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AN ASSESSMENT OF SOVIET FORCES FACING NATO- THE CENTRAL REGION- AND SUGGESTED NATO INITIATIVES

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This paper presents an assessment of the Soviet-Warsaw Pact forces in the Central Region (i.e., German Democratic Republic and Czechoslovakia) facing the NATO forces. Emphasis is on the improvements made in Soviet ground and air forces during the past ten years. The discussion is qualitative and quantitative, and includes changes in organization, with the emphasis being on trends. → next page

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18. SUPPLEMENTARY NOTES (Continued)

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20. ABSTRACT (Continued)

cont. As appropriate, comparisons are given between forces of the Soviet Union and the United States, and of Warsaw Pact and NATO forces in the Central Front area.

Although there has been a limited change in the number of Soviet divisions assigned to the Central Region, there has been a significant increase in non-divisional troops. Similarly, there have been major qualitative improvements in Soviet division equipment and weapons and in the additional non-divisional units that are not readily apparent in most comparative efforts.

These changes have greatly enhanced the offensive capabilities of the Group of Soviet Forces Germany (GSFG). Soviet military strategy differentiates between offensive and defensive operations, but in the event of war the Soviets stress that it is most likely that a decisive victory over an enemy can best be obtained through the use of offensive operations. The assessment of Soviet doctrine, of the qualitative and quantitative improvement in the combat potential of Soviet forces, and of the training and exercises of Warsaw Pact forces all confirm their basic offensive nature. All observed force improvements have enhanced the ability of these forces to launch a surprise attack against the Central Front of NATO using only those forces presently positioned in East Germany and Czechoslovakia. Second echelon forces and strategic reserves would be committed to movement only after a military conflict begins.

The paramount importance in Soviet military doctrine is surprise--both tactical and strategic--and in maintaining the combat initiatives in all offensive operations.

This assessment has provided a vehicle for focusing attention on improvements in NATO organization and operations, and on those existing and future technologies that can make a significant contribution to improving the combat potential of U.S. and NATO forces on the Central Front.

AN ASSESSMENT OF SOVIET FORCES FACING NATO - THE CENTRAL REGION

1. INTRODUCTION

This paper presents an assessment of Soviet forces facing the Central Region, i.e., those Soviet forces located in the German Democratic Republic and Czechoslovakia. We will focus our attention on the improvements that have been made in Soviet ground and air forces during the past ten years. To provide some relief from the tyranny of numbers, we have chosen to discuss not only the changes in the quantity of forces, but also the qualitative improvements that have been made. No discussion of combat potential would be complete, however, without describing the organization in which these forces are placed. Further insights come from an assessment of how Soviet forces might be used should a military conflict occur in the Central Region.

Not all types of Soviet military actions can be described, however. This paper limits the discussion to those military actions that the Soviets can be expected to execute should they encounter a stiff mobile defense in depth: a break-through operation. With this limitation, we will minimize the discussion of maneuver operations, Soviet airborne operations, and the [illegible]ies of other special groups. (This does not mean that we are not [illegible]d with the value of tanks, but a tank comes into its own when a defen[illegible] has been defeated and rapid movement and exploitation is possible.)

Because of the active interest in current arms control negotiations, a few comments and suggestions are provided for possible inclusion in future arms limitations discussions with the Soviet Union.

In this assessment, emphasis will be given to comparisons between the forces of the Soviet Union and the United States. Between the Baltic and Czechoslovakia, the majority of Warsaw Pact forces are made up of those of the Soviet Union.[1] Considerable information is available in unclassified sources on the combat potential of these forces and likewise there is considerable information available on U.S. forces.[2] Very modern and capable military units exist in all European countries and our failure to utilize their characteristics in our comparisons does not in any way indicate a lack of respect and interest in their capabilities. In fact, in a number of cases, European equipments are superior to those in current U.S. operational units.

[1] Ref. 9, Military Balance, pp. 95-102.

[2] Number totals for Soviet and U.S. weapons, equipment and personnel in this paper have been directly extracted or derived from a data base consisting of unclassified references. This data base is identified in the appended "References."

This assessment has been an excellent vehicle for focusing attention on improvements in organization and operations and on those existing and future technologies that can make a significant contribution to improving the combat potential of the forces of the U.S. and other NATO countries. Throughout the presentation, reference will be made to those areas of improvement that we believe to be important to pursue. A summary of improvements will be given at the conclusion of this paper.

2. SUMMARY

During the past decade, there have been significant improvements in the combat potential of Soviet ground and air forces facing NATO's Central Region. This is particularly true of those Soviet forces stationed in the German Democratic Republic (GDR): the Group of Soviet Forces Germany (GSFG). Similar force improvements will probably take place within East German forces and during the next several years the equipments that we will describe will probably appear throughout all the armed forces of the Warsaw Pact.[3]

These force improvements have greatly enhanced the offensive capabilities of GSFG. Soviet military strategy differentiates between offensive and defensive operations, but in the event of war the Soviets stress that it is most likely that a decisive victory over an enemy can be best obtained through the use of offensive operations.[4] Our assessment of Soviet doctrine, of the qualitative and quantitative improvement in the combat potential of Soviet forces, and of the training and exercises of Warsaw Pact forces all confirm their basic offensive nature. All force improvements have enhanced the ability of these forces to launch a surprise attack against the central front of NATO using only those forces presently positioned in the GDR and Czechoslovakia. Second echelon forces and the strategic reserve would be engaged after a military conflict begins. The paramount importance in Soviet military doctrine of strategic and tactical surprise and in the maintenance of combat initiatives in all offensive operations has been demonstrated in Soviet training and exercises as well as in the force improvements that have taken place in the past ten years.[5]

[3]Ref. 14, Jane's, shows proliferation of Soviet weapons and equipment to other Pact nations. Ref. 9, Military Balance demonstrates the fact of interaction. Ref. 8, IDR, Apr. 1975, p. 175, underscores the intensive re-equipping of Warsaw Pact forces since 1969-70. (Ref. 4, Soviet War Machine, a recent publication, also illustrates and details particulars of these developments, organization and capabilities for combined arms combat operations.)

[4]Ref. 20, The Offensive, p. 3 and Ref. 18, pp. 158-59.

[5]Ref. 20, The Offensive, Ref. 18, Operational Art; Ref. 17, Tactics, pp. 54-56 and 137-41. See also Ref. 28, Military Herald, Dec. 1975, pp. 77-80 and Nov. 1975.

The materiel developments and deployments in Soviet military equipment demonstrate a continuing intent on the part of the Soviets to maintain quantitative superiority over NATO's forces. Furthermore, the qualitative improvements that have been made have not resulted in any decrease in the number of equipments deployed; in most cases, there has been an increase in the number of major pieces of military equipment placed in GSFG.[6] The qualitative improvements in Soviet equipment show the continued pursuit by the Soviets of their goal of obtaining qualitative superiority over NATO in all combat equipment.

This assessment shows that during the past ten years, the Soviets have made impressive gains in:

a. Artillery and multiple rocket launchers

b. Ground attack aircraft

c. Theatre and field army air defense systems

d. Armored fighting vehicles

e. Anti-armor systems

f. Weapons of mass destruction

g. Communications and electronic warfare systems

The majority of the qualitative improvements have enhanced the conventional combat capability of Soviet forces, but nuclear and chemical forces have not in any way been neglected. This assessment certainly supports Marshall Moskalenko's statement in early May of this year that Soviet improvements in modern arms and materiel have provided virtually new forces, as far as equipment is concerned, to the Soviet Army and Navy.[7]

The assessment provided a number of results on improvements in Soviet combat potential that came as a surprise to the authors. This new awareness has been of considerable assistance in pointing to several technological programs that, if developed and deployed, could greatly increase the combat effectiveness of the NATO forces. The assessment also points to problems that the Soviet Union has that can be exploited.

Not only technical problems and opportunities have been illuminated. This assessment points to some organizational changes that could enhance the deterrent and combat potential of NATO's forces. The organizational changes are extensions of current NATO arrangements and are consistent with reorganizational plans that are being pursued by several of our NATO allies.

[6]Ref. 1, Air Force Magazine, Apr. 1976, p.62 and Ref. 9, Military Balance, p. 101.

[7]Ref. 15, Red Star, "Great Victory of the People," 9 May 1976.

While Soviet improvements are substantial, the ability of NATO to deal with them can be accommodated by a reasonable allocation of NATO's resources. The cost of the organizational changes is usually quite small. The cost of developing and acquiring the new technologies is in each case affordable.

3. SOVIET MILITARY OBJECTIVES AND STRATEGY

A thorough study of Soviet professional military literature and the history of all major military campaigns of the past 40 years allows a description of probable Soviet military objectives and strategy for a war in Western Europe. The first and most obvious objective is to deny the West the opportunity of acquiring any territory in Eastern Europe through military means. The second basic objective derives from their view of the nature of war: the offensive.[8] Their doctrine, force structure, materiel, combat support system, and training all point to a relatively short military campaign should war break out in Western Europe. The Soviets would hope to seize NATO territory in Western Europe in about two weeks, before NATO could be substantially reinforced.[9] To achieve this objective, the Soviets need the advantages of a surprise attack that is covered by deceptive actions,[10] thereby, obtaining and keeping the initiative, and pursuing their territorial objectives in a very intense but brief campaign.

The Soviet strategy for achieving their objectives is derived from an analysis of those campaigns that have been most successful in the past. Multiple, phased axes of advance would be established and a minimum rate of advance would be "forced" through the application of massed, conventional suppressive fires. Should it be necessary to use weapons of mass destruction, they will be applied in a manner that complements the conventional combat capability of Soviet forces.[11] The objective necessity of using either nuclear or chemical weapons is probably decreasing because of the improved conventional capability of Soviet forces. Nevertheless, the Soviets continue to make important improvements in their nuclear and chemical forces.[12] The Soviets possess complementary military options for obtaining their objectives should war occur in Europe.

[8] Ref. 20, The Offensive, p. 3; Ref. 18, Operational Art, pp. 158-59; and Ref. 4, Soviet War Machine, p. 238.

[9] Ref. 26, Soviet Operations, p. 84. See also Ref. 7, RAND Notes on Sokolovsky, p. 81.

[10] Ref. 17, Tactics, p. 43, and Ref. 20, The Offensive, pp. 58-60.

[11] Ref. 17, Tactics, p. 39; Ref. 10, Tank Company, p. 5; and Ref. 4, Soviet War Machine, pp. 170, 172.

[12] Ref. 26, Soviet Operations, pp. 46-52; Ref. 20, The Offensive, pp. 43-44. See also Soviet War Machine, pp. 174, 198-99.

The Soviets expect to encounter an excellent defense in depth.[13] The capabilities that have been provided to their forces are all designed to try to overcome such defenses. Realizing that they may not be able to defeat a good forward defense, they have given particular emphasis to techniques for creating deception and surprise. If these techniques are successful, they would be able to occupy NATO's territory using maneuver tactics. The Soviets' Manchurian campaign against the Japanese KWANTUNG army is the historical example that receives a great deal of emphasis in their professional literature.[14]

The details of a plausible Soviet campaign have been developed from a terrain analysis of Western Germany and the Low Countries applying Soviet doctrine, organization, and force characteristics against classic Western defenses.[15] An analysis of Soviet military writings indicates that rates of advance of 20 to 40 kilometers per day[16] can and must be achieved during those operations that are concerned with defeating and breaking through an Allied defense. During the exploitation phase, the rates of advance are expected to increase to 50 to 80 kilometers per day and perhaps 100 kilometers per day.[17]

In both situations, the rates of advance are forced through the application of carefully planned conventional fires using artillery and air. (Nuclear and chemical munitions may be employed to augment these conventional suppressive fires.)[18] These rates of advance are higher than those obtained in successful campaigns during World War II. Nevertheless, the Soviets plan to enforce these rates with their modern suppression systems, and with their improved armored fighting vehicles. They believe these rates can be sustained for a few weeks with the much improved combat logistic system that the Soviets now have. These rates are only twice those

[13]Ref. 3, Antitank Warfare, pp. 122-23.

[14]The RAND Corporation has developed a number of studies bearing on the Soviet interest in and emphasis on the Manchurian campaign. See, for example, Timely Lessons of History: The Manchurian Model for Soviet Strategy by John Despres, et al., WN 9151-NA, July, 1975.

[15]Ref. 20, The Offensive, pp. 60-61 and Ref. 18, Operational Art, pp. 167-201.

[16]Ref. 26, Soviet Operations, p. 84; Ref. 11, Combined Arms Army in the Attack, Chap. 4; Ref. 19, Rates of Advance, Chap. 1; and Ref. 4, Soviet War Machine, p. 238.

[17]Ref. 26, Soviet Operations, p. 84. See also Ref. 16, Sizing Up Soviets, p. 43, and passim in issues of Ref. 28, Military Herald.

[18]Ref. 19, Rates of Advance, pp. 108-126. See also Ref. 4, Soviet War Machine, pp. 169, 170, 199.

that were accomplished in break-throughs and exploitation operations in World War II. At that time, Soviet tank forces were able to move at about 45 to 50 kilometers per day in the exploitation phase;[19] while combined arms forces advanced roughly 25 to 35 kilometers per day. (Figure 1)

An examination of the geography of Western Europe, and the forces presently stationed near the West German border shows that 60 to 8 axes of advance might be pursued. These axes would be initiated at the same time and would proceed along the best geographical areas of Northern and Southern Germany, passing into the Low Countries and possibly into France.

Before we describe how the Soviets might try to implement their strategy, a review of Soviet Force improvements and organization is needed. This is provided in the next section.[20]

4. AN ASSESSMENT OF SOVIET COMBINED ARMS FORCES

To achieve their objectives, Soviet forces must cover 600 kilometers in about two weeks.[21] What forces are available and what are their capabilities? To provide a meaningful answer to this question, we require an assessment that deals with not only the quality and quantity of Soviet weapons and military equipment but also with the organization that Soviets have developed to control and operate their forces. The training of Soviet troops has also been examined but in the interest of limiting the discussion this material will not be summarized. (Following the description of the quality and quantity of weapons and organization, a description of a classic break-through operation is given in Section E.)

The Soviet military operations, as well as those of NATO, will take place with combined arms Armies. These Armies are made up of equipments that provided four important combat functions: suppression, maneuver, defense, and support. (Figure 2)

The elements of suppression are artillery, multiple rocket launchers, close air support, mortars, helicopter gunships and surface-to-surface missiles. A wide variety of conventional, nuclear, and chemical munitions are available and allow what we have termed "complementary combat".

Important maneuver elements consist of tanks of various classes, and armored infantry and reconnaissance vehicles.

[19]Ref. 24, World War II USSR Frontages and Breakthroughs. See also Ref. 11, Combined Arms Army in the Attack, p. 180.

[20]Ref. 20, The Offensive, p. 21.

[21]Ref. 26, Soviet Operations, p. 84, discusses phasing of offensive operations by a Soviet Front.

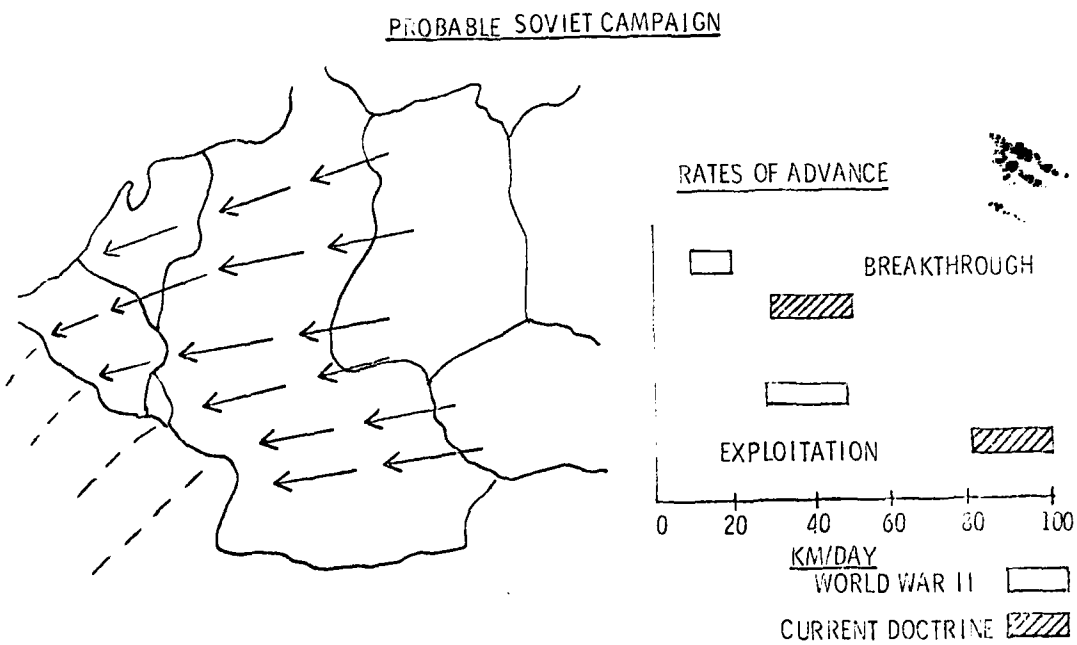


Figure 1. Probable Soviet Campaign.[22]

[22] Based on the content of Ref. 26, Soviet Operations; Ref. 20, The Offensive; Ref. 24, World War II USSR Frontages and Breakthroughs; and Ref. 19, Rates of Advance. (Routes of advance used by both sides in this area during WW I and II would generally coincide with these axes.)

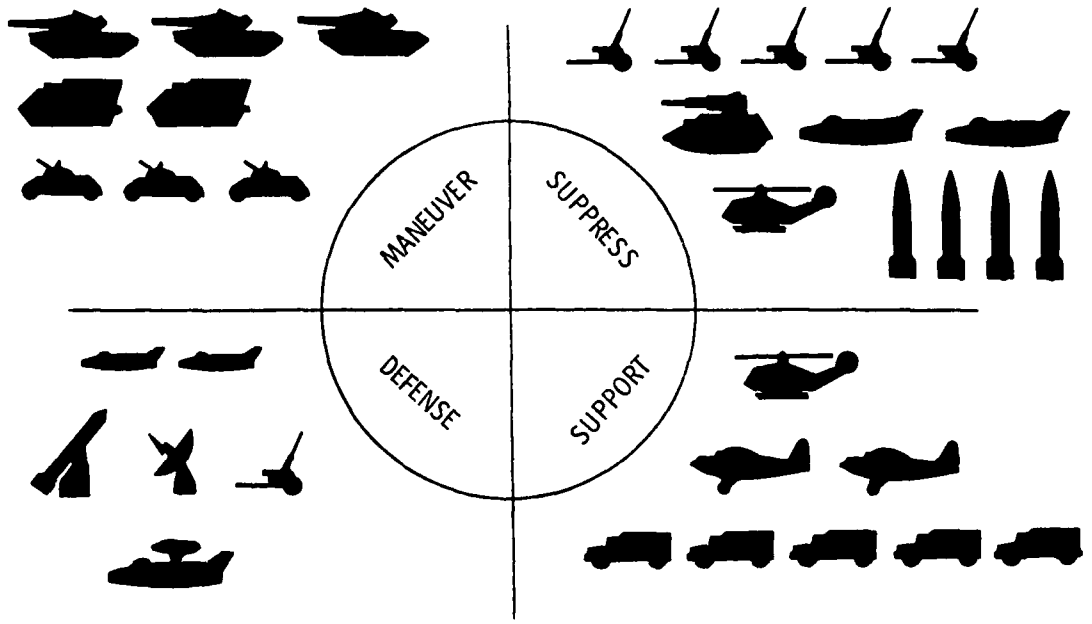


Figure 2. Combined Arms.

The defense forces consist of theater and Army air defense and anti-armor systems. These systems are either wheeled or track-mounted there are a large number of man portable systems.

Combat support elements are derived from trucks, railroads, ers and fixed-wing aircraft. In addition, excellent engineering units a able as are a wide variety of bridging and river crossing equipments.

Offensive operations are conducted by these forces. The success o the operations is dependent on the mutually supporting activities between the target-acquisition systems, the artillery, the maneuver units, the engineering and logistics support systems, and protection provided by air defense, anti-tank and artillery units. The momentum of the offensive is sustained by an organization that allows a Division assets to be echeloned or subordinated to another one. The independent assets of an Army can also be attached to the echeloned divisions as can those of the Front commander. Later, a description is given of a break-through operation. This is conducted by an Army utilizing assets subordinated into the one Division area where the break-through operation is to take place. The Front commander looking over several simultaneous break-through operations uses his assets to support those breakthroughs that prove successful.

