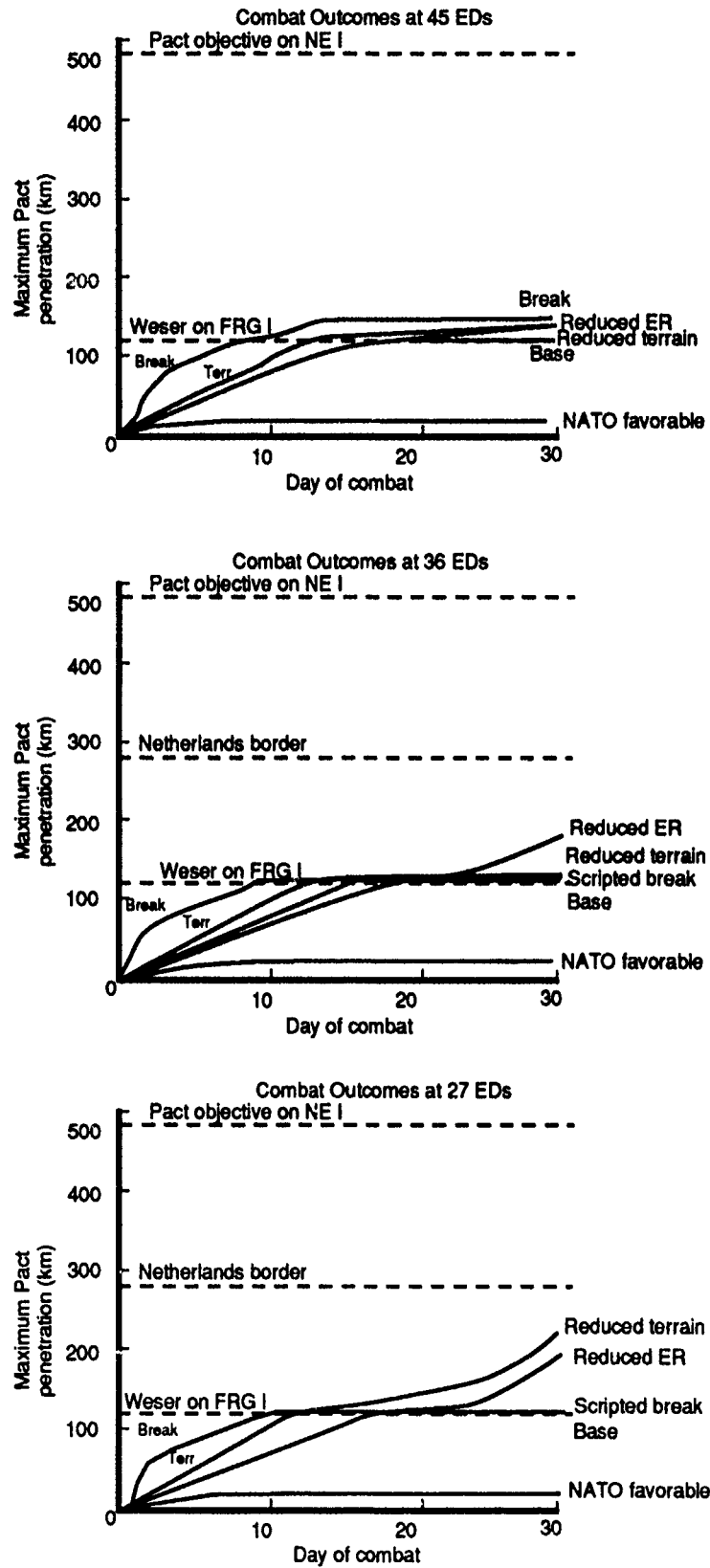


Fig. 3.4—Robustness of NATO defense decreasing with force level

### **NATO-Favorable Cases**

For completeness, we also examined NATO's performance when it had the benefit of prepared defenses at the IGB (up to 20 km), and had in addition been able to add an extra division to each of the two main-thrusts sectors before D-day to more fully cover those defenses. At all force levels, as Fig. 3.4 shows, this was sufficient to stalemate the Pact attack virtually at the IGB. These cases are important simply because they show that the upper bound of NATO's performance is not limited to holding at the Weser. Under the proper conditions (which many would regard as a best estimate, especially if the CFE agreement has enough stability measures) NATO could fully succeed with forward defense. Here, however, we were more interested in what might take place under less favorable conditions for NATO.

### **Robustness Excursions**

At both 36 and 27 EDs, forcing a Pact breakthrough on FRG I during the first day of war failed to significantly alter the baseline outcomes. The Pact had greater success, however, under conditions of reduced defender advantage. At 36 EDs, removal of NATO's presumed "terrain" advantages produced a slightly better outcome for the Pact, and reduction of exchange ratios by 25 percent resulted in a significant Pact success (the attack had reached the 190 km mark by day 30, and was still advancing). At 27 EDs NATO's defense failed in both instances, and by day 30 of the war the Pact had far surpassed the Weser and was approaching the Netherlands border with full prospects of achieving its strategic objectives.