When large military operations are conducted by the West, the unit deployed is a Corps. When large military operations are conducted by the Soviets, the organization that is deployed is a Front. This organization has some similarity to a Western Army Group, but is not in any way identical to it. The Soviet Front consist of several Armies, two to as many as eight.[23] All aviation is controlled by the Front commander, and a Front has a large amount of artillery, armored fighting vehicles, transportation, and engineering units. The Group of Soviet Forces Germany can be considered a Front. Should war occur in Europe, GSFG may be composed only of Soviet forces.[24]

The assets in the organizations that make up the Soviet Front can be broken into several major groupings--one associated with supporting a break-through, others associated with exploiting a breakthrough. Although this structure is arbitrary and changes with time, the break-through assets are those that provide the suppressive fires. The exploitation oriented functions are conducted by the armored fighting or maneuver units - tanks - supported by artillery assets attached to the maneuver forces for this purpose engineering, river crossing, and logistic systems all accompanying the maneuver forces.[25]

[23]Ref. 8, IDR, Apr. 1975, p. 183.

[24]Ref. 26, Soviet Operations, p. 79. See also Ref. 4, Soviet War Machine, pp. 236, 238.

[25]Ref. 26, Soviet Operations, pp. 6-16. See also Ref. 4, Soviet War Machine, pp. 158, 163, 169-70.

One criticism often directed at Soviet military organizations is that they have insufficient service support units. The answer to this criticism is their innovation in organization which allows the echeloning of several Fronts. Deficiencies that occur in one Front are made up at appropriate times by providing assets from the subordinated Fronts to those places that can most effectively exploit opportunities on the battlefield. Those axes of advance that succeed in breaking through defenses receive the active support of the echelon forces and allow the rapid exploitation of success. The Soviet logistics system which today is as modern and efficient as any found in the West, is set up to provide preplanned resources to the combat forces.[26]

The assets available to a Front commander are substantial. There is today no similar concentration of assets under the command of an Army Group Commander in the West.[27] There is a great deal of flexibility available for offensive operations conducted by Soviet Forces. This is one of the major asymmetries that exists between the forces on the Central Front. (In reality NATO does not face the Warsaw Pact. Most of NATO Corps face first-line Soviet Armies.)

Previously we noted that the Soviets are quite proud of the modernization programs that has taken place during the last decade in Soviet forces. The assessment tests this assertion and also examines some conventional wisdoms frequently stated in the West. For example, we frequently read that the Soviets produce large quantities of military equipment but that it is crude and unsophisticated. We are then reassured that the West can match or make up for Soviet quantitative superior because of the qualitative superiority of Western Equipments. This "myth" is becoming more difficult to support with the evidence that is now available.

4.1 Soviet Suppression Assets and Organization

The Soviet view of the important elements of the offensive have been described in a multitude of texts, articles and histories of military campaigns. They argue that the purpose of and the core of modern combat is the organization of conventional suppressive fire.[28] This fire is provided by artillery, multiple rocket launchers, mortars and aircraft and is essential not only for the offensive but also for a sturdy defense. These forces

[26]Ref. 9, Military Balance, pp. 99-100. See also Ref. 4, Soviet War Machine, p. 163. Ref. 8, IDR, Apr. 75, pp. 175. Ref. 13, NYT, 6 Mar. 76, p. 2.

[27]Ref. Data Base; Ref. 5, White Paper; see also Ref. 4, Soviet War Machine, p. 170.

[28]Ref. 18, Operational Art, pp. 112-13, 198, 220, 281, and Ref. 20, The Offensive, pp. 26, 118, 125, 149.

are responsible for the neutralization or annihilation of defenses and opposing fire weapons. The weight of a Soviet artillery barrage will be applied to NATO's artillery, its battlefield support rockets, its anti-tank defenses, and their command posts.[29]

The Soviet program for modernization of artillery has resulted in a large increase in the number of artillery tubes available to both Motorized Rifle and Tank divisions. (Figure 3). Today they have artillery assets equal to that of a typical U.S. division. The number of tubes for multiple rocket launchers has also been increased. U.S. divisions no longer have this particular component of artillery. A number of Soviet artillery pieces are now self-propelled. The artillery assets available to a Soviet Army and to a U.S. corps are approximately equal in number and caliber. There are a large number of artillery tubes available to a Soviet Front; there is no comparable assignment of assets within NATO.

Further asymmetries emerge when we examine the qualitative features of Soviet and U.S. artillery; firing rates and range. The 122 and 152 millimeter systems for the Soviets have had important range improvements; 40% for the 152 millimeter. The Soviets 130 millimeter Howitzer has always had a good range (28 km) and firing rate (6 rounds per minute). Today, their systems are superior to U.S. artillery systems. Range improvements in U.S. artillery systems are under way and should be deployed in the early 1980's. (Figure 4).

There is considerable sophistication apparent in the technical characteristics of the new Czeck multiple rocket launcher. There are a large number of tubes per launcher, and in addition, there are provisions for the rapid reloading of this system. We do not know if the Soviet forces intend to use this system. Should it be provided to Soviet forces in the future, the magnitude of suppressive fire available to Soviet artillery will be dramatic. This is apparnet when we examine the growth in salvo weight that has occurred since World War II. At that time a division salvo was two tons. For artillery alone, this has been improved to over three tons today. The inclusion of multiple rocket launchers increases the weight to almost nineteen tons. The shocking power of Soviet artillery is apparent. (Figure 5).

Large concentrations of Soviet artillery can be obtained with their concept of organization. Assets of a Soviet division can be raised from 72 guns to over 400 guns through subordination.[30]

[29]Ref. 29, The Offensive, pp. 132-137.

[30]Ref. 23, Soviet Weapons and Equipment.

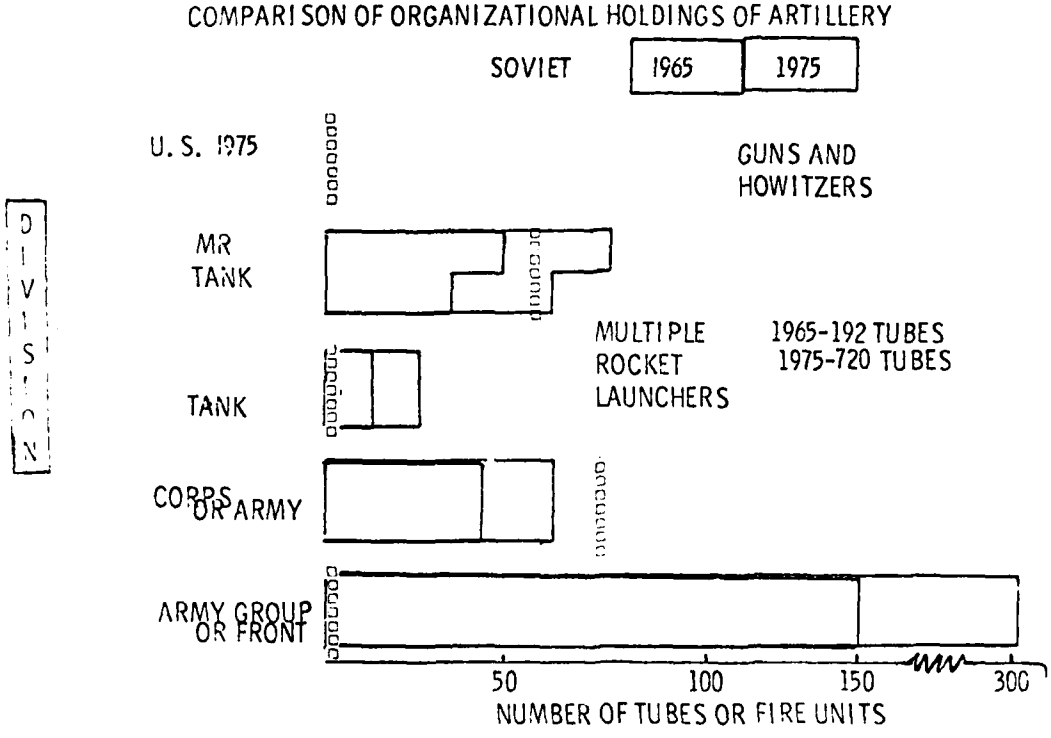


Figure 3. Comparison Of Organizational Holding Of Artillery.[31]

[31]Ref., Data Base. For Soviet Division assets, see Ref. 23, Soviet Weapons and Equipment. For non-divisional assets, see Ref. 25, U.S. Army FM 30-40. See also Ref. 26, Soviet Operations, which indicates that the Soviets allocate an Artillery Division for Front, and an Artillery Regiment for Army. The Regiment has 54 guns, and an Artillery Division is made up of four regiments.

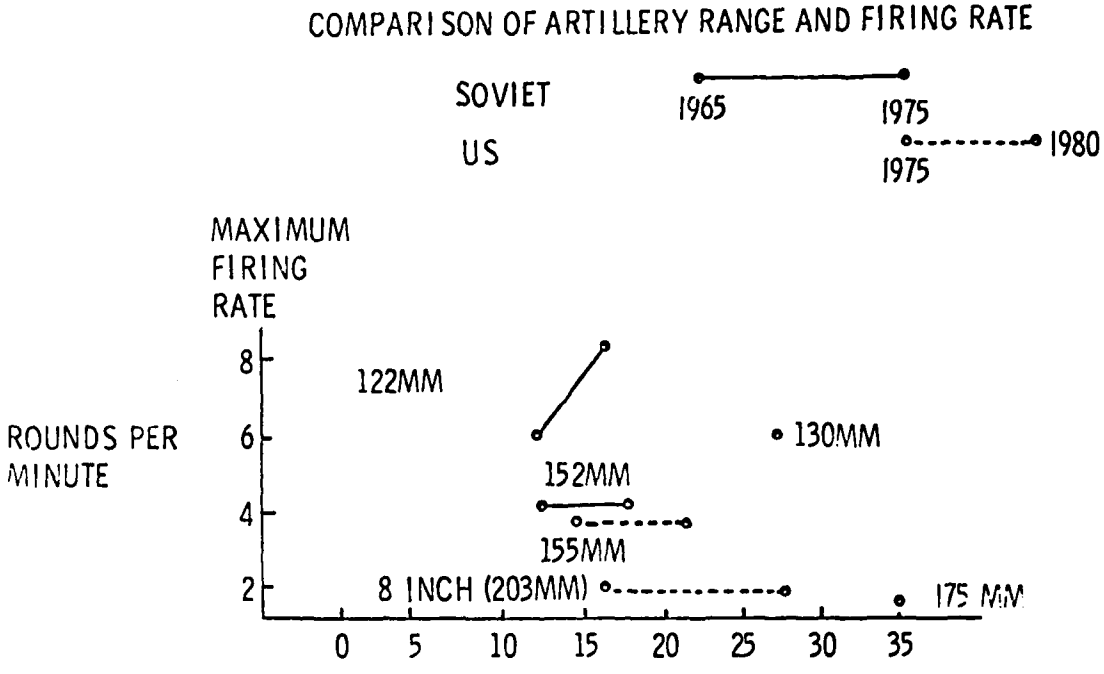


Figure 4. Comparison Of Artillery Range And Firing Rate.[32]

[32] Ref. Data Base.

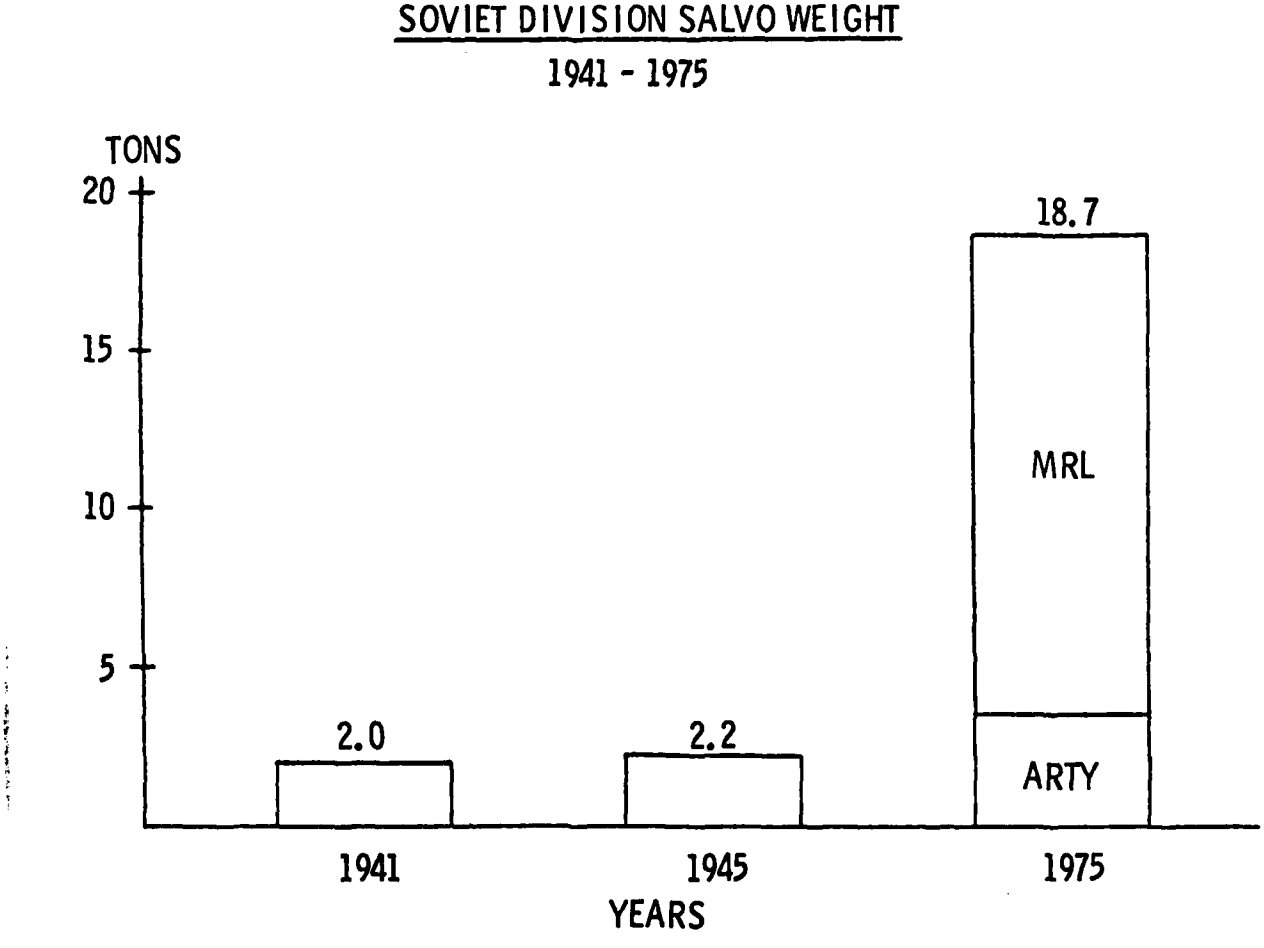


Figure 5. Soviet Division Salvo Weight.[33]

[33] For weapons, see Ref. 23, Soviet Weapons and Equipment. For Weight of pounds, see Ref. 14, Jane's.

The evolution in numbers and quality of Soviet artillery with its high firing rates and increased range provides a much improved suppressive fire power to the Soviets and improved survivability on a nuclear battlefield.[34] The Soviets possess a quantitative and qualitative lead over the United States. In particular, the flexibility of their organization and the large number of assets held by the Soviet Front commander provide an important superiority in the combat potential for conventional artillery suppression.

4.2 Combat Support and Other Aircraft

One of the most dramatic improvements in Soviet forces has occurred in Soviet frontal aviation. The introduction of newer Soviet aircraft during the past ten years has provided Frontal aviation with a four-fold increase in payload and a two and a half fold increase range.[35] Today, Soviet combat support aircraft compared favorably with those aircraft available to NATO. (Figure 6).

In the early sixties, forward deployment of Soviet frontal aviation was necessary in order to provide combat support aircraft to one-third of West Germany with Soviet assets based in the German Democratic Republic. Today, Soviet frontal aircraft operating from deep bases can cover all of the airfields in NATO. In addition, the MIG-23 and the SU-19 are capable of delivering conventional or nuclear ordnance to all NATO bases even when flying at low altitudes.[36]

A comparison of the F-111 and the SU-19 shows that these aircraft are comparable. Arguments or disputes in the SALT discussions between the U.S. and the Soviets that the Backfire is similar to the F-111 cannot be supported. The Backfire weighs approximately three hundred thousand pounds. The F-111 and the SU-19 weigh one-third of that.

The majority of Soviet Frontal aircraft are now of swept-wing design. (Figure 7). Their ground attack capability is very comparable to that available in the West. Judgements have been made that the avionics of Western aircraft systems are probably superior.[37] Nevertheless, the air threat in NATO has increased significantly in the last ten years. The need for passive protection of aircraft, the active defense of airfields, etc., and the acquisition of improved Army air defense systems is apparent.

[34] Ref. 18, Operational Art, p. 179.

[35] Ref. 14, Jane's; and Ref. 8, IDR, Apr. 1975, pp. 180-81 and 184.

[36] Ref. 8, IDR, Apr. 1975, p. 184; and Ref. 4, Soviet War Machine, pp. 96, 104.

[37] Ref. 8, IDR, Feb. 1976, pp. 67-69, May 1976, pp. 193-97. See also Ref. 4, Soviet War Machine, pp. 76, 96.

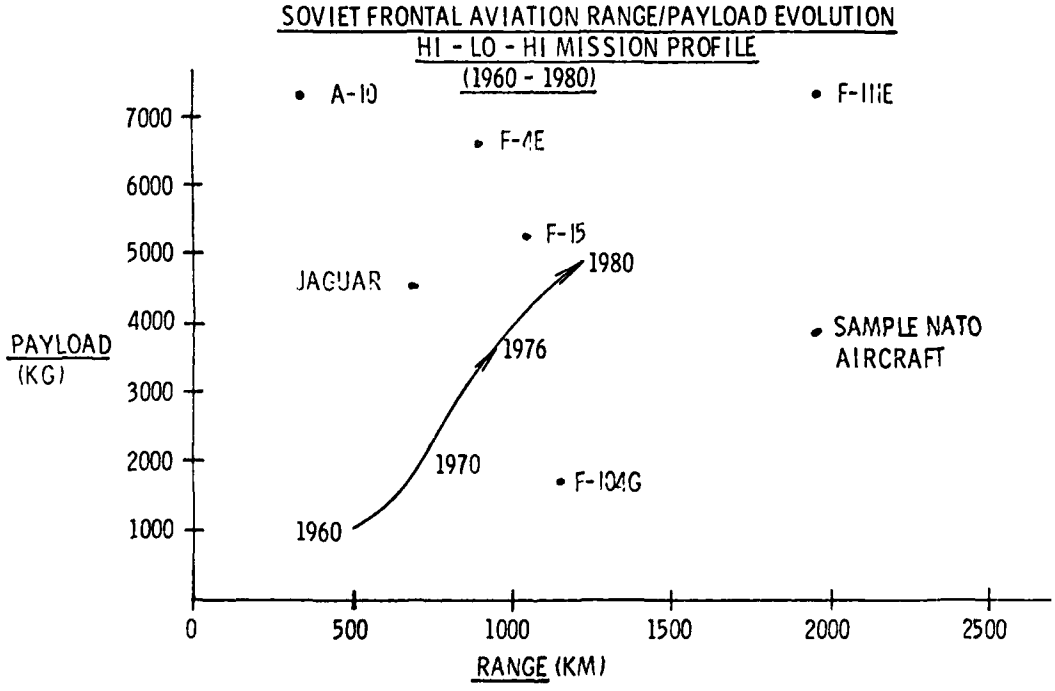


Figure 6. Soviet Frontal Aviation Range/Payload Evolution.[38]

[38] Ref. Data Base; Ref. 14, Jane's; and Ref. 8, IDR, Apr. 1975.