Clearly, these excursions show a tendency for NATO's prospects to decline with force level even at parity. But why should the drop in force level hurt a defending NATO more than it does an attacking Pact? NATO succeeded in the 45 ED excursions by wearing down the Pact attack over time, relying particularly on the availability of sufficient forces at the prepared defenses of the Weser. As force levels drop, however, the length of time over which NATO can sustain a strong defense shortens. At 27 EDs, NATO has only nine EDs available with which to

reinforce two main-thrust axes. The combination of reduced defender advantage and lack of reserves allows the Pact to move through the Weser before NATO can erect substantial deliberate defenses behind the river line. Having failed to hold at its strongest point, NATO's defense is thereafter unable to check the Pact advance.<sup>5</sup>

These results also illustrate how Pact success on a single axis can quickly unravel NATO's defenses along adjoining axes as well. In the Pact-successful cases just discussed, NATO's Weser defenses on NE I were rendered useless because NATO forces there had to pull back from the Weser to protect flanks against the Pact advance on the adjacent FRG I (see Fig. 3.5). This highlights the importance for NATO of maintaining a successful defense along all fronts of battle.

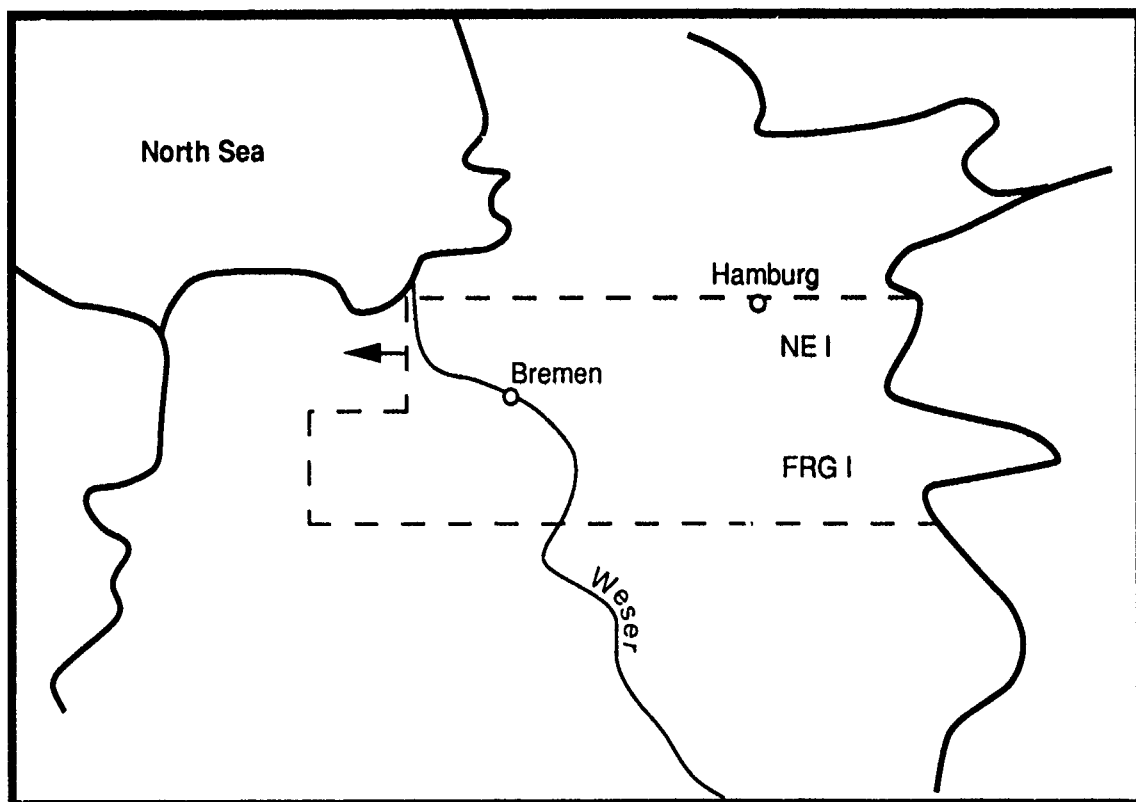


Fig. 3.5—NATO withdraws from the Weser on NE I to cover flank with FRG I

<sup>5</sup>An important factor here is that the model assumes that movement rate increases with decreasing defender density at constant force ratio, the theory being that tactical penetrations become easier as density drops. See Bennett et al. (1988).

## Summary

Robustness excursions at 36 and 27 EDs revealed a tendency for NATO's prospects to decline with force level. This trend, however, became visible only under conditions very favorable to the Pact. It is important to remember that NATO's defense was still relatively successful in the NATO-conservative base cases at 36 and 27 EDs and could even hold near the IGB given the proper advantages. Nevertheless, these results illustrate how force level can influence NATO's ability to conduct a successful defense. They foreshadow the more dramatic effect that lower force levels can have on that ability, as we will see next.

## COMBAT OUTCOMES AT VERY LOW FORCE LEVELS: 18 EDS

At 18 EDs the sheer sparsity of force brought about dramatic changes in the progress and outcome of combat. Results were quite volatile and were much more sensitive to small changes in NATO force employment than at higher levels. It is difficult, therefore, to characterize NATO's prospects in any general way at this level.<sup>6</sup> In examining the cases that follow, however, we can identify some pivotal combat determinants that could "make or break" NATO's defense at very low force levels.

We first note that at 18 EDs the Pact was able to launch a single-thrust attack along the current NE I axis without the problem of overmassing, thereby maximizing its force ratio advantage. Importantly, NATO's initial defensive lines were stretched very thin, with main-thrust coverages of 75 km of geographical frontage per ED on the FLOT (about 50 km/ED in terms of military frontage). This brought the issue of force-to-space density to the fore, since from a very approximate extrapolation from historical analysis we estimate that breakthroughs might well occur at such densities.