EVOLUTION AND INVENTORY OF TACTICAL AIRCRAFT

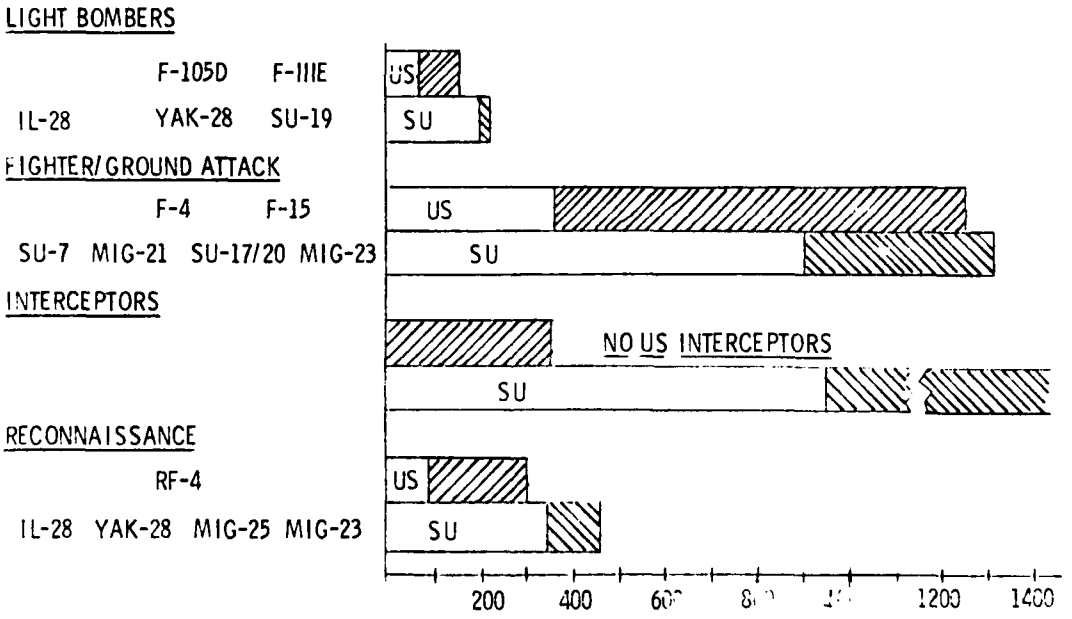


Figure 7. Evolution And Inventory Of Tactical Aircraft.[39]

[39]Ref. Data Base, and Ref. 9, Military Balance, p. 100. See also Ref. 8, IDR, Apr. 1975 and May 1976.

4.3 Surface-to-Surface Missiles

The evolution of surface-to-surface missiles has proceeded along comparable lines on both sides. The Soviets, however, have deployed larger numbers of missiles in the Central Region of NATO--some twelve hundred to slightly more than four hundred for NATO. (Figure 8)

Some sixty Scaleboard missiles are available to three Front commanders. The Scaleboard is comparable in some ways to the Pershing 1-A system in the West. The Scud A and B, which can be compared with Sergeant and Lance, is available to both the Front and Army commanders.[40] The Frog III and VII system compares in many ways to Honest John.[41] It is assigned to a division and large numbers of these are available in Eastern Europe. (Figure 9)

Soviet surface-to-surface missiles are provided with nuclear and chemical warheads. Soviet forces are also provided with good chemical protective systems. Individuals have protective suits and equipment for the detection and the removal of chemical agents from troops and equipment.

At present, the MBFR discussions acknowledge the existence of nuclear weapons provided by the United States, and the West has offered to withdraw a significant number of nuclear warheads from Europe in exchange for withdrawal of Soviet ground forces, mainly tanks. The Western proposals for MBFR should recognize the existence of large inventories of Soviet nuclear weapons and delivery vehicles in Eastern Europe. Once acknowledged, a proposal for the balanced reduction of Soviet and U.S. nuclear weapons might result.

This issue is complicated, however, for there are a large number of intermediate and medium range missiles and bombers stationed in the Western Soviet Union, many of which are targeted on U.S. and Allied Forces in Western Europe. At present, we estimated that there are a few thousand weapons stationed in the Soviet Union that are not now a part of either the SALT or MBFR. Last, but not least, it is worthwhile to remind ourselves that the Soviets are in the process of developing a new medium or intermediate range missile - the SS-X-20. This system will be mobile and it is possible that a MIRV will be provided. How many of these missiles the Soviets will choose to build remains to be seen, but it is a good guess that perhaps some one thousand to fifteen hundred will ultimately be deployed. The total number of comparable medium range missiles and aircraft available to the Alliance is smaller.

[40] Ref. 9, Military Balance, pp. 5-6, 22 and 71-72. See also Ref. 4, The Soviet War Machine, pp. 158, 159, 176, 214, 223-224, 237.

[41] Ref. 14, Jane's.

EVOLUTION AND INVENTORY OF SURFACE TO SURFACE MISSILES

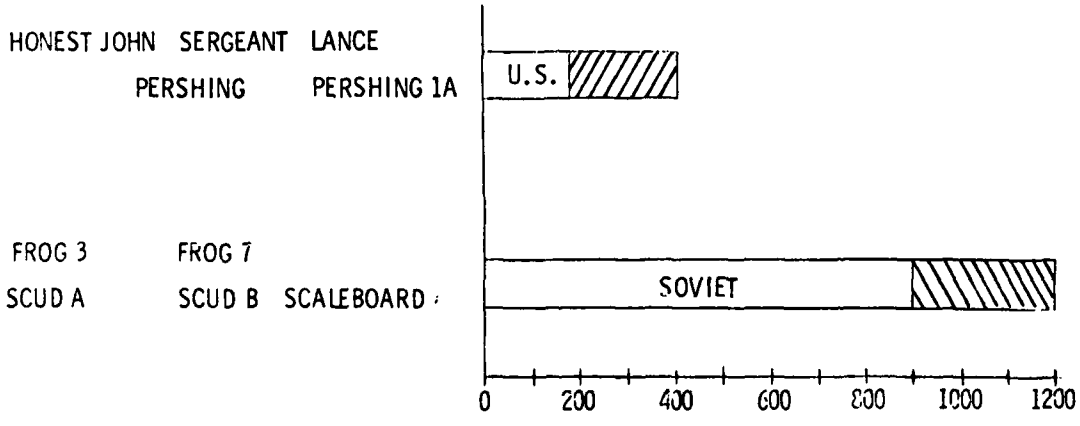


Figure 8. Evolution And Inventory Of Surface To Surface Missiles.[42]

[42] REf. 1, Air Force Magazine, April 1976, p. 62, and Ref. 9, Military Balance, pp. 71-75.

SOVIET NUCLEAR MISSILES
BALTIC TO ALPS

COMMAND	SCALEBOARD	SCUD	FROG
FRONT - 3	1 UNIT (UNKNOWN SIZE) 12 LAUNCHERS/UNIT 1 - 2 MISSILES (60 TOTAL)	2 BRIGADES 9 LAUNCHERS/BDE 1 - 2 MISSILES (100 TOTAL)	-
ARMY - 10	-	1 BRIGADE 9 LAUNCHERS/BDE 1 - 2 MISSILES (140 TOTAL)	-
DIVISION - 45	-	-	1 BATTALION 4 LAUNCHERS 2 - 3 MISSILES (600 TOTAL)

Figure 9. Soviet Nuclear Missiles Baltic To Alps.[43]

[43] Ref. 14, Jane's; and Ref. 9, Military Balance, pp. 71, 73.

Much has been made of the U.S./Soviet strategic balance. Equal concern should be given to the state of what might be called the Euro-Atlantic balance. Future arms control discussions should discuss ways in which these important delivery vehicles can be limited and perhaps reduced in number.

4.4 Soviet Maneuver Forces

Although the organization of conventional suppressive fire is frequently termed the core of modern combat, the Soviets recognize that suppressive fires must be supplemented by highly mechanized infantry and tanks in order to defeat and break-through defenses. Immediately after lifting the artillery barrage, the remaining defenses are attacked by groups of armored infantry vehicles artillery, and tanks that make up what the Soviets call "the decisive blow". These forces conduct fire missions against those undestroyed defenses which then allows the echeloned reinforced tank companies to proceed rapidly through the defensive zones. Tank exploitation operations will then take place.[44]

The Soviets have deployed in the past twenty-five years three new tanks which have been derived from the T-34, their successful medium tank of World War II. The T-55 was introduced in the fifties, the T-62 in the sixties, and now in the seventies, the T-72. The gun caliber has grown from one hundred and five millimeters to one hundred twenty-two millimeters. The T-72 will be provided with an automatic loader and the Soviets are going to reduce the number of crew men from four to three.[45]

At present, the West is discussing the desirability of choosing either the XM-1 developed by the U.S. or the Leopard-2 developed by West Germany. The sophistication of the Soviet T-72 is apparent. The Western tank that is ultimately chosen will face a formidable adversary. The success of tank operations may turn on the quality of fire control systems and crew training. It is expected that the West may ultimately have a slight edge in this area.

In the fifties, the M-113 of the U.S. was clearly superior to the Soviet battlefield taxi, the BTR-50. The Soviet infantry had to dismount through the top and other personnel were exposed. The improvements that the Soviets made in the early 1960's did not change the picture markedly. During the 1960's there was a clear technological superiority in Western armored infantry vehicles.

[44] Ref. 20, The Offensive, p. 90.

[45] Ref. 8, IDR, Feb. 76, pp. 24-26. See also Ref. 4, Soviet War Machine p. 178.

With the introduction of the Soviet BMP the picture has changed. This vehicle is clearly an armored infantry fighting vehicle. Personnel carried in this vehicle can fire their weapons through a series of ports on each side and in the rear. In addition, the vehicle carries a 73 millimeter smooth bore gun and also mounts a Sagger anti-tank missile. It is in every sense of the word an armored fighting vehicle, the U.S. M-113 is still a battlefield taxi. The BMP also can be pressurized to protect it from chemical and bacterological agents and it has equipment to detect these agents and nuclear radiation.[46]

There are roughly equal numbers of tanks and armored infantry vehicles and armored personnel carriers in similar Soviet and U.S. divisions. Once again, however, there is a disparity in that Front possesses significant numbers of additional armored assets. The qualitative differences are small but the Soviets possess the advantage of numbers.[47] The advantage in combat potential can pass to the Soviets in certain combat situations. (Figure 10).

4.5 U.S. and Soviet Personnel

The three previous sections show that the Soviets possess approximately the same number of tanks, armored infantry vehicles, and artillery, as the U.S. in comparable divisional units. These fighting equipments are placed in Soviet divisions that have a smaller number of personnel than do comparable U.S. divisions. For example, the U.S. Mechanized division has 2,500 more personnel than comparable Soviet Motorized Rifle Division. The Soviet tank division has only 11,000 personnel, which is to be compared with U.S. Armored divisions of 16,500 personnel. The increase in the number of assets available to the Soviet Front has been matched by an increase in personnel. From 1971 to 1976 approximately 100,000 men were added to Soviet Forces yet no new divisions were formed. The personnel increases in divisions was small. Th large increases in personnel occurred at Front and Army.[48] (Figure 11).

Many assessments compare divisions, tanks, and aircraft in Central Europe for NATO and Warsaw Pact. The mere counting of divisions, tanks, and aircraft can be unrewarding if one fails to remember the organization in which the Soviet forces are placed and the flexibility that this organization provides the Soviet Front commander. A Front can organize large concentrations of artillery, tanks and armored infantry vehicles along major axes of advance to produce the force superiority ratios that the Soviets believe to be essential for success.

[46]Ref. 8, IDR, Jun 1975, pp. 896-898; Ref. 23, Soviet Weapons and Equipment; Ref. 25, US Army FM 30-40, p. 5-25; Ref. 16, Sizing Up the Soviet Army, pp. 24, 26. See also Ref. 4, Soviet War Machine, p. 185.

[47]Ref. 9, Military Balance, p. 99. Ref. 8, IDR, Feb. 1976, pp. 24-26. Ref. 16, Sizing Up the Soviet Army, pp. 27, 29.

[48]Ref. Data Base; and Ref. 5, White Paper, p. 34.

COMPARISON OF ORGANIZATIONAL HOLDINGS OF SELECTED ARMORED VEHICLES

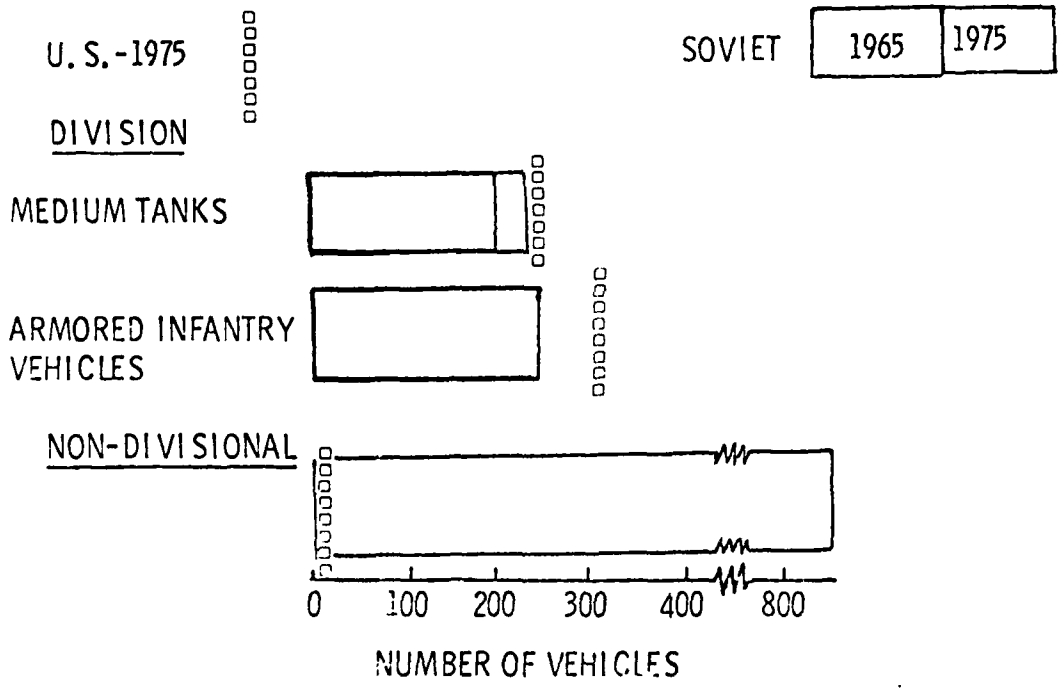


Figure 10. Comparison Of Organizational Holdings Of Selected Armored Vehicles.[49]

[49] Ref., Data Base . Divisional data from Ref. 14, Jane's; Ref. 23, Soviet Weapons and Equipment; Ref. 5, White Paper; and Ref. 21, Armor Reference Data. Non-divisional data from Ref. 9, Military Balance; Ref. 5, White Paper; and Ref. 8, IDR, Apr. 1975, p. 183.

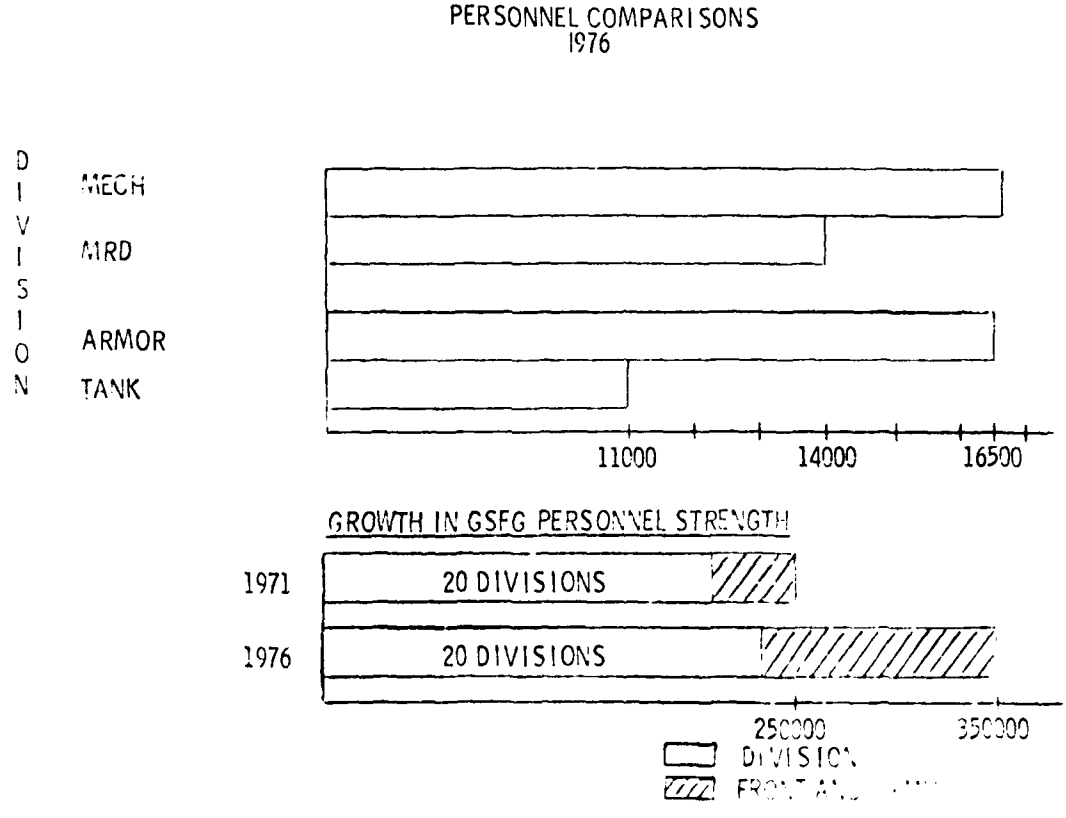


Figure 11. Personnel Comparisons.[50]

[50] Ref. Data Base; Ref. 5, White Paper; Ref. 13, Middleton, NYT; and Ref. 16, Sizing Up The Soviet Army, pp. 12-14.

4.6 Anti-Tank Weapons

Prior to the 1960's the number of anti-tank weapons available in the inventories of both countries was relatively small, and confined to relatively inaccurate infantry weapons and highly accurate anti-tank guns. The anti-tank guided missile in the 1960's and early 1970's is a revolutionary development. The Soviets currently have twice as many anti-tank guided missiles per division as the U.S. (Figure 12).

The United States has deployed, in some numbers, the TOW missile and is currently deploying Dragon. U.S. systems are usually operated in the open and are vulnerable to massed suppressive fires. There is, however, an improvement program in process to shelter some of these. Approximately half of the Soviet inventory of anti-tank guided missile launchers is sheltered.

The Soviets also have a battalion of 100 millimeter anti-tank guns. The U.S. have none.

In summary, the Pact has more anti-tank weapons than NATO. Many of the Pact weapons are protected and attached to vehicles for use in mobile fire combat.[51]

4.7 Air Defense Systems

There is a significant assymetry in air defense between Soviet and U.S. forces. The Soviet evolution has gone from simple, relatively crude guns and surface-to-air missiles, to a group of sophisticated, high fire power, mobile air defense guns, mobile air defense missiles, and man portable air defense missiles. These are all supplemented by an area air defense system. (Figure 13).

One dramatic way of displaying the growth in Soviet air defense is to examine the envelope of coverage provided by the guns and surface-to-air missiles. A review for 1963, 1970, and 1973 shows the increase in number and quality of air defense systems and their improved coverage.

The Soviets have produced a highly mobile, multiple air defense system capable of extending well beyond the line of contact. Greater survivability of semi-fixed systems has been achieved through overlapping support. Better road convoy coverage is derived from the SA8 and SA9.

[51] Ref. 23, Soviet Weapons and Equipment. (Tables 3, 4, and 5, together with totals of APCs listed for Soviet Motorized Rifle and Tank Divisions, demonstrate this.) See also Ref. 4, Soviet War Machine, pp. 156-7, 160, 164, 176, 213-214, and 222-223.

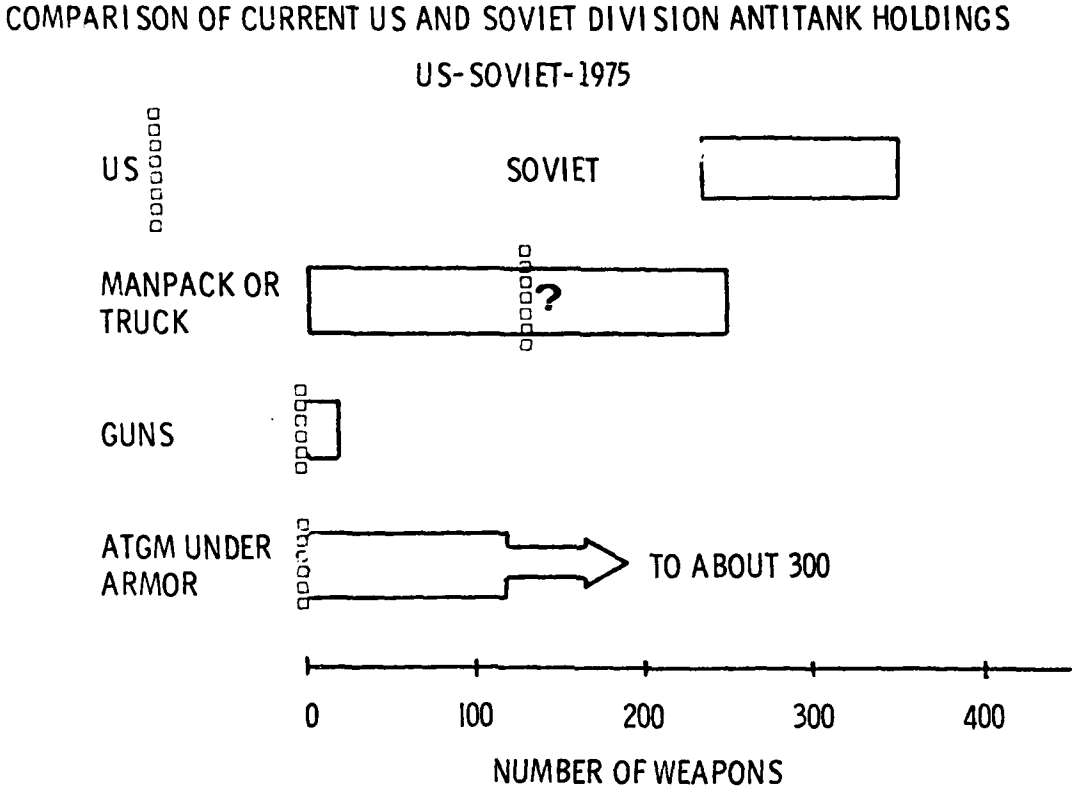


Figure 12. Comparison of Current U.S. And Soviet Division Antitank Holdings.[52]

[52] Ref. Data Base.