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<sup>6</sup>Analysis in these cases requires careful attention in early runs to day-by-day events in the simulation and, in some instances, intervention to correct model artifacts by changing the decision rules used for force employment so as to cover complications not encountered in more usual studies. Hence, we emphasize the descriptor "analytic wargaming."

### Base Case Results

Figure 3.6 shows the striking outcome of the base case. The Pact gained an almost immediate breakthrough on D-day as a result of the combination of superior force ratios and very low defender density. Further, the simulated NATO commander reacted to the D-day invasion with an immediate deployment of several brigades to shore up density problems elsewhere in the theater--a plausible reflex in the face of uncertain intelligence, but one that was unnecessary at higher force levels.<sup>7</sup> This further depleted NATO reserves. Moving faster than the handful of remaining reserve divisions could reinforce the axis, then, the advance reached the Weser on D+4. Some limited prepared defenses awaited there, but NATO density was still so low that the Pact's momentum carried it across. As the Pact continued forward, NATO could not shore up the defenses with enough quickness and force to stem the attack, and by D+30 the Pact had fully achieved its objective.<sup>8</sup>

In moving from 27 to 18 EDs (with the baseline case's conservative assumptions), the situation had clearly changed from a generally NATO-favorable environment to a much riskier one. At least in model terms this is the effect of thinning the forward committed forces to the point that they are no longer sufficiently dense to hold the initial attack long enough for the defender reserves to respond. As the situation becomes more fluid, exacerbated by a relative lack of defender reserves, the side with the initiative tends to prevail, as occurred in this base case. We hasten to point out that this dramatic effect

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<sup>7</sup>We recognize that some believe that future intelligence capabilities will make a successful Pact deception about main-thrust sectors extremely difficult. However, such judgments depend on scenario details. We note (Davis et al., 1989) that CFE "stabilizing measures" could materially improve odds of good defense, in part by increasing the likelihood of a cohesive NATO response to warning indicators.

<sup>8</sup>A key analytic variable here is the model's assumed rate of reinforcement for sectors in trouble. Our baseline assumptions are believed to be only prudently conservative (e.g., one to two EDs per day for the double-thrust cases, and two EDs per day for the single-thrust cases) because of real-world problems of traffic control and interdiction. Obviously, however, the defender would do better if one assumed more rapid reinforcements.

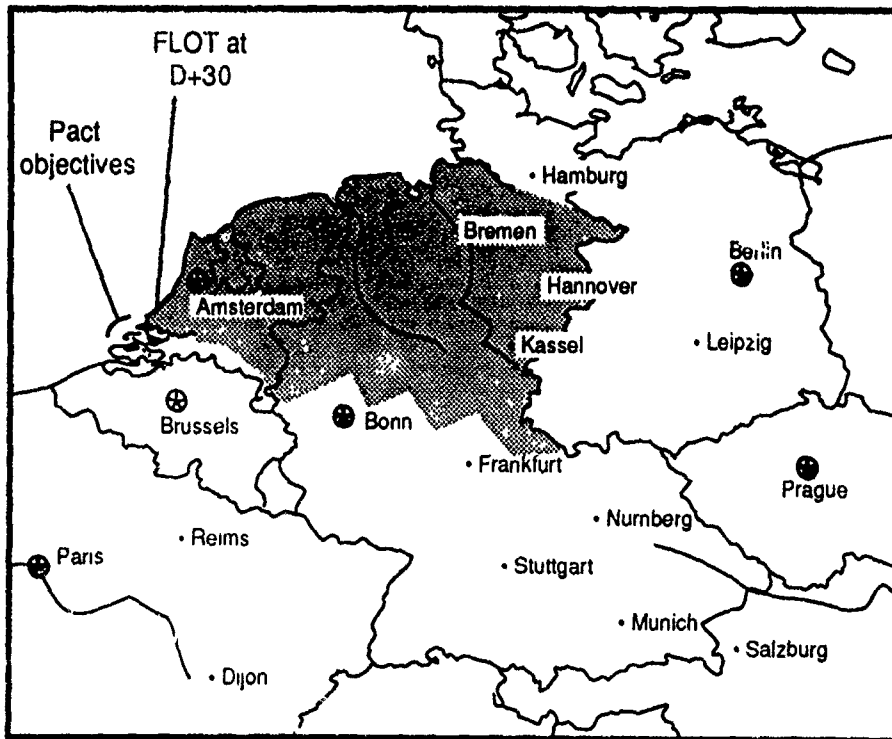
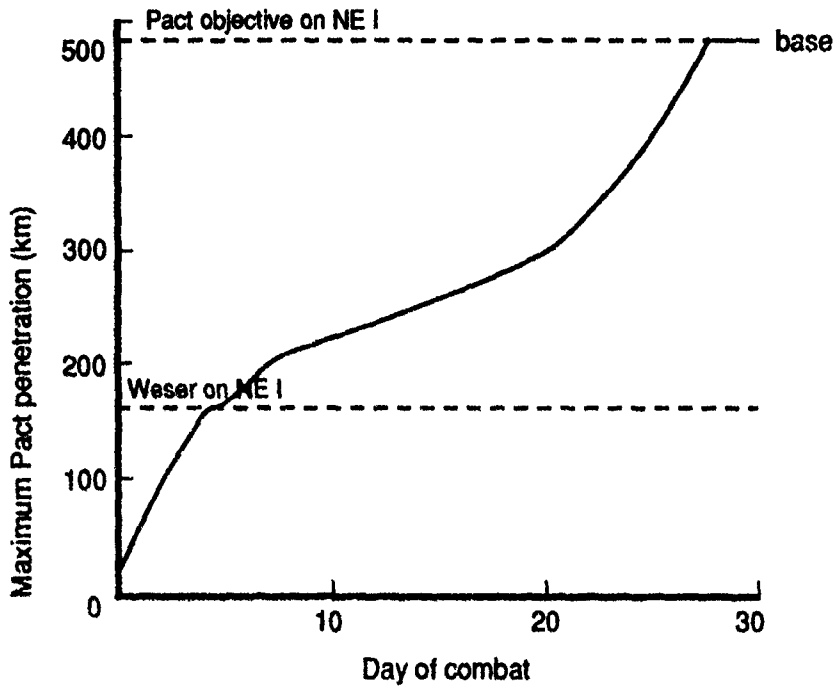


Fig. 3.6—Combat outcome in base case at 18 EDs

occurred at 18 EDs (rather than, say, 12 or 25 EDs) because of our particular input data and threshold effects in the model itself (e.g., a parameter that dictates how much frontage a unit can cover before it "breaks").<sup>9</sup> What the simulations contribute, therefore, is not an estimate of the precise force level at which an operational minimum is reached, so much as a demonstration that the static picture of a "sharp edged" operational minimum is more properly replaced by an image of gradually increasing fragility in the defense as force levels decline. Moreover, the primary purpose of these simulations was to help identify factors that may be critical to NATO's prospects in such a low force level regime. We now turn to this task.

### **Improving NATO's Prospects**

The base case imposed rather stringent conditions on NATO's defense. We might then ask whether there are reasonable steps that NATO could take to improve its prospects at force levels near the operational minimum.

**Improved NATO Prepared Defenses.** It seemed possible that the availability of more prepared defenses at the Weser might have allowed NATO to stem the Pact attack there, and hence in this excursion we

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<sup>9</sup>The RSAS employs a breakthrough concept based on historical research. This research showed that as defenders tried to "stretch" to cover too much frontage there was a tendency for the attacker to achieve local penetrations and encirclements and the stretched defender was unable to respond effectively. The battle then became one of exploitation and pursuit until the attacker reached his objective, the attacker was forced to stop for logistics reasons, or defender reserves from elsewhere arrived to contain the penetration. The exact frontage at which this phenomenon occurred varies widely in history and there have been significant changes in force composition and equipment in recent years. Extrapolation of historical evidence to current forces suggested that this breakthrough transition is most likely in the range of 50 to 60 km of *usable* frontage per ED (i.e., as much as 80-100 km of geographic frontage). For this work the value of 50 km was used. Other RSAS applications have used higher values. See Davis et al. (1989) for a lengthy discussion of how much disagreement exists regarding force-to-space requirements and the reasons for those disagreements. This study used data consistent with that Note's illustrative parameter values.

granted NATO the ability to erect barriers along the IGB, and to create a maximum of 20 km of prepared defenses at the Weser. (In other RSAS analysis, this has generally been considered to be a feature of the *base* cases except in short mobilization scenarios.) As Fig. 3.7 shows, however, NATO gained little here. The IGB barriers slowed the Pact only slightly (again because of very low defender density) and the attack still reached the Weser so quickly that little more than the 5 km granted in the base case were able to be constructed. Hence, the speed of the Pact's initial success was the deciding factor.

The key analytic assumption of the model here is that prepared defenses do not greatly decrease the defender's density requirements. This seems reasonable to us, since there are many historical examples of barrier penetration by audacious infantry operations against thinly *manned* defenses. Collapse of defenses can be quite sudden, as it was in the Ardennes in 1944.

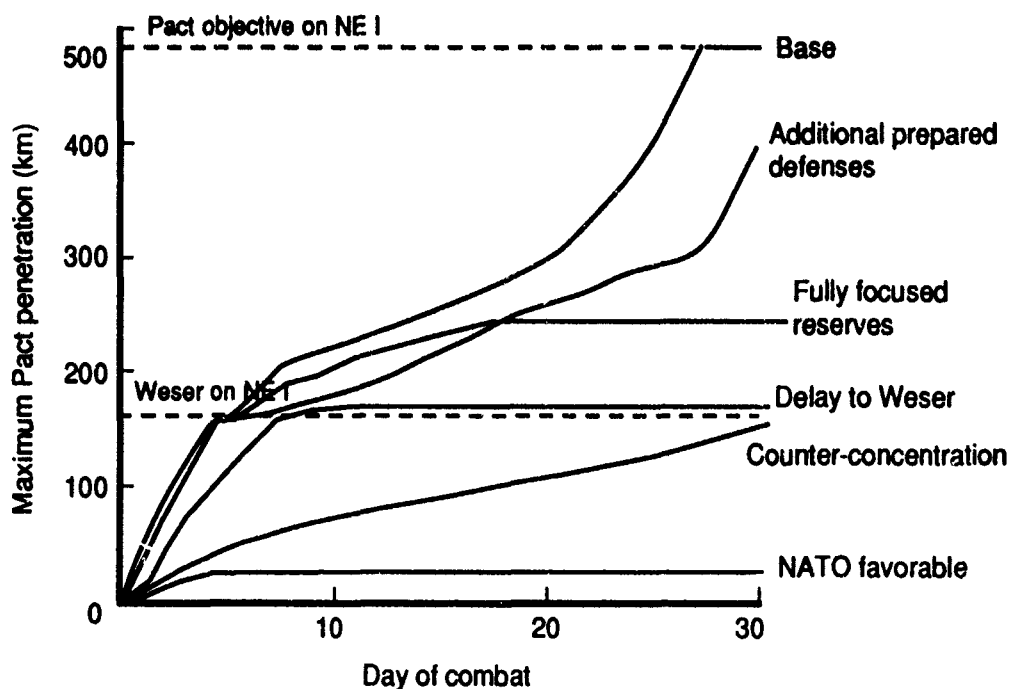


Fig. 3.7.—Improving NATO's prospects at very low force levels (18 EDs)