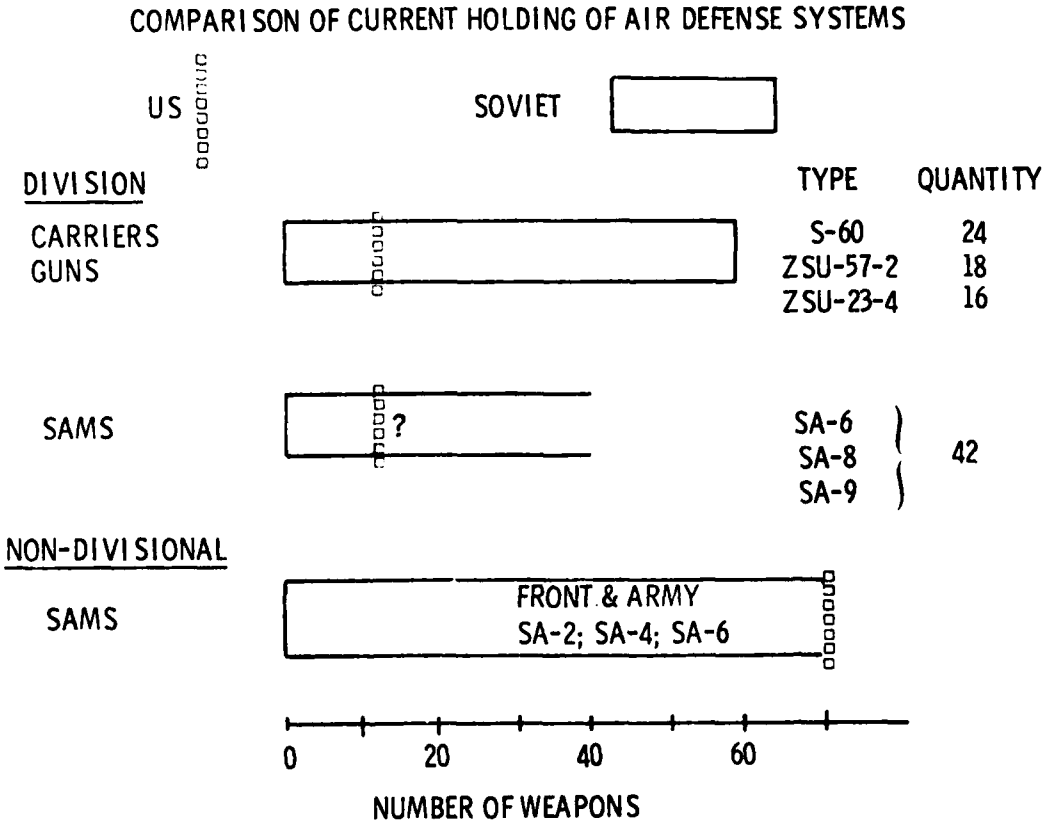


Figure 13. Comparison Of Current Holding Of Air Defense Systems.[53]

[53] Ref. Data Base. (For division data, Ref. 23, Soviet Weapons And Equipment; Ref. 8, IDR, April 1975; and Ref. 21, Armor Reference Data.)

There is an increased number of systems at all echelons and an increased number of fire-on-the-move systems. The technology represented by these systems can no longer be qualified as crude.[54]

Planning of NATO air attacks to overcome such defenses must not be quite sophisticated. It must involve coordination in time and space of means of protection, jamming, counter-measures, spoofing and suppression of the defenses by various munitions in preparation for strike aircraft. Such coordination requires significant pre-planning and, to some extent, inhibits the flexible use of air.

4.8 Electronic Warfare

The Soviet capability in electronic warfare exists at all levels. They have the capability to attack key nodes, key communications, and weapons. The Soviet family of jammers applies to land, sea, and air based applications. A modernization program is underway.[55]

The modernization in Command and Control accompanying these developments has resulted in increased speed, reliability and redundancy at all levels. In addition, there has been extensive development of hardened communications systems.[56]

4.9 Logistics, Bridging, and Engineering

The Soviet logistics assets, and bridging and engineering equipment is of high quality and available in large numbers. The Soviet logistic system, for example, is now comparable to that of the United States.[57] The notion that Soviet forces would require significant numbers of trucks from the civilian economy in order to function adequately is no longer supported by the available evidence.

[54] Ref. 9, Military Balance, p. 100; and Ref. 8, IDR, Apr. 1975, p. 183.

[55] See, for example, Ref. 29, Soviet Military Review, Issue 1-76, "Troop Control in Combat," pp. 14-15 and 18; Ref. 28, Military Herald, June 1974, "Remember the Enemy is Listening," p. 184; Ref. 28, Military Herald, Apr. 1971, "Suprise in Combat," p. 28; Ref. 20, The Offensive, p. 137, and Ref. 26, Soviet Operations, pp. 246-47.

[56] Ref. 8, IDR, April 1975, p. 175. In addition, Ref. 9, Military Balance, pp. 98-100, discusses logistics and Soviet capabilities for relatively rapid reinforcement and speculates on the capabilities of NATO and Warsaw Pact countries for sustained combat. Ref. 16, Sizing Up the Soviet Army, addresses Soviet readiness for short intense war in pp. 17, 21-23, 28-29, and 35. (See also Ref. 4, Soviet War Machine, pp. 158, 163-64.)

4.10 Comparisons, Suggested Improvements, Conclusions

An attempt has been made to summarize and compare the functional combat potential of U.S. and Soviet forces for two periods, the mid-sixties and the mid-seventies. (Figure 14). This comparison shows that Soviet improvement programs have given the Soviets an advantage in combat potential in a number of areas where NATO forces had superiority just ten years ago.

a. SUPPRESSION - ARTILLERY

The combat potential of Soviet artillery is clearly superior to that of the U.S. The qualitative improvement, the increase in numbers, and the organizational arrangements provide the Soviets with the ability to mass and effectively deliver large volumes of suppressive fire on NATO's fire weapons and anti-tank systems. When Soviets break-through operations are described, this suppressive fire will be shown to be quite effective.

For effective counter battery fire, longer range NATO systems are required and improved munitions are needed. Responsive and survivable target acquisition and fire direction centers are also needed. These improvements are available in the near term.

b. SUPPRESSION - AIR

An advantage in the combat potential of suppression provided by air resources probably resides with NATO if Soviet air defenses have been defeated.

The Soviets have made impressive improvements in their ground attack aircraft. Roughly 80 percent of the main ground attack aircraft of GSFG are now of high quality.[57]

The continued flexible use of NATO's ground attack aircraft will require better defense suppression systems, electronic warfare techniques, stand-off rockets and missiles for attacking defensive systems.

c. MANEUVER

The maneuver function is performed by tanks and armored infantry vehicles. In the mid-sixties, the edge in combat potential lay with NATO since it had superior tanks and superior armored personnel carriers. A numerical advantage in the sixties

[57] Judgement, based on Order of Battle; Ref. 8, IDR, April 1975, and Ref. 1, Air Force Magazine, issues of March and April, 1976.

FUNCTION	1965	1975	1980's
SUPPRESSION - ARTY, ETC	RED	RED	
SUPPRESSION - AIR	BLUE	ORANGE	
MANEUVER	BLUE	ORANGE / RED	WHAT SHOULD NATO INITIATIVES BE?
ANTI-ARMOR DEFENSE	BLUE	RED	
AIR SUPERIORITY	BLUE		
INTERDICTION	BLUE	ORANGE	
THEATER AIR DEFENSE	RED	RED	
DIVISION AIR DEFENSE	RED	RED	
LOGISTICS	BLUE	ORANGE	

Figure 14. Advantage in Combat Potential, (Quantity + Quality + Organization)

lay with the Soviet, but the edge was with Allied forces. With the qualitative improvements and the increases in assets that has taken place in the seventies, in our judgement, the edge could lie with the Soviets, although the issues may be in doubt. As we discussed before, fire control systems and training may be the deciding factor. Nevertheless, the competition in this area is stiff and the NATO allies will have to make wise choices in the tanks and APCs for deployment in the future. A successful mobile defense requires good tanks in quantity.

d. ANTI-ARMOR DEFENSE

In the sixties the advantage in these systems favored NATO both in terms of sophistication and numbers. The Soviets have now surpassed the U.S. and NATO in the number of anti-tank systems and the quality of their weapons is increasing. In addition, the protection to men and equipment on Soviet armored fighting vehicles gives them a decided edge, particularly in fire combat.

NATO's anti-tank systems must be protected both by fortifications on the battlefield and by armor on those vehicles where these weapons are mounted. Greater numbers are required since NATO's posture is defensive. Technology should provide quality and low cost proliferation.

e. AIR SUPERIORITY

In the early sixties, the West clearly had a lead and it appears that this matter may now be contested. The efficient use of these resources will be the deciding factor.

f. INTERDICTION

The West still has a significant edge in technology in those aircraft like the F-111. NATO possesses insufficient numbers however.

g. THEATER AND ARMY AIR DEFENSE

The combat potential clearly lies with the Soviets. A side-by-side comparison in this case, is not too meaningful. The threat from modern Soviet aircraft is substantial now. NATO's air defense posture must be re-examined.

h. LOGISTICS AND OTHER SUPPORT

In the sixties these functions were better provided by the U.S. and NATO. The Soviets are now in an excellent position to support large scale offensive operations. One would judge that the effect on combat potential for both sides is about the same.

4.11 Conclusion

This assessment shows that the Soviets have carried on an effective and broad modernization of their air and ground forces during the past decade, which has been accompanied by a number of significant technological advances. Soviet equipment can no longer be though of as being only highly proliferated in numbers, but relatively crude in technology. The deployed technology of Soviet aircraft, air defense, armored fighting vehicles, and anti-armor defenses, as well as the means that have been developed for complementary combat, leads one to the conclusion that the Soviets have equaled in sophistication many of the equipments produced by the West. The Soviet concept of organization provides them with important advantages.

The question that NATO must face is whether the modernization programs that it is pursuing will produce the combat potential necessary to deter the Soviets and to defeat them should deterrence fail. An examination of how the Soviets might choose to use their forces in combat operations will assist us in answering this question.

5. CHARACTERIZATION OF SOVIET BREAK-THROUGH OPERATIONS

The Soviets have made an extensive study of the lessons of past conflicts. From their own wartime experience and those of others they have fashioned a modern military force, a doctrine for its use, and in their view, a group of operating techniques that, if enforced, will assure the success of offensive operations.

This historical framework, coupled with the results and analysis of their own exercises, provides a set of fundamental principles that the Soviets view as applicable to modern warfare in Central Europe. This assessment is based on these Soviet perceptions, and on the characteristics of Soviet armaments, organization, and operational limitations. (Previous sections provide some data; more is given below.)

This discussion focuses on a break-through operation against a stiff forward defense. This is accomplished in the classical Soviet manner using massive conventional suppressive fires and the timely application of the "massive blow", followed up with supporting echeloned tank forces. Soviet

doctrine calls for the use of these techniques in the face of a prepared on hasty defense. Soviet attempts at deception and surprise have failed and NATO's forces have been positioned properly to deal with the expected Soviet attack.*

The offensive operations will be carried out by the basic "building block" for Soviet operations, the Front. In Central Europe, the Group of Soviet Forces Germany (GSFG) and the Central Group of Forces (CGF) represent first echelon Fronts. The Northern Group of Forces (NGF) is a second echelon Front. Third echelon Fronts are drawn from the Western Military Districts (WMD) in the Soviet Union.[58] (Figure 15).

Groups of Fronts implement regional operations. This type of organization might be directed by a higher headquarters as was done in World War II. Successful offensive operations initiated by first echelon Fronts are maintained by second and third echelon Fronts.[59] This concept of echeloning is carried to lower level units as well.

The Group of Soviet Forces Germany consists of five Soviet Armies. It may be complemented with two East German Corps.[60] These seven Armies and Crops are located near East German cities (Figure 16). Probable Army boundaries are shown; the frontage controlled by an Army might be 100 km long and approximately 100 km deep.[61]

5.1 Frontal Operations

To illustrate how a single Front would initiate and sustain a campaign, a series of figures (17 to 19) are attached. Within the Front, first and second echelon Armies are positioned, along with the assets of the Front

*NOTE:
Soviet operations and their results are described. Rarely will the counter actions of NATO forces be given. The NATO response will come after a full discussion of our understanding of the application of Soviet fire combat techniques against "typical" NATO defenses. The authors do not claim that the proposed Soviet plan of action would succeed if executed.

[58] Ref. 26, Soviet Operations, pp. 64-65, 84, 235; Ref. 16, Sizing Up The Soviet Army, pp. 17-23; Ref. 9, Military Balance, pp. 95-99; Ref. 8, IDR, Apr. 1975, pp. 182-183. See also Ref. 4, Soviet War Machine, pp. 236-237.

[59] See for example, Ref. 20, The Offensive, pp. 150-153.

[60] Ref. 8, IDR, Apr. 1975, p. 183. See also Ref. 4, Soviet War Machine, pp. 236, 238.

[61] Ref. 26, Soviet Operations, p. 89.

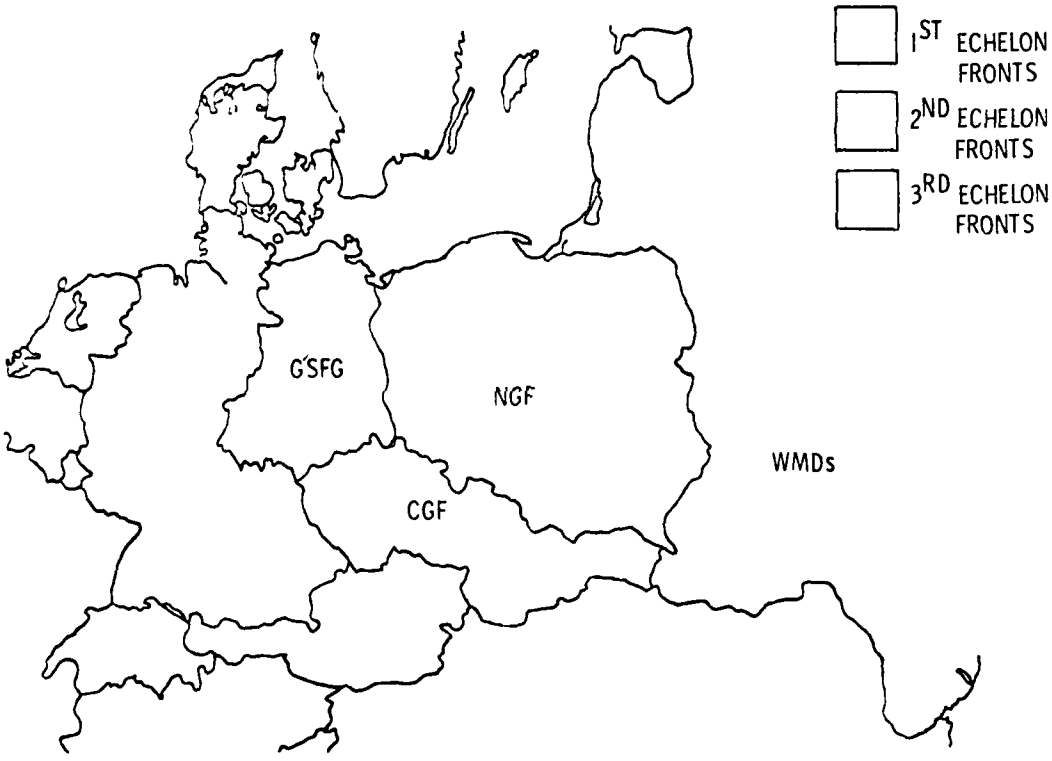


Figure 15. Soviet Frontal Echelons For Central Europe.

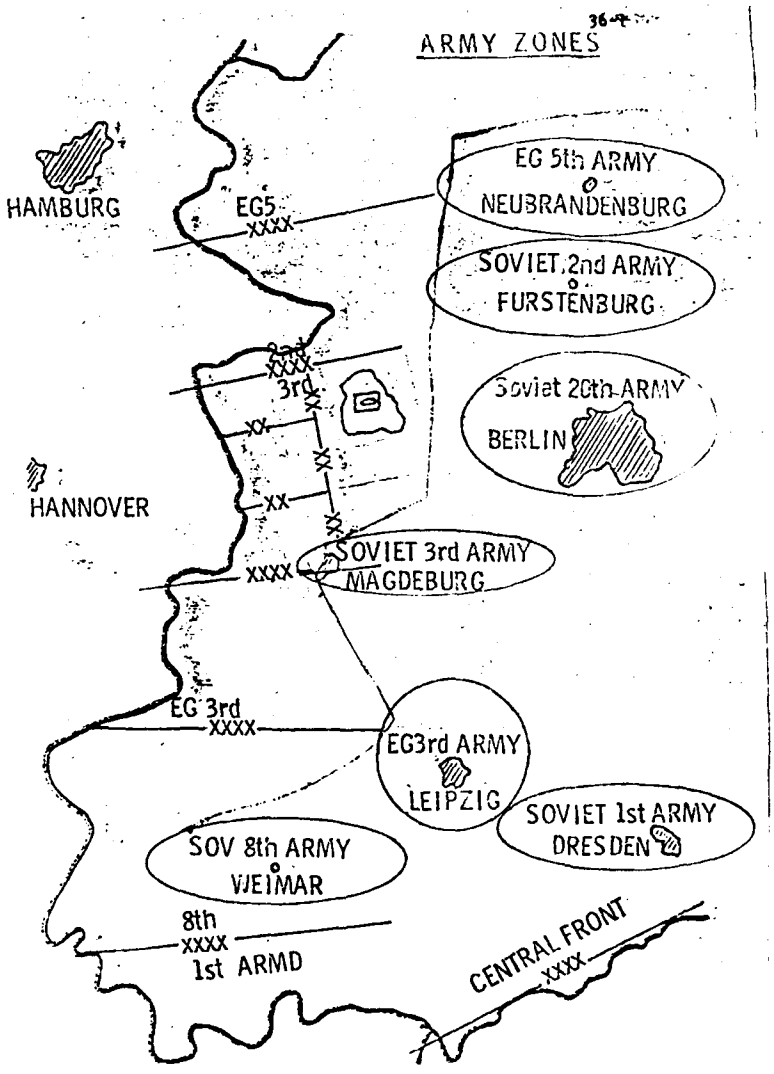


Figure 16. Army Zones.[62]

[62] Ref. 8, IDR, April 1975, p. 183; and Ref. 26, Soviet Operations. pp. 85 and 89.

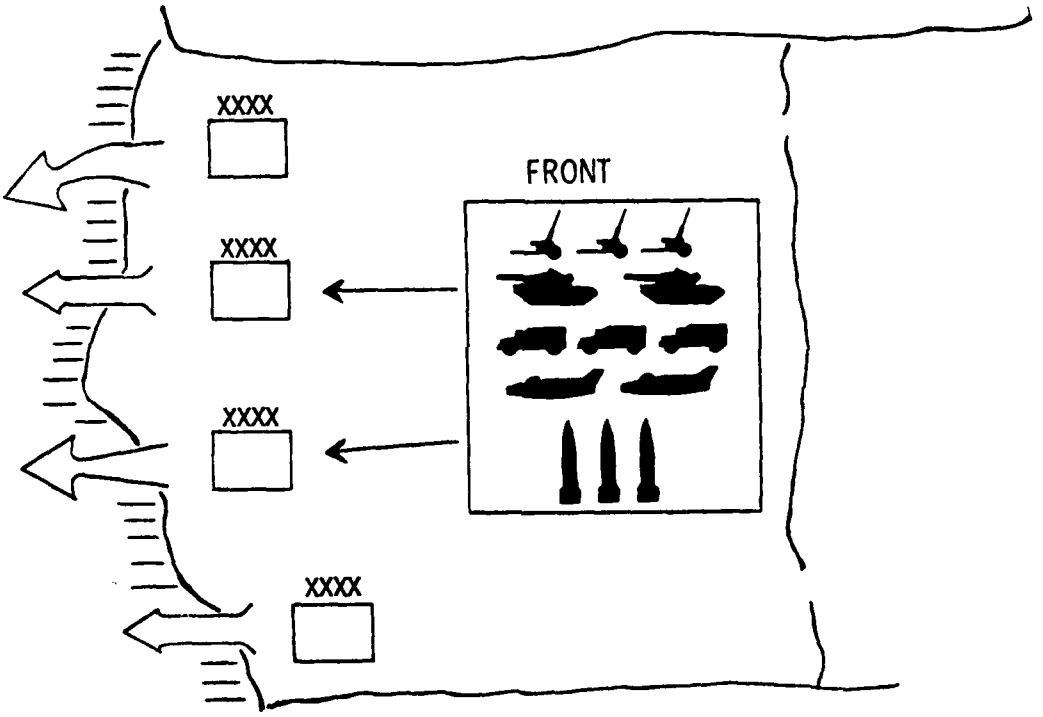


Figure 17. Illustration Of Soviet Concept Of Operations.

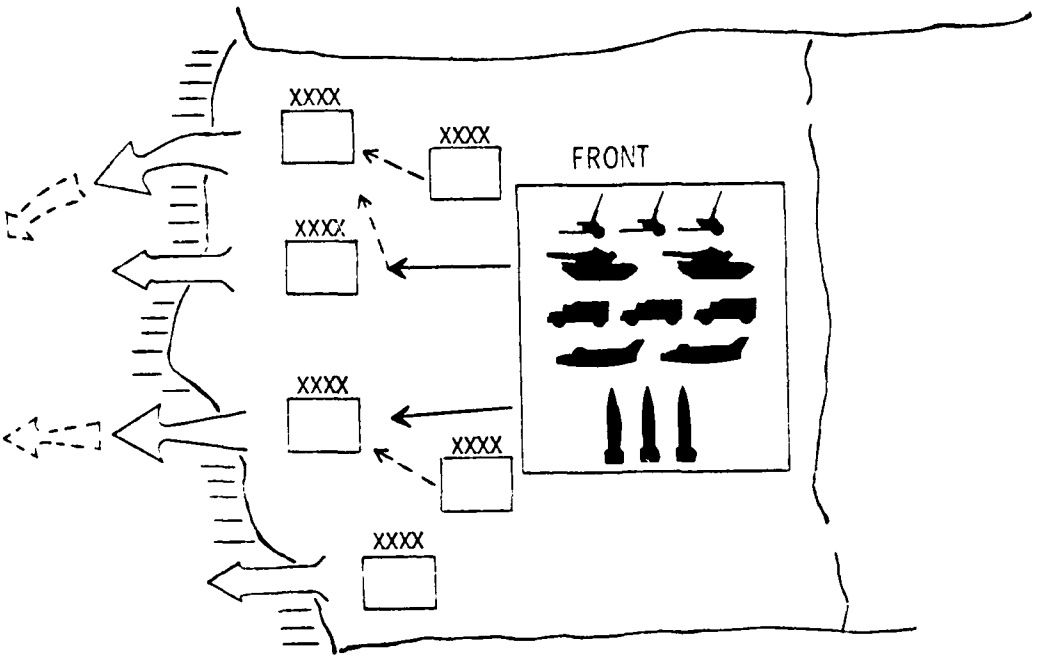


Figure 18. Illustration Of Soviet Concept Of Operations.

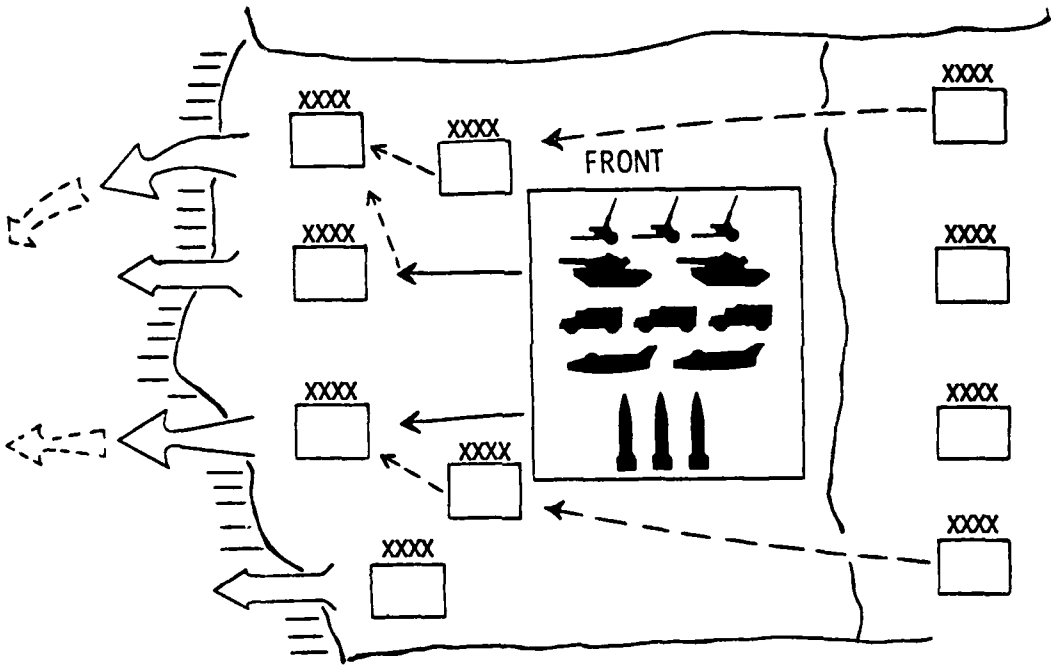


Figure 19. Illustration Of Soviet Concept Of Operations.

commander, to create four axes of advance each involving one major and one minor breakthrough attempt. In planning for this operation, Front will allocate his independent artillery, maneuver units, logistics, Frontal air, and missiles to support those attempts considered more likely to succeed.[63] The central pair of Figure 17 illustrates this. Once operations start, the first (top) and third axes succeed while the second and fourth axes do not. Front then commits its second echelon Armies to support the successful operations. (Figure 18). As time progresses and as further success become evident other second echelon Front elements are inserted for further exploitation.[64] (Figure 19).

This concept of operations was developed during the Second War. The Soviets and others found that single breakthrough attempts could be detected and appropriate measures taken to blunt and defeat them. Where a number of breakthroughs were attempted, some would succeed since the defense would not be able to cope with all simultaneously.

5.2 Breakthrough Operations

The present day Soviet formula for maintaining a rate of advance against a defense in depth is also derived from World War II experience. Along a small sector of the defense, Soviet suppression, maneuver, logistics and air defense are massed and focused against the opposing array of force elements.[65] (Figure 20).

The means of suppression include artillery (guns and howitzers, multiple rocket launchers, mortars) and close air support. If required, the conventional suppression can be augmented by weapons of mass destruction delivered by missiles and aircraft. These suppression assets are focused to a depth to include first and, if possible, reserve echelons committed to the defense. The artillery will attack targets up to 20 km behind the line of contact. Protection for this concentration of force elements is provided by a mobile air defense umbrella made up of a number of gun and surface-to-air missile systems having significant overlap and depth. (See Section D-7). Logistic support is provided using operational concepts which can place Army and Front assets in direct support to the assaulting divisions.[66]

World War II served as a testing ground for these concepts. Many countermeasures were tried that are too numerous to discuss here. Several general principles for a successful defense were learned. They include the need for a "Wall of defensive fires" and strong mobile forces for use in the counter attack.

[63] Ref. 20, The Offensive, pp. 85, 88-89.

[64] Ref. 20, The Offensive, p. 152.

[65] Ref. 20, The Offensive, pp. 61-64, 86-89, 96-100.

[66] Ref. 26, Soviet Operations, pp. 73-78.

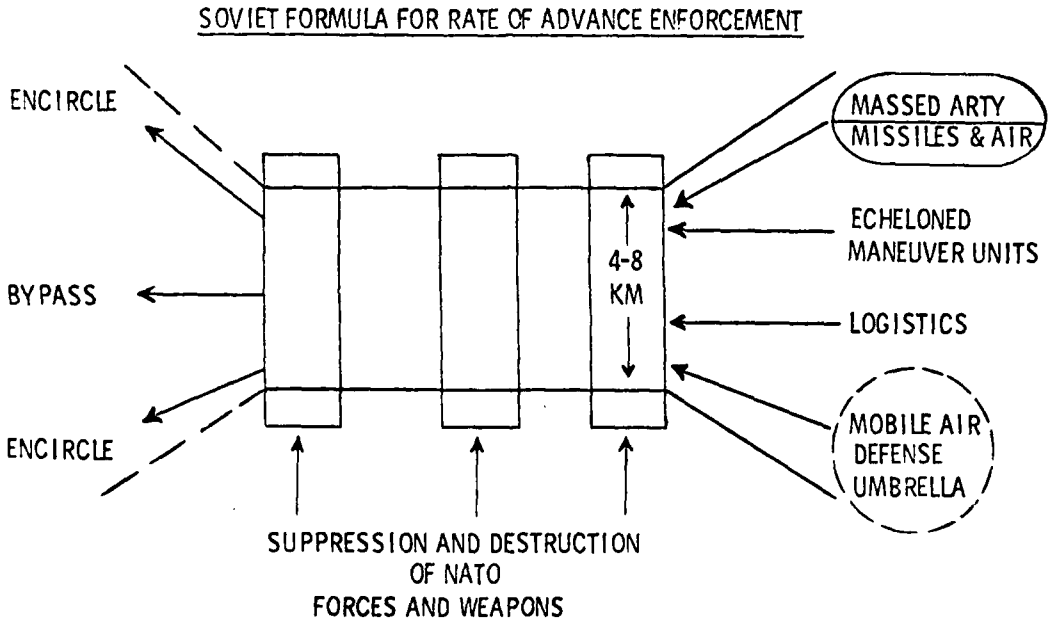


Figure 20. Soviet Formula For Rate Of Advance Enforcement.[67]

[67] Ref. 20, The Offensive, pp. 118-119, 121, 143-154; Ref. 26, Soviet Operations, pp. 94-95, 99-100, 110-112, 120-125.

5.3 Artillery Fire Plan

"The core of modern combat is the organization of conventional suppressive fire". If this be so, it is important to understand its organization, planning and problems of execution. To gain this understanding, an example of a Soviet artillery fire plan will be developed. (Corresponding plans can be developed for nuclear and chemical munitions as well as for the number of conventional sorties required to perform the same tasks.) The technical means for performing this task have been provided by the Soviets. Their technical literature, manuals, etc., provide all the data and constraints that are required to develop the plan.[68]

First, the objectives of the plan. These are:

a. "The destruction of the most important NATO fire weapons" These are NATO's

   - Nuclear battlefield support systems
   - The command posts and fire direction centers that direct and control them.

b. "To deprive the adversary of the possibility of carrying out aimed fire"

   - Neutralize NATO's anti-armor defenses

c. "Keep the initiative in using the means of fire"

   - Suppress NATO's artillery and mortars

Various Soviet manuals have defined what operational results are desired from the application of artillery bombardment. The most devastating is the annihilation of the defensive positions requiring the complete replacement of men and equipment.[69] Usually more than 60 percent of the unit is destroyed. With the rapid application of "the blow" such high levels of damage are not required. If the artillery barrage can cause the defense to become disorganized for one to two hours it can be easily dealt

[68] Ref. 6, Calculating Combat Effectiveness, deals with Soviet methods for calculating artillery requirements to achieve desired effectiveness in fire missions. It demonstrates that Soviet procedures for employing artillery are methodical and highly quantitative. Ref. 12, Firing for Effect, discusses Soviet techniques for employment in specific cases. See for example, Chap. 2 and p. 50.

[69] Ref. 6, Calculating Combat Effectiveness, pp. 33 and 133.

with. This results when 20 to 30 percent of the defensive units are destroyed. Harrassment or the disruption of activity can be produced with just less than a round per hectare per minute. The defense is disabled during the barrage but it has complete effectiveness when the barrage is lifted. (Figure 21).

Other factors affecting the number of rounds allocated to a target are ammunition fusing, localization and delivery errors, and constraints which are caused by operational considerations. But the principal determinant for round allocation is the desired damage level.

Typical constraints are a 60 minute duration for the preparatory fire, movements of exposed batteries once per hour for survivability, and a firing rate that does not exceed the maximum fire table regime (about 110 rounds per hour).[70]

A schematic representation of a defense in depth is shown in Figure 22. It consists of a collection of platoon strong points supported directly by mortar platoons, and dual capable artillery. Command posts of various echelons would be distributed at various distances from the line of contact. Honest John and Lance missile launchers would be in rear areas to provide battlefield nuclear support. (They would probably be assigned to Air Army for attack with conventional bombs if their location were known. Nuclear ordnance could also be used.)[71]

The Soviet methodology for determining the number of rounds required is based upon the degree of damage required, the size of the target area, usually specified by doctrine, and the vulnerable area of the elementary targets (Figure 23). The target is deemed to be larger or smaller based upon a comaprison of estimated localization and delivery errors. The choice leads to a selection of precalculated tables that allows all final calculations of the number of rounds needed for each target.

An illustrative Soviet fire plan is given in Figure 24. The methodology gives allocations of approximately 1,000 rounds for NATO's anti-tank systems, 500 to 1,000 for command posts, approximately 200 for mortar platoons, 500 to 2,000 rounds for various artillery batteries, and approximately 1,000 rounds for surface-to-surface missile launchers such as Honest John or Lance if they were within range.

[70] Ref. 28, Military Herald, Apr. 1973, "Planning Artillery Fire," pp. 162-166.

[71] Soviet military writings stress the importance of destroying "tactical means of nuclear attack" and emphasize that high priority must be given to this task. See, for example, Ref. 20, The Offensive, pp. 132-137.

TARGETING DAMAGE FACTORS

	PERCENT DAMAGE	NUMBER OF ROUNDS PER HECTARE (122MM)	OPERATIONAL RESULT
HARASSMENT	10	45	HEADS DOWN DURING BOMBARDMENT
NEUTRALIZATION	30	150	1-2 HOURS TO REORGANIZE
ANNIHILATION	> 60	$\gtrsim$ 300	UNIT MUST BE COMPLETELY REPLACED

Figure 21. Targeting Damage Factors.[72]

[72] Ref. 6, Calculating Combat Effectiveness; Ref. 12, Firing For Effect Against Batteries; and Ref. 2, Artillery Firing.

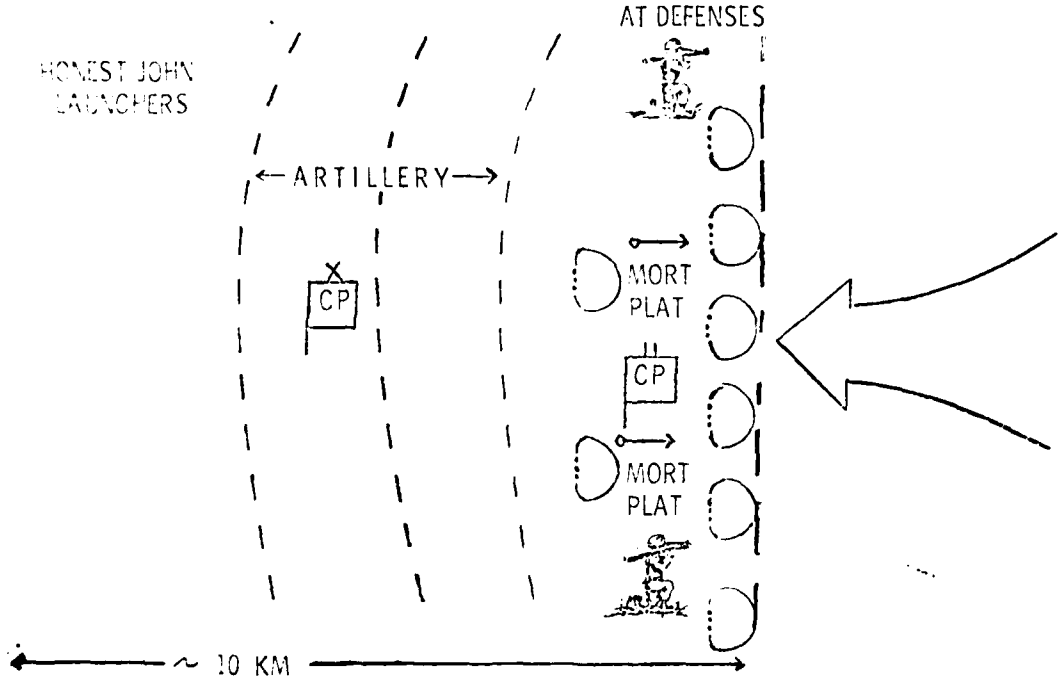
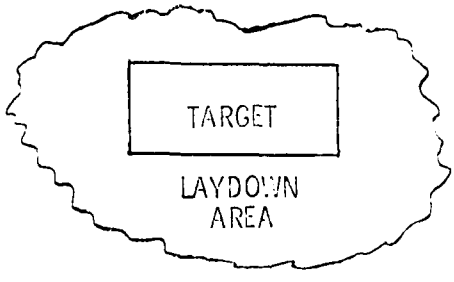


Figure 22. Illustrative Array Of NATO Defenses Opposing Soviet Breakthrough Force.

FACTORS CONSIDERED IN ESTIMATING TARGET DAMAGE



CHARACTERIZATION
- AREA
- LETHALITY CRITERIA

LOCALIZATION
- RECCE
- EMITTER LOCALIZATION
- MAP INTERPRETATION

LAYDOWN
- OPTIMIZED DELIBERATE DISPERSION OF ROUNDS
- DAMAGE NORM DENSITIES

Figure 23. Factors Considered In Estimating Target Damage.[73]

[73] See Note 41-2 above.

ILLUSTRATIVE FIRE PLAN TO ACHIEVE OBJECTIVES

TARGETS	ROUNDS PER TARGET	NUMBER OF TARGETS	ROUNDS REQUIRED
FIRE WEAPONS			
8" BATTERY	1800	4	7200
155mm BATTERY	1800	6	10800
HJ & LANCE LCHR	1230	2	2460
COMMAND & CONTROL			
BATTALION CP	510	1	510
BRIGADE CP	900	1	900
DIRECT FIRE MEANS			
ANTI-ARMOR SYSTEMS			
1st ECHELON	690	4	2760
2nd ECHELON	1260	2	2520
FLANKS	690	2	1380
OTHER NATO ARTY			
MORTAR PLATOON	160	2	320
175mm BATTERY	550	2	1110
	TOTALS	26	29960

Figure 24. Illustrative Fire Plan To Achieve Objectives.[74]

[74] Derived from Reference 6, Calculating Combat Effectiveness.

The damage resulting from this barrage is given in the next two Exhibits. With good localization and delivery errors - 100 meters - (Figure 25) the Soviets satisfy their objectives:

a. Neutralization or annihilation of NATO's nuclear battlefield support capability and the Command Post that direct them.

b. Annihilation of all direct fire weapons - anti-tank systems - and personnel not in foxholes or lacking overhead protection.

c. Harrassment or neutralization of the remainder of the defense. With the rapid application of "the blow", applying effective direct fire, the offensive should maintain the initiative in direct fire combat.

Inaccurate estimates of target locations result in graceful degradation in projected damage. Characterizing the target as an area is the principal reason for this. In the best cases, damage varies linearly with respect to localization error. At worst, it is approximately one-half of the square of the localization error ratio. (Figure 26).

The effects of changes in firing rate are not very great. Published data show a typical 122, 130, or 152 millimeter howitzers can fire 90 to 110 rounds in one hour. Movement of some batteries for survivability would lessen the barrage output by approximately 10 percent. NATO and Soviet artillery are typically placed out of range of mortar. This restricts them to zones 5 km or deeper behind the line of contact. Many Soviet artillery batteries can now be placed beyond the range of NATO artillery under these traditional rules.

The fire planning applies to a Brigade in the defense. Typical breakthrough sector targets are distributed in an area 4 to 8 km in width, with a depth of 8 to 12 km. Analysis of the variations in kind and number of targets produce barrage totals ranging from 15,000 to 35,000 rounds of artillery, i.e., .75 to 1.5 kilotons of barrage weight. Artillery barrages of this size were common in World War I and World War II.