**NATO Counter-Concentrates.** Forward defense could not succeed in the base case because of the thinness of the defense offered by NATO's initial balanced deployments. To test the effect of improved reaction we relaxed this condition. In the "counter-concentration" case of Fig. 3.7, we deployed one additional division to NE I before D-day. This might be a part of an initial deployment that anticipated likely axes of attack, or a response to a detected massing of Pact forces on that axis, which many analysts would regard as a best estimate assumption. In any event, the benefits to NATO of one extra division on the FLOT at D-day were significant. Whereas in standard force ratio terms one division might not be expected to have a large impact, in this case that division was able to bolster the density of NATO forces. With a fuller covering density, NATO was able to slow the attack long enough for reinforcements to arrive. As a result, the attack did not reach the Weser until day 29. Although the Pact had not yet breached the Weser by day 30, NATO's defenses there were on their last legs--a test run indicated that the defense would fail a few days after our standard end point at D+30. On the other hand, a more realistic assumption would have permitted NATO to pull forces off other corps sectors to reinforce the main sector(s) so late in the campaign. We are exploring such cases in ongoing work, along with NATO counteroffensive options.

**Combining Counter-Concentration and Improved Prepared Defenses.** Once again, for completeness we note that, as at higher levels, when NATO is granted prepared defenses at the IGB (up to 20 km) and is also able to add an extra division to the main thrust sector before D-day, the Pact was held very close to the IGB.

**NATO Delays to the Weser.** These results indicate that NATO should rethink its concept of forward defense when faced with very low force levels. This would not necessarily imply a retrenchment from the *strategy* of forward defense. But in those cases where NATO is caught "blind" to the attack as portrayed here, NATO might choose *operationally* to conduct a delaying defense back to the Weser. This would allow reinforcements to arrive where they could do the most good--in the prepared defenses of the Weser. Further, by avoiding an early

breakthrough, such a delaying defense could buy more time for those reinforcements to arrive. In other work we refer to "contingent forward defense" to allow for this case in which a fallback is necessary.

The "delay" curve of Fig. 3.7 shows the dramatically improved outcome for NATO resulting from such tactics.<sup>10</sup> The Pact did not reach the Weser until day 6 of combat (rather than on day 4), and with reinforcements sent directly to the Weser NATO was able to meet the Pact there and gradually grind down the attack a short distance past that line. Here, as at higher force levels, NATO's defender advantages overcame the Pact's locally advantageous force ratio.

**Fully Focused NATO Reserves.** In running the 18 ED cases above, and gaming through many others, it became apparent that differences in the employment of two or three brigades could turn the course of the battle, causing us to wonder how well NATO could do with perfectly focused use of reserves, i.e., devoting all reserves to defending against the main thrust. The answer is that although the initial breakthrough still occurred, with the Pact again reaching the Weser by day 4 of combat, NATO now had four additional brigades of reserves (relative to the base case) and was able to limit the Pact to a penetration of about 225 km (i.e., somewhere between the Weser and the Dutch border). This merely highlights once again the importance of good intelligence, and quick response to that intelligence, in making best use of available forces at these very low force levels.

### **Importance of Parity**

At very low force levels such as 18 EDs, the risk increases that the Pact could tip the balance of forces significantly in its favor by bringing "out of theater" reinforcements into play during mobilization. For example, at 45 EDs even an extra nine EDs in the Pact's favor does

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<sup>10</sup>Note that although it is easy for a model to conduct an effective "delay" operation, in the real world such operations involve very difficult maneuver and the coordination of air and ground forces. It is questionable how well some of NATO's current forces could pull off such operations, since they are not extensively exercised. Air operations could be a critical factor.

not dramatically alter the force balance, whereas at 18 EDs such an addition would give the Pact a 1.5:1 theater force ratio advantage. Further, the uncertainty of outcomes found at the 18 ED level suggests the consequences of such an imbalance would be more pronounced at that level.

A fuller exploration of nonparity cases is high on the agenda of our continuing work, and we have already gamed a number of cases in which the Pact had 27 EDs available at D-day while NATO had but 18. In this situation, the Pact had sufficient force to once again launch effective attacks along more than one axis, forcing NATO to stretch its already limited reserves even more thinly. Figure 3.8 shows that, even when NATO replicated one of its most successful defenses from the cases examined above, i.e., delay to the Weser, that defense was overrun when the Pact had 27 EDs and attacked along both NE I and FRG I axes.