A number of NATO defensive systems are subject to severe attrition as a result of artillery bombardment consistent with Soviet fire planning. Those artillery, command post, and anti-tank platoon strong points which require crews to operate out of the open will be seriously attrited. Improvements in system survivability, such as those contemplated in the TOW under armor concept are needed. NATO artillery systems must plan to move frequently to increase their survivability greater range is needed. New systems, munitions and other means are needed to disrupt and ultimately annihilate Soviet artillery.

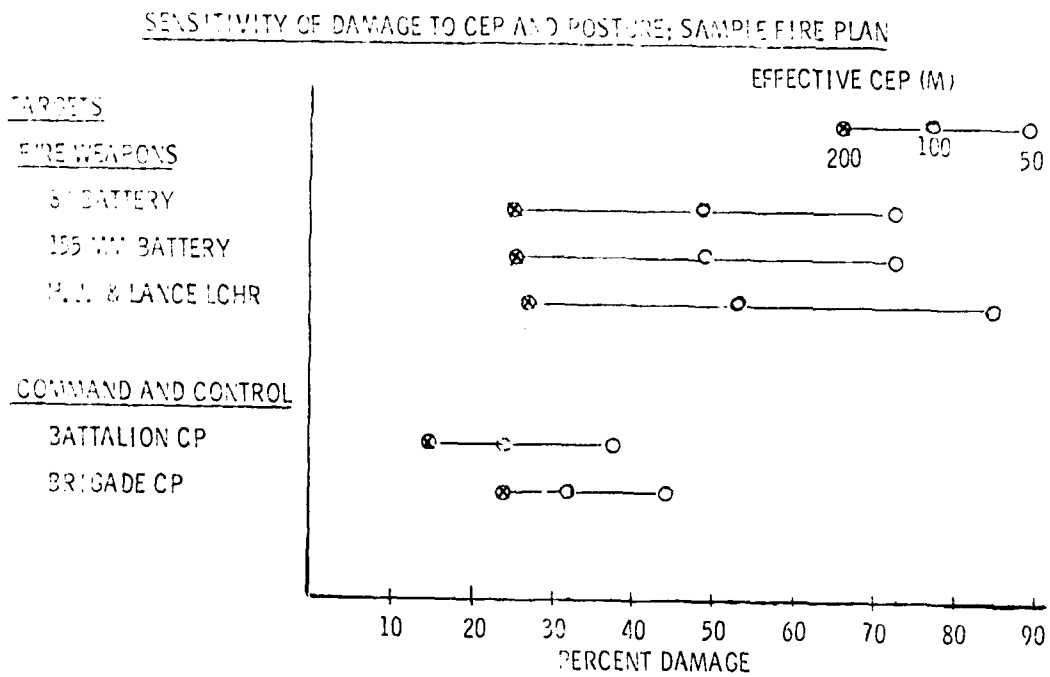


Figure 25. Sensitivity Of Damage To CEP And Posture; Sample Fire Plan.[75]

[75] Methodology from Ref. 6, Calculating Combat Effectiveness.

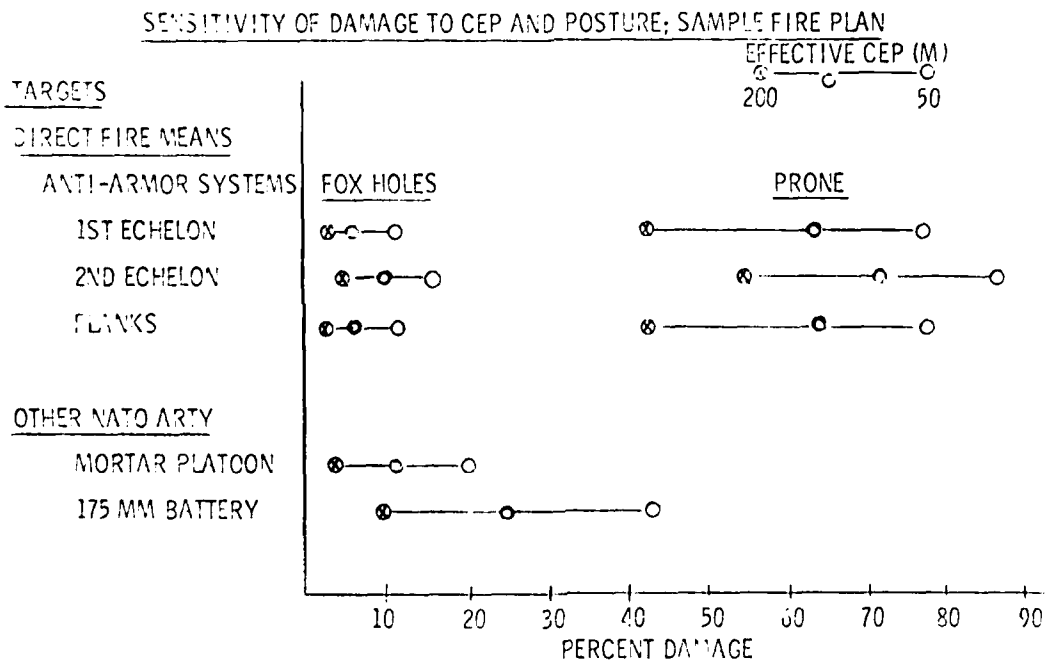


Figure 26. Sensitivity To Damage To CEP And Posture; Sample Fire Plan.[76]

[76] Methodology from Ref. 6, Calculating Combat Effectiveness.

5.4 Placement and Organization of Artillery

The qualitative improvements in Soviet artillery, i.e., the increase in firing rate and range have materially improved the capability to carry out its suppression mission. A stylized array focused on a 4 to 8 km breakthrough zone, protected by air defense systems shows that the posture for batteries is very favorable.* (Figure 27). Battery separation of almost 2 km can be effected over a large fan sufficiently wide to bring fire on all elements of the defense in depth. This arrangement also increases the survivability of Soviet artillery during a NATO nuclear attack.

The approximately 300 guns and howitzers needed to execute the fire plan are significantly in excess of single division holdings. Typically a Motorized Rifle Division has 52-122 mm and 18-152 mm howitzers.[77] The 18-BM24 Multiple Rocket Launchers are[78] each equivalent to a single tube of artillery in meeting barrage needs. At most, a Division could produce the equivalent of 90 tubes.

Soviet subordination doctrine (Figure 28), applied to this case, would provide in the artillery zone 72 additional tubes from a second echelon Tank Division and up to 54 guns from Army.[79] Front can easily supply the division an additional 84 tubes.[80] The assets at Front can support three or four such concentrations at one time.[81]

Mortars in the Division and Frontal Air have the capability to support several more concentrations. One sortie by all Soviet Frontal ground attack aircraft (900) is the equivalent to 360 artillery tubes firing for one hour.[82] Adequate stocks of munitions must be available for this large amount of suppressive fire.

* (This array considers the number of batteries, the range of Soviet artillery, the required number of rounds to be fired by each battery as part of the preceding fire plan and the need for nuclear dispersion of these batteries.)

[77] Ref. 23, Soviet Weapons and Equipment. See also Ref. 4, Soviet War Machine, pp. 158-159.

[78] Ref. 25, US Army FM 30-40, Table 6-7, p. 6-47.

[79] Ref. 26, Soviet Operations, Fig. 5-1, p. 92; Ref. 25, US Army FM 30-40, Table A-5.

[80] Ref. 23, Soviet Weapons and Equipment.

[81] Ref. 26, Soviet Operations, points out that the Soviet Front has an Artillery Division made up of at least three regiments. Pages 28, 29 and 87 discuss allocations of Front artillery.

[82] Derived by using US lethality calculations for 500 lbs. bombs as contained in Department of the Army TM 9-1907, "Ballistic Data Performance of Ammunition," July 1948, p. 49.

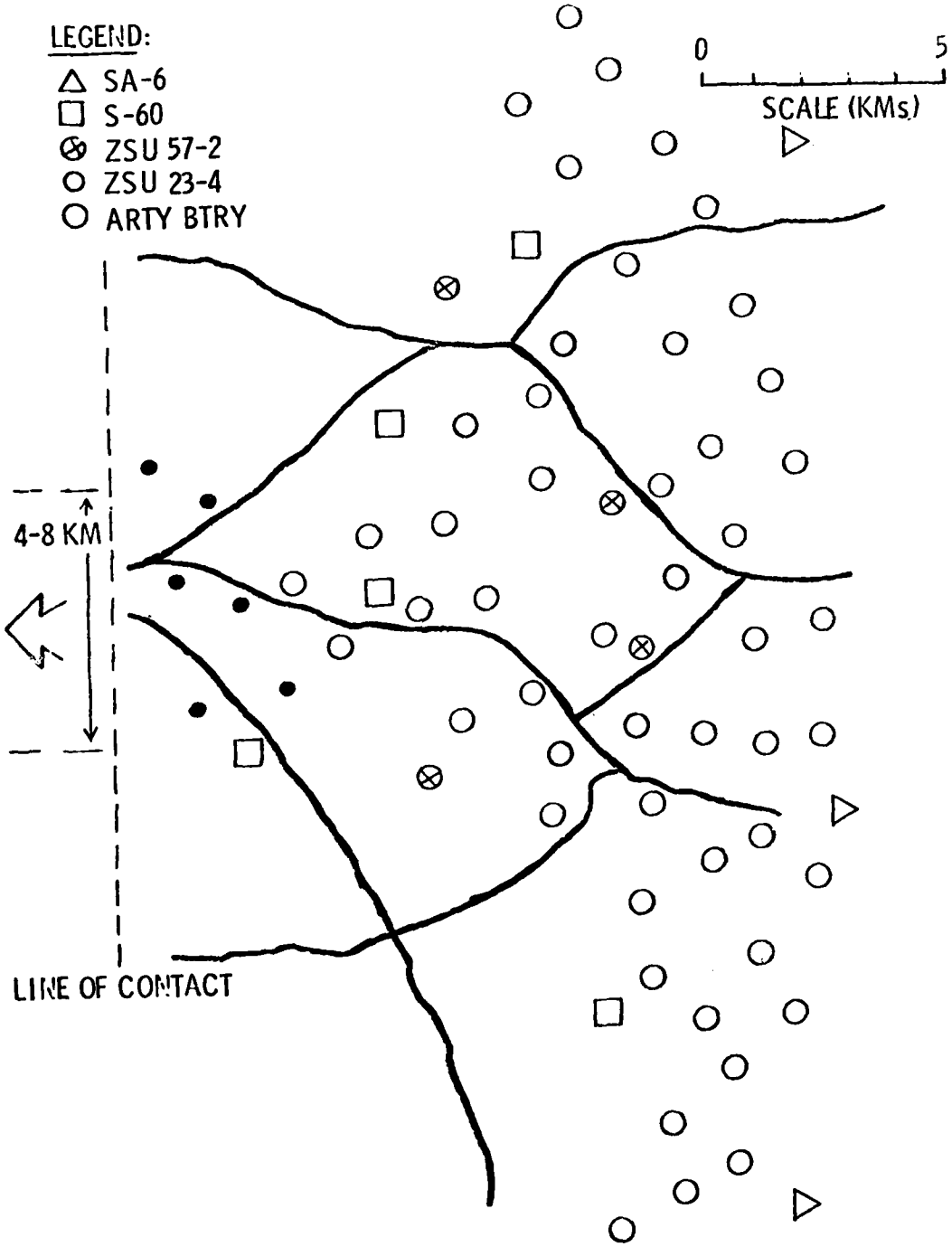


Figure 27. Illustrative Array of Artillery and Air Defense Arrayed for Breakthrough.

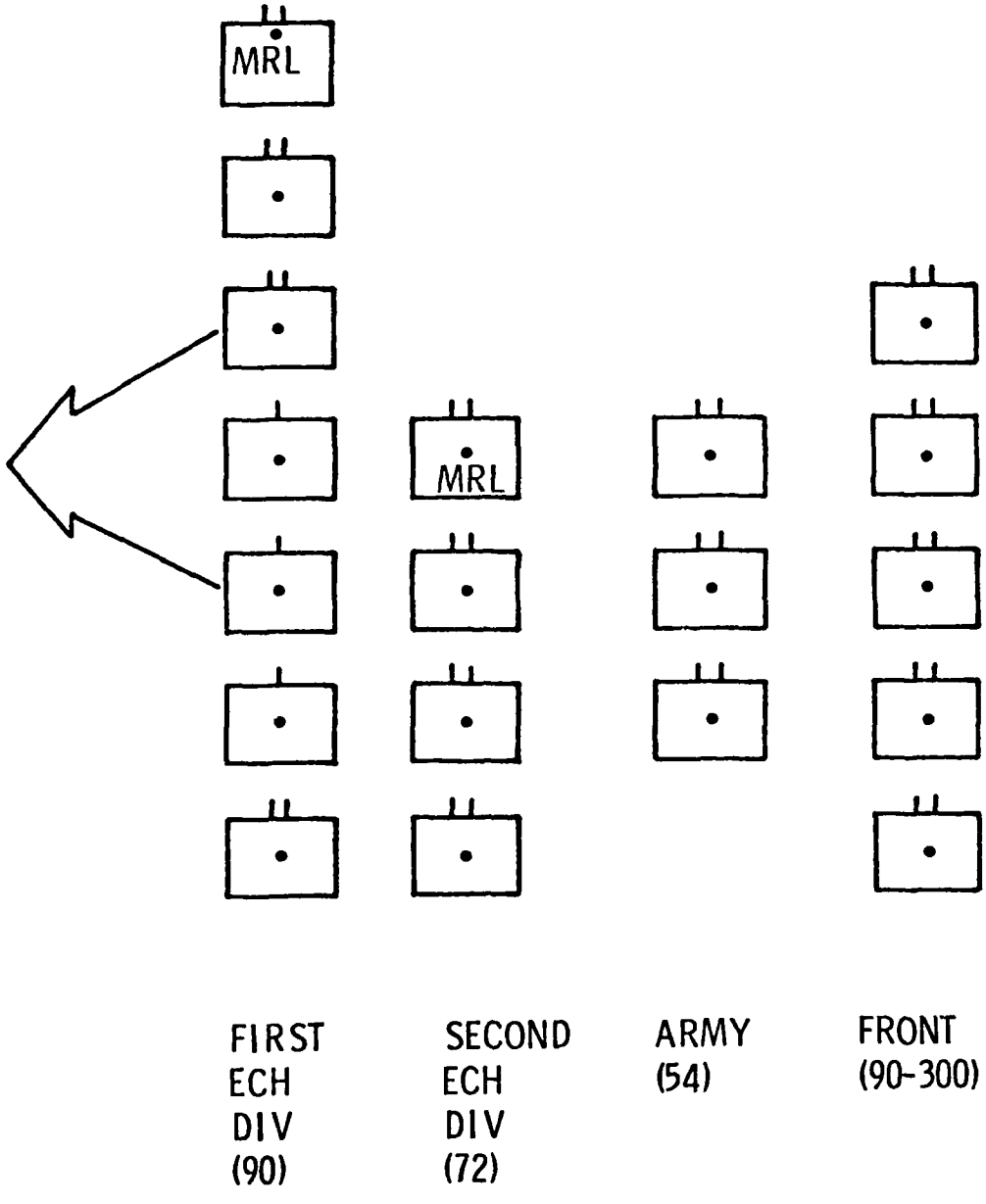


Figure 28. An Example of Soviet Subordination of Assets.

5.5 Integration of Suppression and Maneuver Operations

A good mobile defense in depth cannot be defeated without the timely application of the direct fire of maneuver units. To show the effective integration of fire and maneuver operations reference should be made to a map which shows the political boundary between East and West Germany.

The next exhibit, (Figure 29) portrays in this terrain a Soviet Division front augmented with subordinated units opposed by a NATO Brigade. (A Brigade size defense was portrayed in the previous section dealing with artillery fire planning.)

Elements depicted on the Soviet side include echelon maneuver elements, first echelon Division artillery, subordinated second echelon artillery, Multiple Rocket Launchers, and Army and Front artillery. In addition, there are subordinated supply elements.

On the NATO side, the defense is depicted in terms of platoon and company strong points, armor reserves, Division and Corps artillery, mortar platoons, command, control and target acquisition, and Brigade support elements.

A magnification of scale shows stylized company elements and individual vehicles assembled for penetration (Figure 30).

A number of reinforced motorized rifle companies are shown. Immediately to the rear are reinforced tank companies. Columns of tank companies heading toward the breakthrough area will help maintain the momentum of the offensive when they are engaged.

Assaults carried out by lead Motorized Rifle elements are directed against platoon strong points and are intended to overcome these after they have been partially attrited by artillery fire.

Soviet offensive doctrine calls for lead elements of the first echelon Division to penetrate defenses to as great a depth as possible.[83] Echeloned in on their heels are elements of the second echelon Division to maintain this momentum. Located in this area may be a total of 50 to 70 reinforced and other maneuver units over and above those employed for security operations outside the breakthrough area.

This large concentration of vehicles presents NATO with lucrative targets for attack by NATO air. Protection against NATO tactical air attack is built around a number of overlapping gun and surface-to-air missile systems (Section D-7).

[83] Ref. 20, The Offensive, pp. 95, 148, 155-158.

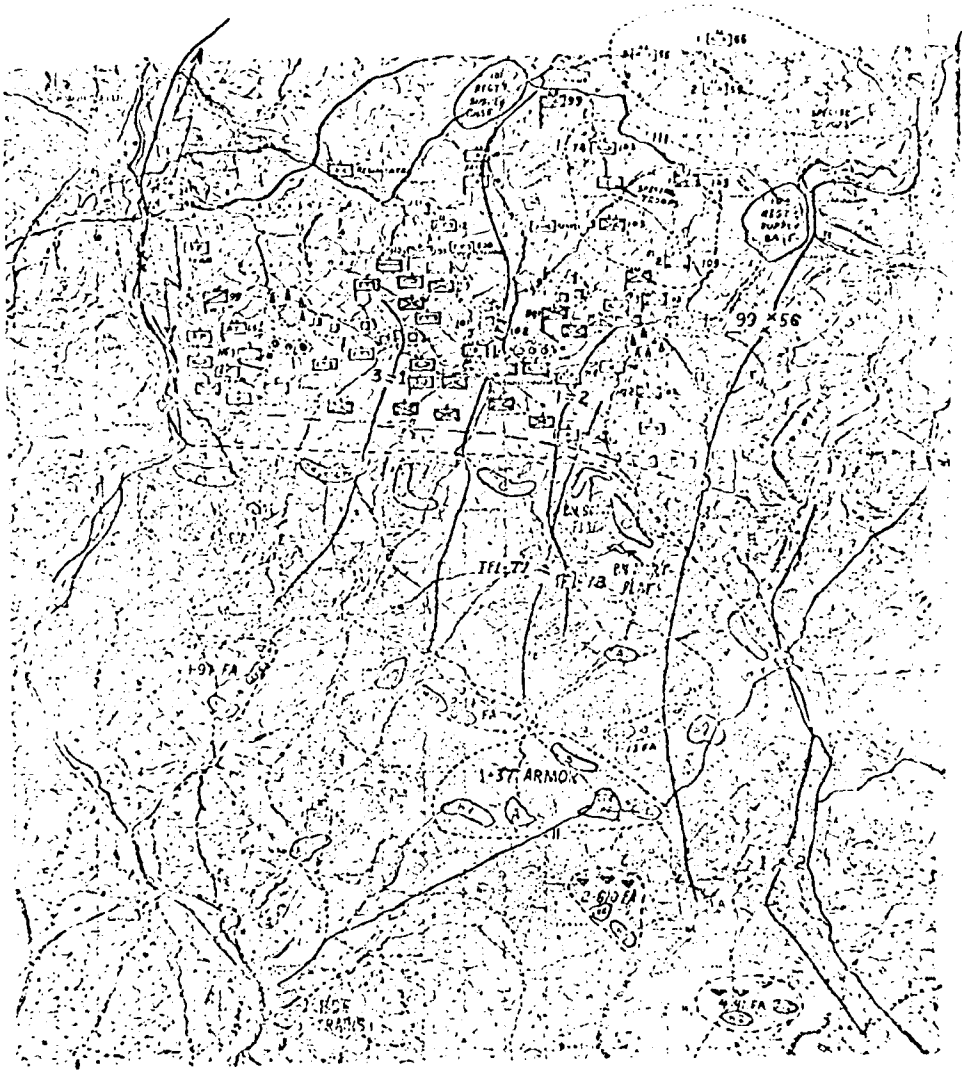


Figure 29.