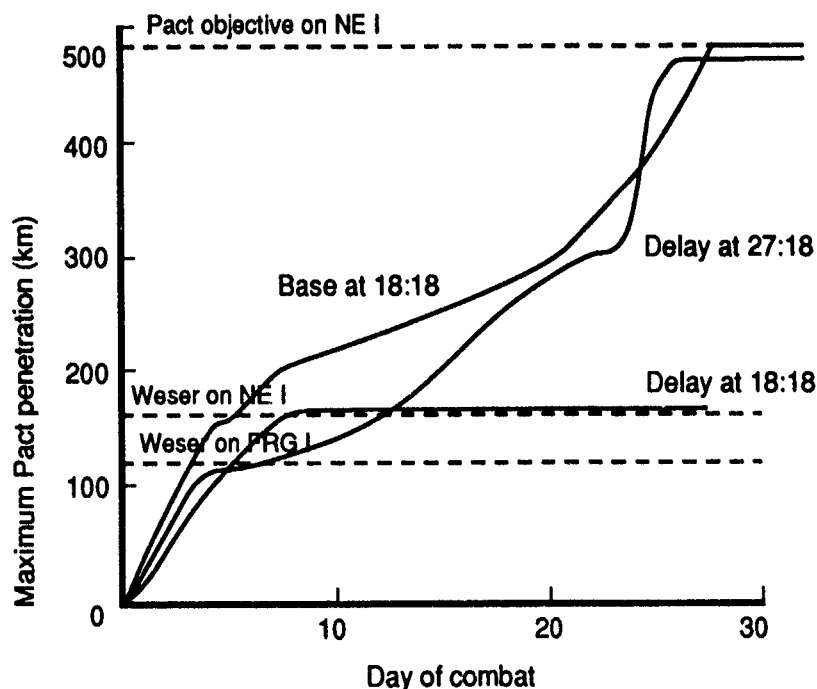


Fig. 3.8—Pact receives out-of-theater reinforcements during mobilization (theater force ratio of 1.5:1)

Moreover, with this force advantage the Pact could open even a third axis of attack with some success. Even though this reduced the Pact's force-ratio advantage along the main thrusts, it exploited NATO's difficulty in maintaining sufficient force-to-space density by pressing at many points simultaneously--essentially increasing the number of opportunities for something in the defense to give way. We examined simultaneous thrusts along NE I, FRG I, and the strategically important Belgian I Corps axis, and found that even with a well executed delay to the Weser and perfect use of NATO reserves the Pact was able to penetrate nearly to the Belgian border (290 km) by day 30 and was still advancing on BE I (aided by a breakthrough on that axis around day 25). A slightly less perfect employment of *one NATO brigade* resulted in a collapse on FRG I, with the Pact achieving its full strategic objectives by day 30. It can be argued that the Pact's prospects in the triple-thrust case are even better than these simulations show simply because at low force levels the chance for a breakthrough to occur would in reality increase with the number of similar thrusts, though the model does not take this explicitly into account.<sup>11</sup>

In short, these results call to our attention the importance of sustaining dynamic parity throughout mobilization. They argue for explicit and thorough consideration of nonparity conditions even when planning defense in a parity environment.

### Summary of Outcomes at 18 EDs

In moving from force levels of 27 to 18 divisions, a threshold was crossed that resulted in full Pact success in the base case of forward defense under conservative assumptions about scenario. NATO forces on FLOT at D-day were no longer able to cover the territory assigned them in sufficient density to prevent a Pact breakthrough. Once this breakthrough occurred, the Pact was able to move very swiftly, making deep penetrations before NATO reinforcements could arrive.

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<sup>11</sup>Based on past work as well as our understanding of campaign dynamics, it seems evident that a theater force ratio of 1.5:1 is much more adverse if the defender has 18 EDs rather than, say, 27 or more. Theater force ratio is not a good measure of effectiveness.

Outcomes in general were quite volatile, however, and NATO often did much better. NATO enjoyed notably greater success when counter-concentrating, for example, and when fully focusing its reserves. These results highlight the importance of reliable intelligence, and of quick, decisive reaction to that intelligence at force levels where outcomes often turn on the proper or improper use of a single division. Moreover, NATO can considerably dampen its uncertainties by robbing the Pact of some of the initiative and speed upon which the attack's success depends. This could be accomplished by delaying back to the Weser, rather than attempting to defend forward at the IGB. In the case examined here, this tactic prevented an initial Pact breakthrough, and allowed reinforcements to be concentrated at the prepared defenses of the Weser where they could be of greatest effect.

These explorations help to identify key emphases for NATO defense planning in a low force level environment. Nevertheless, their volatility is indicative of the importance of more extensive and innovative approaches to modeling and understanding of very low level force warfare, and of the dangers inherent in attempting to maintain a forward defense at extremely low force levels.

#### **SUMMARY: INFLUENCE OF FORCE LEVEL ON COMBAT OUTCOMES AT PARITY**

NATO's prospects grew increasingly uncertain in these simulations as force levels declined. As Fig. 3.9 illustrates, under certain reasonable conditions (prepared defenses at the IGB plus counter-concentration) NATO's defense held very near the IGB at all force levels. Further, at 45 EDs NATO was able to hold at the Weser even across a range of very Pact-favorable conditions. In such cases NATO's presumed defender advantages (as reflected in favorable exchange ratios) enabled it to grind down the force ratio advantage the Pact had amassed on main-thrust axes. As force levels dropped to 36 and 27 EDs, however, the range of outcomes broadened. NATO continued to hold at the Weser even in the conservative base cases, but when operating with reduced defender advantages was more likely to run out of force before the