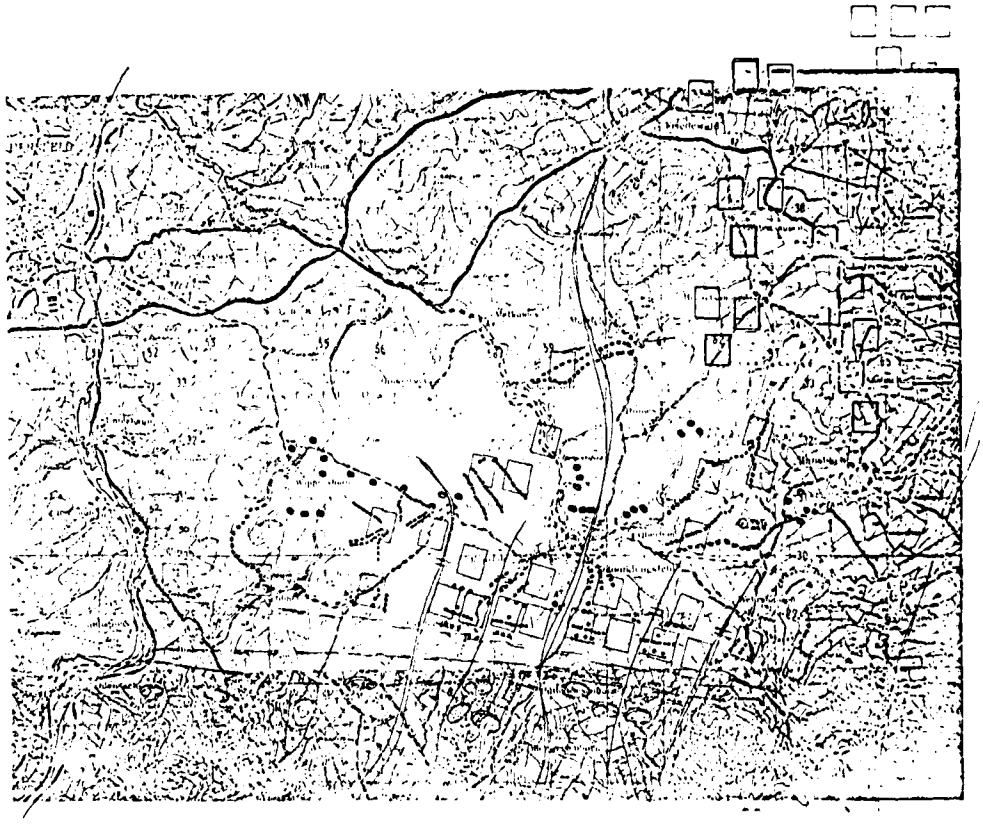


Figure 30.

The organizational problems surrounding the buildup in the number of vehicles necessary to accomplish a breakthrough are enormous. A buildup of several thousand vehicles support the breakthrough zone and might extend 40 km rearward from the line of contact. The buildup starts with front line security forces and their artillery, logistics and engineering all protected by air defense.[84]

Maneuver elements are planned to come in on the run. Soviet doctrine calls for entering the attack directly from march formation.[85] This accomplishes two goals. The first is to maintain the momentum once the attack has begun. The second is to minimize the time of exposure to attack for those elements which cannot disperse.

The sensitivity of Soviet doctrinal requirements on troop movements is as follows: if one effects transit over three independent roads in doctrinal formation at speeds of 15 km per hour, night-time movement would accomplish all buildup objectives. A decrease to one or two roads, or more importantly, a slower rate of movement, 5 km per hour, would seriously jeopardize the operation. This sensitivity can be exploited by barriers of various kinds.

The risk of massing the maneuver units is countered by minimizing the amount of time in the massed state and by the suppression of NATO nuclear battlefield capabilities.

5.6 Summary of the Breakthrough Operation

Following this long description, we can provide a series of "snapshots" (Figures 31, 32, and 33) of the overall operation. The quality, movement and results of the operation become evident.[86] In the Army zone, an example is developed for a forward deployment of three Divisions with one Division in reserve. The forward Divisions include two Motorized Rifle and one Tank Division.

The single breakthrough described here is to be carried out in the zone of one of the Motorized Rifle Regiments within the Motorized Rifle Division. The second echelon Army and Front assets are grouped into the area in order to provide the necessary maneuver and suppression, air defense, reconnaissance and flank protection. Immediately in support would be a second echelon Army with its lead elements ready to exploit a success.

[84] Ref. 20, The Offensive, pp. 89, 93-94, 106-107, 148-150. Ref. 8, IDR, Apr. 1975, p. 183.

[85] Ref. 20, The Offensive, pp. 141-147.

[86] These "snapshots" are built on the data cited in Note 61-1 below, and constructed to reflect the units, weapons and equipment of the breakthrough forces and second echelon elements involved in the operation depicted.

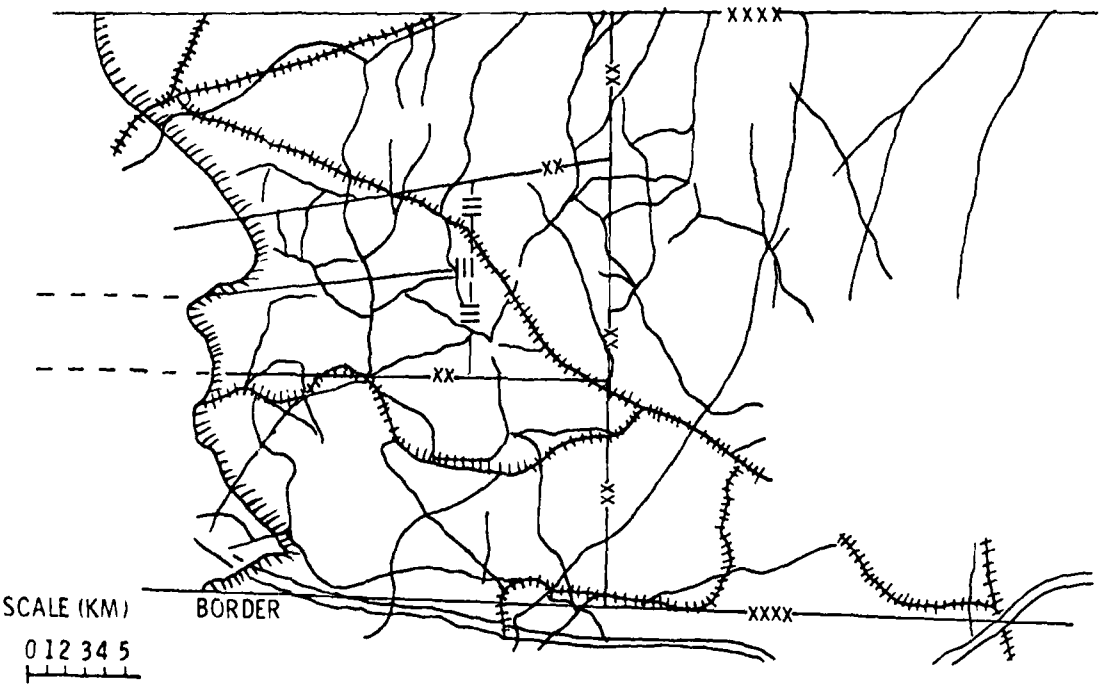


Figure 31.

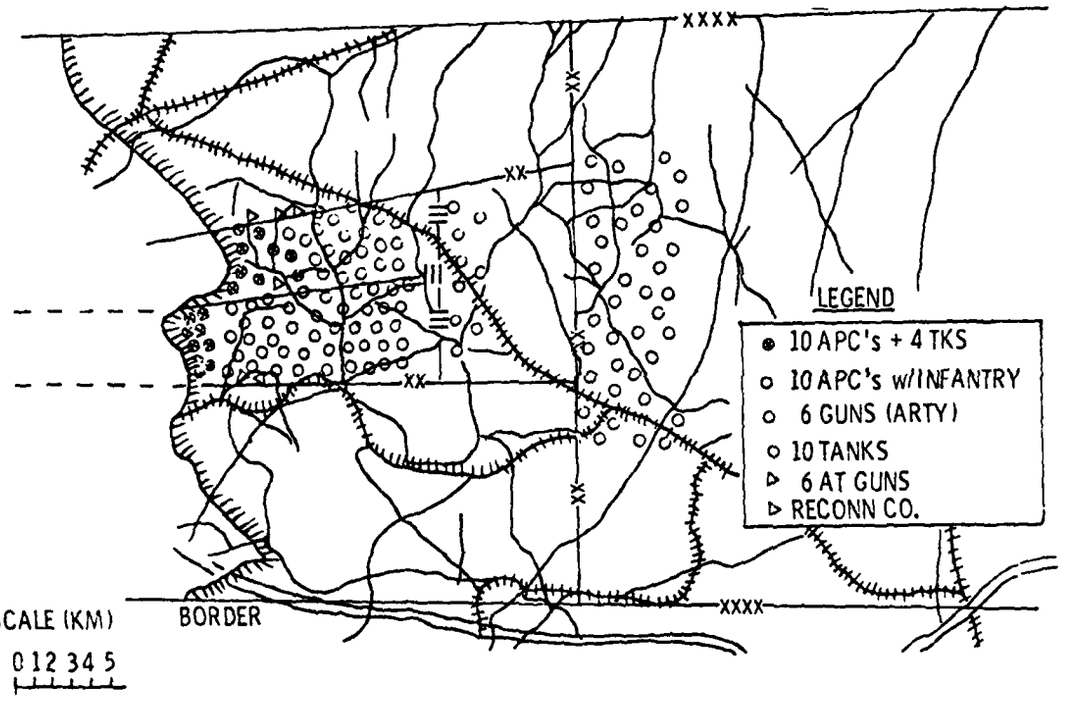


Figure 32. MRD In Breakthrough (H - 1 Hrs) With 2nd Echelon TK Div & Army.

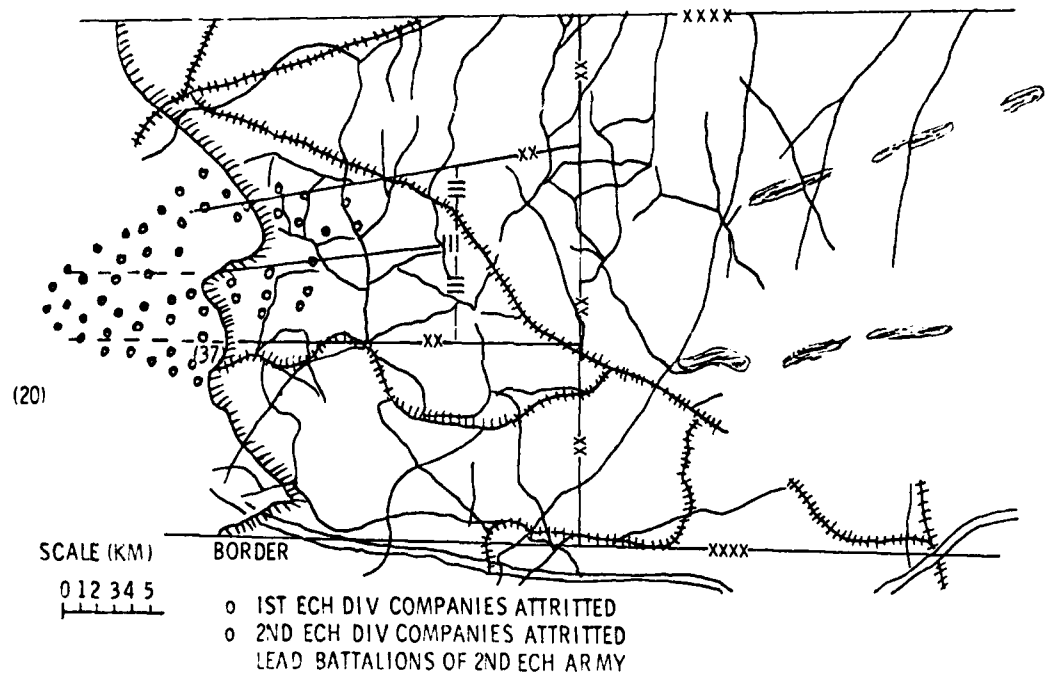


Figure 33. MRD In Breakthrough (H + 8 Hrs) With 2nd Echelon TK DIV & Army.

The deployment is first shown in the pre-breakthrough state with lead elements consisting of reinforced Motorized Rifle companies immediately supported by reinforced tank companies. Rearward of these would be the first and second echelon Division artillery augmented by Army and Front artillery totalling 50 batteries for use in suppressing targets in the breakthrough zone. (Figure 32). Flank protection is augmented with anti-tank gun companies. Reconnaissance companies are deployed forward in order to collect information and find opportunities for bypassing strongly defended positions.

Eight hours after the operation begins, there has been some severe attrition in the Soviet first and even second echelon division elements. (Figure 33). Lead elements of the second echelon Army come up to exploit the now severely attritted defense with breakouts to either side of the breakthrough zone or directly through it.

5.7 Number of Soviet Forces: The Problem of their Annihilation

To appreciate the problem that will size NATO's response, the final chart (Figure 34) of this section displays the assets available for this operation. The Tank and Motorized Rifle Divisions bordering the breakthrough have normal complements of assets. The size of the breakthrough forces is much larger. Over half the personnel, half of the vehicles, two-thirds of the artillery, a major portion of the air defense, and the truck support are located in the breakthrough force zone.

To slow the momentum of the attack will require significant damage levels. Even neutralization levels (30 percent) would only eliminate 300 vehicles. This would disrupt the attack for some time but surviving and echelon forces could be brought up to continue the attack. It is probably necessary to effect near annihilation levels on maneuver companies and artillery in order to stop the assault. This would mean destroying 60 percent of the artillery and maneuver companies, a total of 30 batteries and approximately 600 armored fighting vehicles.

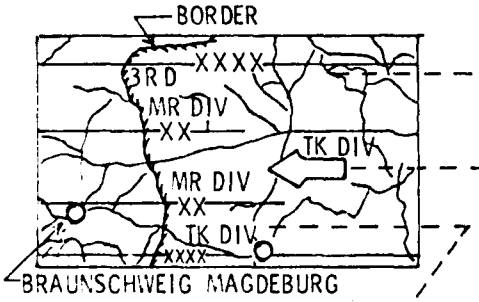
This level of attrition would be necessary at each point where a breakthrough operation was attempted. This discussion began by choosing the case of four axes of advance, each trying to execute one major breakthrough operations. To stop all would mean the destruction of 120 batteries of artillery and 2,400 armored fighting vehicles.

NATO's response to operations of this type is large, whether the response is conventional or nuclear. In the next section, we turn to those means for efficiently deterring or defeating such operations.

ASSETS IN ARMY SECTOR AND BY DIVISION

3RD ARMY PLUS AGUMENTATION (TOTALS)

PERS	55000+	GUNS	408	SCUD	18	TRKS	5750
TKS	1198	MRLS	72	SCBD	6	AD	196
APCS	1100	FROG	16	MORT	180	SAMS	60



TK DIV

PERS	11000	GUNS	60
TKS	333	MORT	18
APCS	200	TRKS	1300
FROG	4	AD	58
MRLS	18	SAMS	0

BREAKTHROUGH FORCES

	DIVS	AUG	TOT
PERS	25000	2000	27000
TKS	600	-	600
APC	500	-	500
GUNS	162	132	294
MRLS	36	-	36
SSMS	8	24	32
TRKS	2650	400	3050
AD	104	0	104
SAMS	0	60	60

MR DIV

MORT	54
PERS	14000
TKS	266
APCS	300
GUNS	72
MRLS	18
FROG	4
TRKS	1350
AD	46
SAMS	0

Figure 34. Assets In Army Sector And By Division.[87]

[87] Ref. 23, Soviet Weapons And Equipment; Ref. 26, Soviet Operations, pp. 79-81, 90-92, 98, 102-104, 118-119; Ref. 25, US Army FM 30-40.

6. INITIATIVES FOR NATO

Some impressions of the power of Soviet "fire combat" forces have been given. The question that naturally arises is whether existing NATO forces and organization are adequate to deter the Soviets from starting a military conflict of the type described, and further, if, for some reason, military operations should start, whether present forces are adequate to quickly blunt these Soviet offensive operations. One can start to answer questions of this sort by noting that NATO's military forces are modern and formidable in their own right. In addition, all of the NATO allies are presently modernizing their forces and military organizations in preparation for the challenges of the future. We can also remember that past campaigns show that numerically inferior forces, efficiently employed, can successfully defeat numerically superior forces on the offensive.

This paper will not attempt to summarize all of the modernization programs that are presently under way. Instead, our focus will be on those actions that this paper points to, that enhance the combat potential of NATO's existing defensive forces. Emphasis is given to those measures that will enhance survivability, efficiency, and conventional defensive firepower. These same measures will also enhance the effectiveness of NATO's nuclear forces. More detailed suggestions for the modernization of NATO's nuclear forces were made at a conference similar to this one held here in Ebenhausen in March of 1975.

While we do not explicitly consider modernization of various aircraft, tanks and armored infantry fighting vehicles, it is clearly needed. Current development and acquisition programs must result in superior equipment fielded in present or expanded quantities.

The fact that we recommend some initiatives indicates that our assessment shows the need for improvements above and beyond those currently in process. The initiatives fall into two broad groups: (1) those that permit the efficient and timely use of existing forces, and (2) those which increase the survivability and the "fire" effectiveness of present and modernized forces. The specific initiatives all follow from the assessment presented above: an operational characterization of the threat. The character of defensive forces follows from a description of the threat. Offensive objectives can be used to develop the functions of forces and the types of equipments necessary to carry out those functions. For definition of the defensive force, the task is harder. We wish to emphasize that an operational characterization of the threat is necessary. A mere comparison of opposing numbers and the character of divisions is not adequate to judge the capabilities of NATO's defenses.

For both groups of initiatives there are near and long-term programs that are suggested.

6.1 The Efficient Use of Forces

The efficient use of force requires information in the hands of operational commanders who can alert, move, and deploy NATO's defensive forces along expected Soviet axes of advance. The accurate positioning of NATO's defense follows from good information on the status and movement of Soviet forces. This type of information, not necessarily in the same amounts, must be provided to military and probably political authorities in order to obtain approval for taking up defensive positions. The efficient collection, fusing, analysis, and dissemination of surveillance, reconnaissance, and other information on the status of Soviet forces can now be accomplished efficiently with the combined assets of the United States and its NATO allies. The Boerfink facility is an example of this activity: several more such facilities are required.[88]

Important changes have occurred in warning, indicators and NATO's response time as the basic character of Soviet forces has changed. Because of the increases in the combat capability and range of Front's air, and ground forces, fewer classic indicators that the Soviets are planning offensive operations against the West are available to NATO. Soviet military potential for a surprise attack against NATO has increased.[89]

To deal with this possibility, NATO should consider the creation of peacetime operational headquarters. Portions of the air attack and ground forces of each nation would be attached to these NATO operational headquarters. The theater information and engagement system would be located at these headquarters. This recommendation is only an extension of current NATO practice. At present, the air defense forces of each nation are a part of the NATO Command system in peacetime. The problems of coordination, adequate communications, and so forth have been worked on for years. The same or similar type of organizational arrangement should now be made for the remainder of the defensive forces of NATO.

NATO operates an integrated air defense system since the capability of modern aircraft does not allow any time for the mobilization, integration, and training of defensive forces.

With the improvements that have been made in the ground forces of the Soviet Union, a similar situation is developing. NATO's planning for years has assumed long-warning times. The force improvements that have been made in Soviet ground systems and in Soviet ground attack aircraft now allow the

[88] Ref. 1, Air Force Magazine, May 1976, contains a description of the arrangements and procedures of this activity.

[89] Ref. 16, Sizing Up the Soviet Army, pp. 6-7, 12-15, 19-20, 21-23; Ref. 8, IDR, Apr. 1975 and Feb. 1976; Ref. 9, Military Balance, pp. 98-99; Ref. 13, NYT, 6 Mar 1976, p. 2.

organization of offensive operations against NATO in a short time; two or three days. Further, many of NATO's classic warning indicators will probably no longer be available. Above and beyond this reality, however, there is the need for integrated NATO operational centers where joint training can take place. Problems of communication, in the use of sophisticated intelligence and target location systems as well as in operations across Corps boundaries must be solved on a day-to-day basis in peacetime if NATO's defensive forces are to be used efficiently should war occur.

There are many reasons why these organizational arrangements have not been made in the past. The objective changes that have occurred in the character of Soviet forces are such that the creation of peacetime NATO operational headquarters are required now. Additional training and exercises will be needed to achieve greater integrated readiness. This will require additional funding. Modern training technology for headquarters and forces can reduce training costs and increase readiness.

6.1 Sizing NATO's Conventional Response to Multiple Breakthroughs

The weight of conventional munitions required to defeat a strong Soviet Frontal attack is large. The discussion of Soviet artillery fire planning is persuasive here. Here, we give the minimum size of NATO conventional response. We only assume successful engagements, as was done for the Soviet fire plan. In real combat, availability and attrition of forces, neither of which is treated here, can dominate the outcome. Our sizing calculation give insights into minimum needs but do not quantify force sizes or stockpiles of munitions.