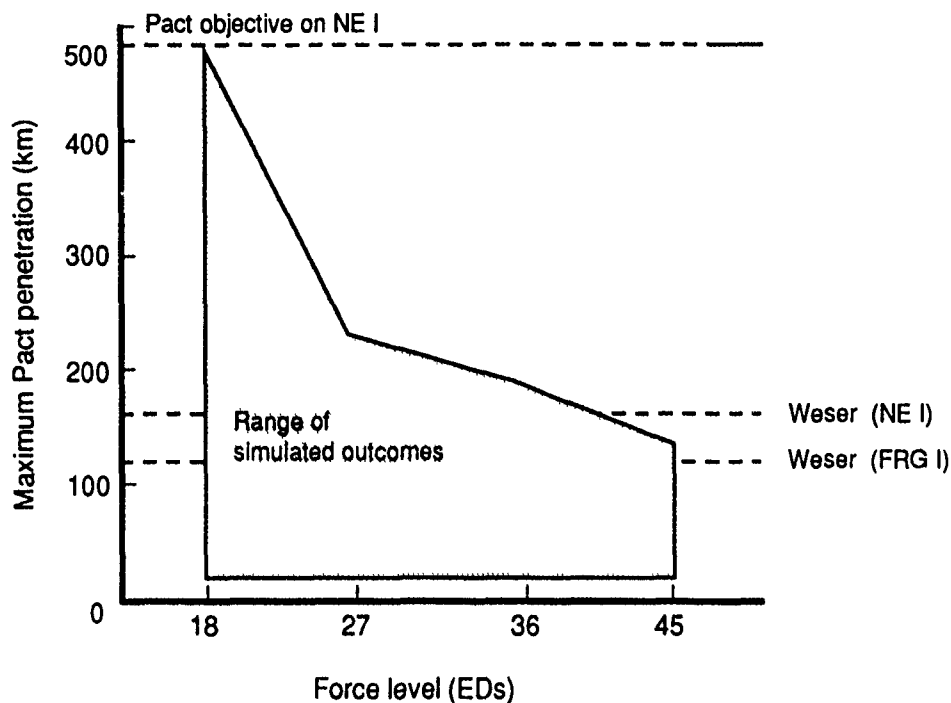


Fig. 3.9—Influence of force level on outcome uncertainty

attack could be worn down. Finally, outcomes at the 18 ED level varied widely even under baseline assumptions about defender advantage. NATO's force-to-space density was so low that the Pact gained an almost immediate breakthrough on D-day. Exploratory gaming at this level found that NATO's success often hinged on the proper timing and placement of a few brigades, and pointed up the volatility of outcomes at levels below or near the "operational minimum."

This volatility may have important implications for conventional stability at low force levels. It implies that as force levels decline NATO's prospects for a successful defense depend increasingly on factors other than force posture, such as generalship, timeliness, intelligence, and mobility. This would probably be regarded as a less militarily stable situation than obtained at higher force level parity, where NATO had (relatively) greater latitude for error in these qualitative areas.

It is not yet clear, though, how much weight this factor merits in the overall stability equation, pending addressal of the following issues in our ongoing work:

- We need to ascertain the extent to which non-force-posture factors still drive combat outcomes when the airwar is included. (It is possible that inclusion of the airwar may make the situation so favorable to NATO that this sensitivity, though still present, might have a diminished impact on the final outcome.)
- Although it does appear that sensitivity to non-force-posture factors is one dimension along which NATO's military stability declines with force level, that stability may increase along another. Specifically, as force levels decline, the attacker runs an increasing risk that even should he achieve victory in battle, he will have insufficient force remaining to occupy and control significant territory. The rate at which these two opposing factors take effect, and their net effect on military stability, requires our further attention.

Finally, of course, policymakers will need to weigh any decrement in military stability at low force levels against other benefits that deep reductions might bring, such as a possible increase in political stability (decreased likelihood of war) and potential economics savings.

Figure 3.10 dramatizes in another manner the potential consequences of dropping below the "operational minimum" (somewhere between 27 and 18 EDs in this analysis). These results are not so much predictive of dire outcomes for NATO at the operational minimum as they are a flag of warning that parity is very different at different force levels. The increased fragility of NATO's prospects at 18 EDs highlights the need to understand and identify factors upon which battles might turn at very low force levels. Our results here indicate that the following can be quite important to improving NATO's prospects in combat driven largely by initiative and quickness.

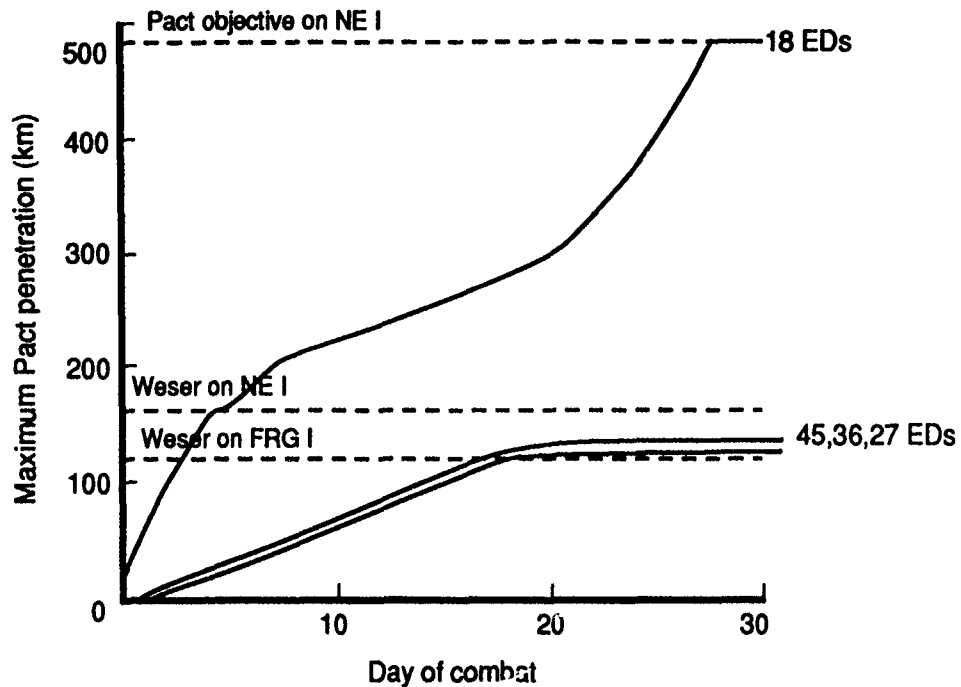


Fig. 3.10—Influence of force level on combat outcomes

- *C3I.* NATO's success in excursions in which it was allowed to counter-concentrate or to fully focus its reserves highlights the need for timely and reliable intelligence, and the capability to quickly respond to that intelligence.
- *Unity of Command.* Closely allied to the above is the importance of achieving fungibility in the use of forces, as was the assumption in this study. This implies a true unity of command in which all NATO forces are capable of being employed with equal dexterity and timeliness (without such interoperability problems as would be expected today).
- *Contingent Forward/Fallback Strategies.* NATO can rob the Pact of some of the initiative and speed upon which the attack's success depends by delaying back to the Weser, rather than

attempting to defend forward at the IGB. In the excursion examined here this tactic prevented an initial Pact breakthrough, and allowed reinforcements to be concentrated at the prepared defenses of the Weser where they would be of greatest effect in containing and ultimately defeating the attack.

- *Counterattack Capability.* If NATO cannot credibly mount theater counteroffensives, the Pact could strip even more forces off "other" sectors to reinforce main thrusts (Davis et al., 1989).

Table 3.1 provides a tabular summary of outcomes for all the cases we have discussed here.

Table 3.1

TABULAR SUMMARY OF OUTCOMES

Case	Maximum Penetration by D+30	Theater Force Ratio (Red/Blue) on D+30
45 Base	130	0.72
Scripted break	145	0.70
Reduced ER	138	0.79
No terrain advantage	136	0.70
NATO-favorable	20	
36 Base	128	0.68
Scripted break	129	0.71
Reduced ER	190*	0.80
No terrain advantage	167	0.70
NATO-favorable	20	
27 Base	127	0.72
Scripted break	129	0.69
Reduced ER	205*	0.83
No terrain advantage	228*	0.75
NATO-favorable	20	0.70
18 Base	491**	1.18
Added NATO barriers	400*	0.88
Counter-concentration	159*	0.79
Delay to Weser	170	0.73
Fully focused reserve	250	0.81
NATO-favorable	28	0.73

NOTES: Unless otherwise noted the D+30 situation was a stalemate. The favorable D+30 force ratios in most of the cases indicate that NATO would be in a position to reconstitute forces and take the offensive, perhaps even to restore the status quo ante. However, the focus of this work was on the capacity to contain the initial attack under conservative assumptions and we did not game such an offensive.

\* Pact still advancing on D+30

\*\* Pact had secured objectives in the BENELUX countries

#### IV. CONCLUDING OBSERVATIONS

In this preliminary exploration of Central Region conventional ground combat at parity of forces, "conclusions" would be premature. However, some general observations can be made:

- Current Pact concepts of operation may be largely dysfunctional at moderate force level parity. In the 45, 36, and 27 ED cases examined here the Pact had insufficient force to stress many parts of the theater simultaneously, and was unable to achieve the local superiority needed to produce large-scale breakthroughs. Moreover, when breakthroughs were scripted, Pact forces were unable to exploit them because they lacked the sheer mass required to defeat the remaining defending forces.
- As the overall size of the opposing forces is reduced the type of battle that would ensue changes. At very low force levels where NATO's ability to adequately defend its territory with a rigid forward defense was compromised (18 EDs in this study)<sup>1</sup> we found the Pact's prospects much improved, though NATO could easily succeed as well. These simulations indicate that at such levels the attacker must achieve surprise and early success, and then exploit that success rapidly to prevail. Final success, however, may not require the destruction of the opposing forces but only the attainment of deep objectives that would isolate groups of the enemy and lead to their surrender. Conversely, if the defender can anticipate, or react rapidly to, the attacker's actions, then a pitched battle ensues in which the issue would be much less predictable.

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<sup>1</sup>As noted above, the fact that the failure point is first seen clearly at 18 EDs rather than, say, 12 or 25 EDs, depended on uncertain input parameters and data regarding terrain and tactical force-to-space requirements. See Davis et al. (1989). We have been concerned here not so much with estimating the exact force level at which such a failure point might emerge, as with identifying factors key to NATO's prospects in such an environment.

- The increasing role of factors other than force posture (e.g., generalship, intelligence, timing, and mobility) in determining NATO's prospects as force levels decline should be taken into account when assessing military stability. Our ongoing research should further clarify how much weight this factor merits in such an assessment.

Clearly, in our attempts to understand more fully the critical determinants of low force level combat, attention now needs to turn more closely to the examination of alternative offensive and defensive strategies that emphasize maneuver and mobility. Equally important is the need to consider what happens when the attacker is able to do better than parity and attain a superior theater force ratio through superior force generation rates or the use of out-of-area forces (e.g., Soviet redeployment to the Central Region of forces in military districts such as Kiev, Moscow, or the Transcaucasus). The next step beyond these is to consider cases in which the non-Soviet Warsaw Pact states are unreliable allies of, or hostile to, the USSR.

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