6.2.1 Attack Objectives. Soviet offensive operations feature massive conventional suppression to destroy defenses. At a minimum, NATO must disrupt this artillery fire and its command and control to save its defenses. Soviet maneuver forces will then be faced by a fully capable NATO defense.

Disruption can be effected by forcing the artillery crews to seek protection, or by destroying the crews should they continue to work in the open and fire. If disruption can be accomplished by NATO artillery, the Soviet timing for their attack will be thrown off and success of the attack will be greatly reduced. If the first wave of maneuver units are held in check, succeeding companies will add to the collection of lucrative targets in the assault zone.

Blunting and containing the intended decisive blow by tank and infantry can be accomplished with ground, air, or mixed assets. Damage levels of 30 percent to this attacking force will disrupt it. Reconstitution of small units might require a few hours. The reconstitution of larger units (Regiment Division, Frontal Units, etc.) will require a longer time. In any event, blunting the attack will also prolong the exposure of massed maneuver assets. NATO air attacks can then take advantage of this condition.

Annihilation is defined as damage to 60 percent of all equipment. Complete reconstitution of the force is needed to re-establish combat effectiveness. Damage at this level to first echelon Divisions and echeloning forces would break the entire momentum of the attack. Reinsertion of fresh forces would probably require a few days assuming planning for these replacements had been made.

These results, in addition to the ability to hold at annihilation risk second echelon Army and echeloning Front forces, would constitute a very strong deterrent. Even the possibility of neutralization damage to these forces would seriously complicate Frontal planning and initiatives.

Sizing calculations for munitions and delivery will be examined for the first three cases - disrupting artillery, blunting armored attack, annihilating first and second echelon divisions and augmentation assets. The magnitude of attacks needed to hold other forces at risk can be inferred from these calculations.

A summary of NATO attack objectives and their effect in operational terms is shown in Figure 35.

6.2.2 Sizing Considerations.[90] We now develop the amounts of conventional ordinance required for two classes of weapons; direct fire weapons and area munitions.

Direct fire weapons are Anti-tank Guided Missiles (ATGM), guns of various types, and Precision Guided Munitions (PGM).

The important matters governing direct fire weapons are the survivability of the platforms that launch them, their ability to work in the terrain and weather of Central Europe and the probability that once striking the target it will be destroyed. When discussing ATGMs we must concern ourselves with survivability and with the number of times the launcher can be fired prior to its destruction by opposing fire. When speaking of the effectiveness of these weapons, we use the term "loss exchange ratio" (LER). It is expected that an ATGM launcher can fire several rounds prior to being destroyed. An LER of 10 is considered excellent, one of 5 quite adequate, and a value of 1 is very poor. Previous recommendations on providing protection to ATGMs was directed toward increasing the LER.

[90] Damage calculations in pars. F.2.3-6 inclusive, below, are derived using methodology from Ref. 6, Calculating Combat Effectiveness and numerical parameters for munitions extrapolated from DA TM9-1907, Jul 48, except for CBU data which are from Ref. 8, IDR, Oct. 1973, p. 653.

OBJECTIVES

OBJECTIVE	TARGET	DAMAGE PERCENT	FUNCTIONAL EFFECT
DISRUPT	ARTY, CP	10 30 (CP)	KEEP CREWS FROM FIRING, INTRODUCE CONFUSION, MINOR DAMAGE, SUPPRESS ACTIVITY
BLUNT	AIR DEFENSE, MANEUVER UNITS	30	STOP ATTACK IN PLACE, TEMPORARY DAMAGE TO AIR DEFENSE, ATTRIT MANEUVER EQUIPMENT
ANNIHILATE	ARTY, MANEUVER UNITS, AIR DEFENSE, LOGISTICS	60	DESTROY IN PLACE, SO UNIT MUST BE REPLACED
FORCES AT RISK	SECOND ECHELON DIVISIONS, ARMY	60	ANNIHILATE BEFORE THEY CAN BE USED

Figure 35. Operational Interpretation of Attack Objectives.

Aircraft such as the A-10 can destroy tanks with either PGMs or its own 30 millimeter cannon.[91] Both systems must be used at relatively close range when attacking tanks or armored infantry vehicles. The Soviet air defense systems must be effectively suppressed (operationally this will mean destruction) since the aircraft will have to make up to ten "passes" to use its gun efficiently. Hand held air defense systems such as Strella will have to be dealt with through the creation of many false targets that it will seek instead of the airplane.

Area weapons can also be used to destroy concentrations of artillery and tanks. Bombs, artillery rounds, and sub-munitions are of interest here. The important problem is the location of targets and the large weight of munitions needed for their destruction.

Large amounts are needed because of the size of battlefield targets. Combat units are deployed on the battlefield in groups. For example, a six gun artillery battery occupies two hectares, an area of 100 by 200 meters. A tank company or a group of armored infantry vehicles occupies 30 to 50 hectares on the battlefield. Since only one aircraft pass over the target area is required, survivability is an important but lesser issue.

The results in the sections that follow are presented as successfully delivered volleys of one artillery battery - one round from each of six guns - and as aircraft sorties. Each aircraft sortie can carry 6000 kg of iron bombs or 18 cluster bomblet cannisters. Each cannister contains 147 bomblets and weighs 270 kg, the bomblets are of British design and can perform two tasks. If they strike a hard target a shaped charge is detonated; if they strike a soft target - the ground - the bomblet will produce anti-personnel fragments. For the purpose of our calculations delivery errors are assumed to be 150 meters for artillery and 50 meters for aircraft.

6.2.3 Disruption of Soviet Artillery. A disruption attack is sized against 50 artillery batteries and the 10 command posts (CP) which support them. All are assumed to be in range of improved NATO artillery. Damage calculations (Figure 36) are expressed in volleys, and volleys per target per minute for a firing time of one hour.

The disruption attack is directed against personnel and the soft equipment of the CP. Two extreme postures are considered. Artillery crews may choose to shelter themselves in foxholes till the barrage stops. The crew posture limits damage to very low levels (a few percent) as long as they remain in their foxholes. Should crews try to operate, a small expenditure of NATO munitions will cause extensive casualties. The damage to standing

[91] Ref. 1, Air Force Magazine, Mar. 1976, p.23. Ref. 8, IDR, Feb. 1974, pp. 70-76. See Also Army Magazine, Mar. 1976, p.45.

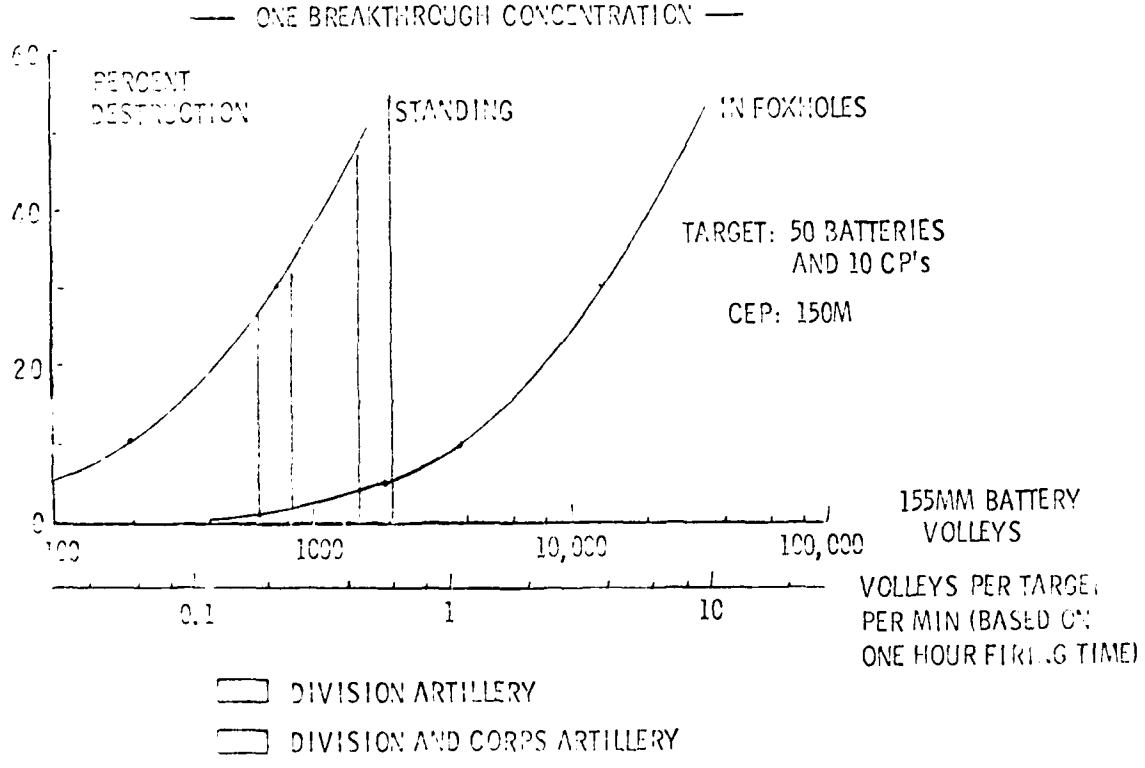


Figure 36. NATO Artillery Fires Required to Disrupt Artillery Units.

crews is approximately 30 percent and 55 percent for the two cases shown. The upper bound on each band represents continous fire for an hour. The lower bound results from the movement of NATO batteries to enhance their survivability.

These sizing calculations, show that disruption is within the capability of improved Division artillery by itself or augmented by Corps. Command, control, and target acquisition capabilities must be enhanced and integrated for rapid reaction. NATO batteries and CPs must have significantly improved survivability. Improved munitions in sizeable stockpiles must be readily available.

6.2.4 Blunting The Armored Attack. Sizing calculations (Figures 37 and 38) for blunting the attack by maneuver units are shown for various air and ground systems. The case for air delivery is considered first. The results show that bomblets are significantly more efficient than iron bombs in damaging such targets. With these munitions, NATO's close support aircraft could deal with a maximum of eight such concentrations and effect 30 percent damage. One successful sortie per aircraft is assumed the efficient use of air and adequate stockpiles of area munitions are minimum prerequisites. To overcome the impact of European weather, these munitions should be designed for low level dispersal. (Precision guided munitions might also be used for this task. Large numbers of all weather systems will be required.)

The sizing calculations for direct fire systems is shown in Figure 38. Anti-tank guided missiles (ATGM) and the 30 mm cannon carried by the A-10 aircraft are considered.

Loss exchange ratio curves (solid curves) displays the results for ATGM systems. The solid vertical lines portray the number of such systems in a Brigade and a Division, respectively. The results show that all Brigade launchers are lost in achieving 30 percent damage against attacking forces, if the loss exchange ratio is 4. Greater numbers of these systems are needed along with improvement in their survivability.

The dashed curves portray the damage results for A-10 passes and sorties employing 30 mm cannon fire against armored vehicles.[92] Since multiple passes are needed (as is the case with PGMs) suppression of air defense is necessary to achieve these results. The results suggest that tens of sorties by A-10 aircraft, and augmented Brigade ATGM units working in concert could effect neutralization and probably annihilation levels of damage on the assaulting Soviet maneuver forces.

[92]See Note 67-2 above.

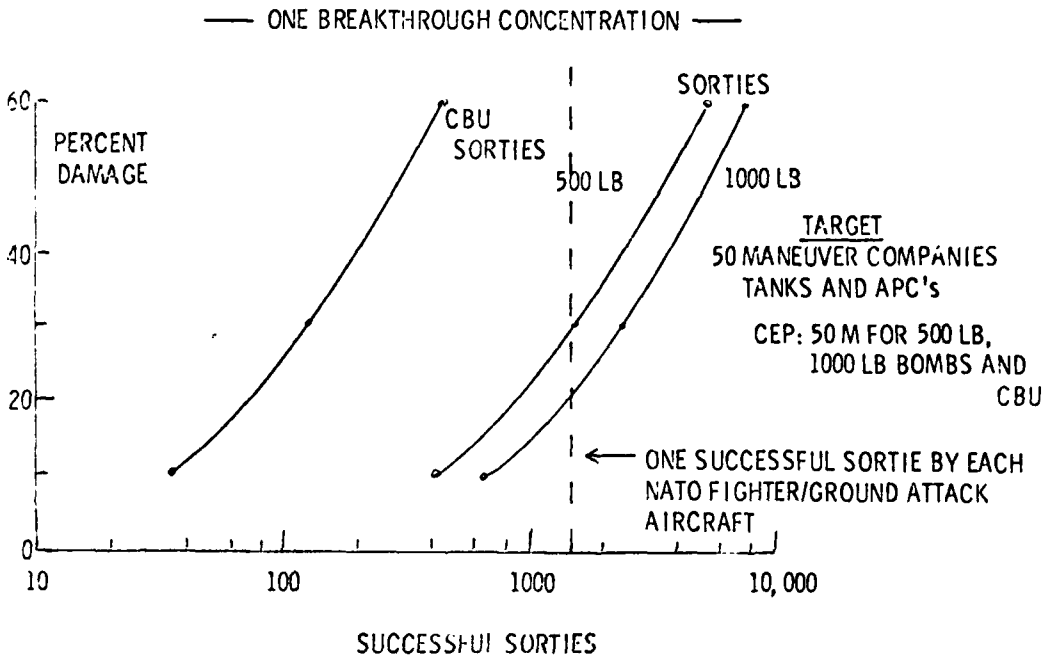


Figure 37. NATO Sorties Required to Blunt Attacking Manuever Units.

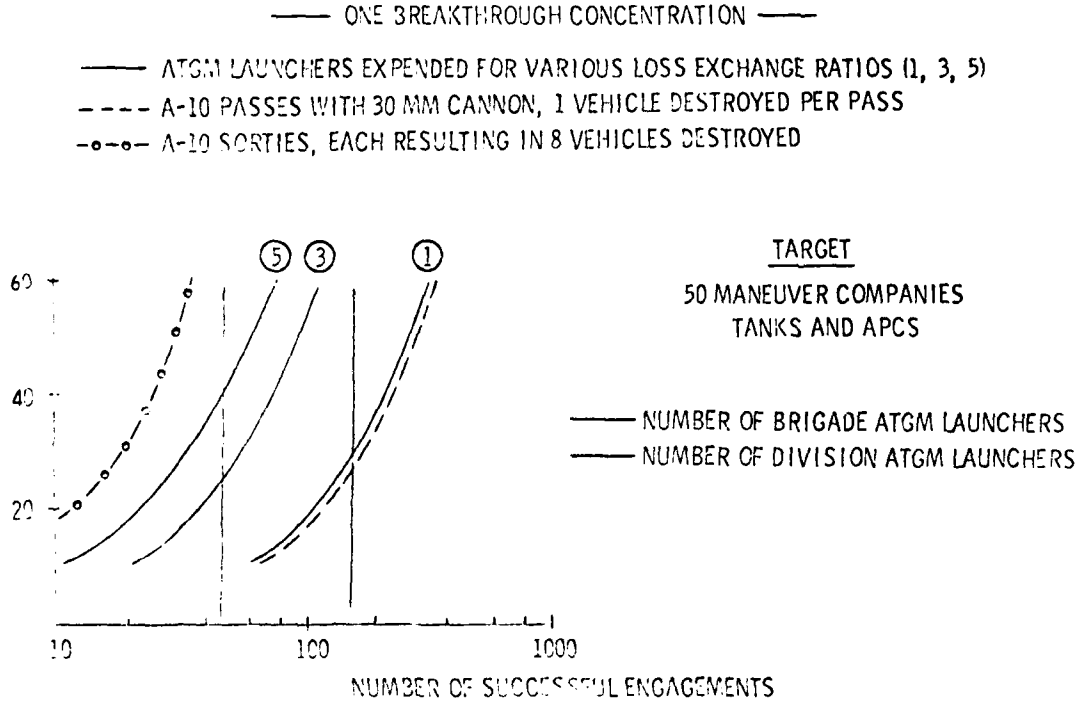


Figure 38. NATO Engagements or Sorties Required to Blunt Attacking Manuever Units.

6.2.5 Annihilation Attacks Against First and Second Echelon Divisions. Annihilation attacks against artillery, air defense, maneuver units, and logistics to achieve the functional effects shown are displayed for two Divisions and Front assets. Delivery of clustered bomblets units will require approximately 700 successful sorties of each Soviet force concentration where such destruction is required. Over 5,000 sorties are required if iron bombs are employed (see Figure 39).

With area munitions alsmost 3,000 metric tons (Figure 40) are needed for each instance where two Divisions and Front assets are to be annihilated. It is seen that stockpiles varying from 12,000 to 24,000 metric tons of advanced munitions successfully employed will be needed to blunt a Soviet Frontal attack on four to eight axes. Short term campaign stockpiles of at least several hundred thousand metric tons would be dictated.

6.2.6 Holding Echeloning Armies at Annihilation Risk. The previous section considered annihilation of two Divisions in an Army. The requirements for an Army would be greater by a factor of 2 to 2.5. Estimates suggest that there may be as many as 10 second echelon Armies. Their locations would dictate air assets as the only reasonable choice for delivery.

Calculations show that as many as 15,000 successful sorties with improved area munitions would be required. This task is enormous when compared to the forces available. One might consider this as a task for theater nuclear forces.

6.3 NATO Initiatives Summary

The threat of a surprise attack by on-line Soviet forces can be deterred by the initiatives we have discussed. The defeat of multiple breakthrough attempts by a stiff forward defense can be accomplished with conventional forces.

The first set of initiatives is displayed on Figure 41. We recommend the creation of facilities where information can be collected, analyzed and displayed in near real time on the status and movement of hostile forces. The theater information and engagement system can accomplish this. The information and targeting so provided can be used simultaneously by political authorities and military commanders. NATO military commanders would be functioning in operational, not planning, headquarters with NATO forces ready for immediate deployment to meet any expected Soviet attack. The Exhibit also shows estimates of relative costs.

The second set of initiatives has as their objective, the provision of sufficient conventional munitions and delivery systems so that NATO can disrupt, blunt, and annihilate first echelon Soviet armies using existing forces. This requires improvements in the survivability and effectiveness of artillery, air and anti-tank milliles. The range of existing artillery

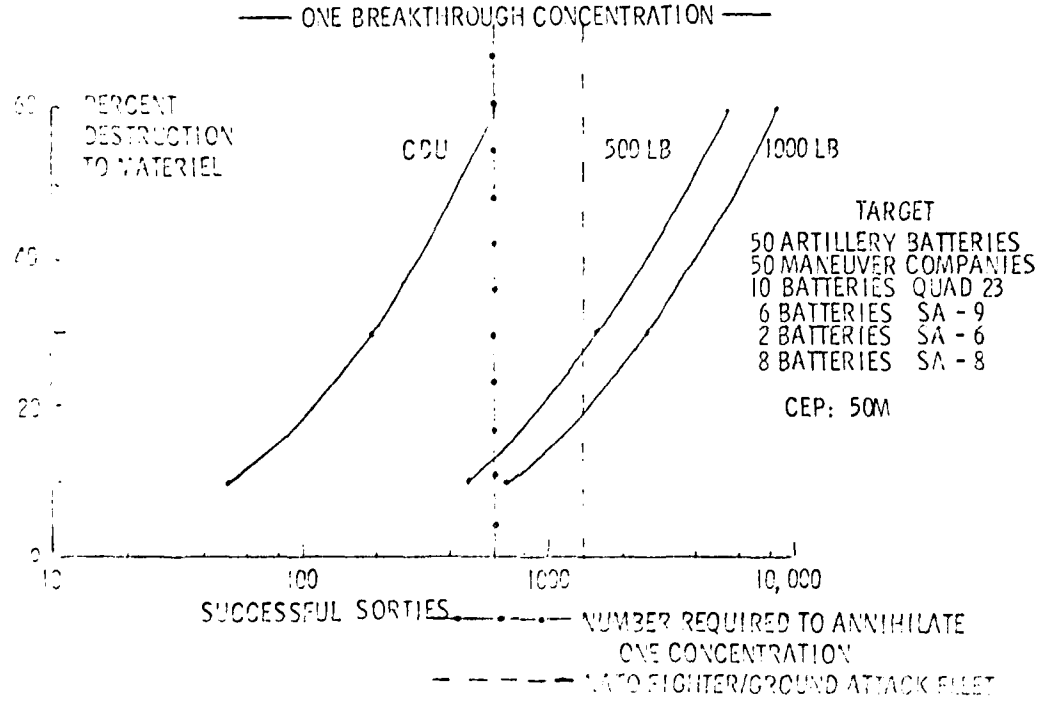


Figure 39. NATO Sorties Required to Annihilate Artillery, Maneuver and Air Defense Units.

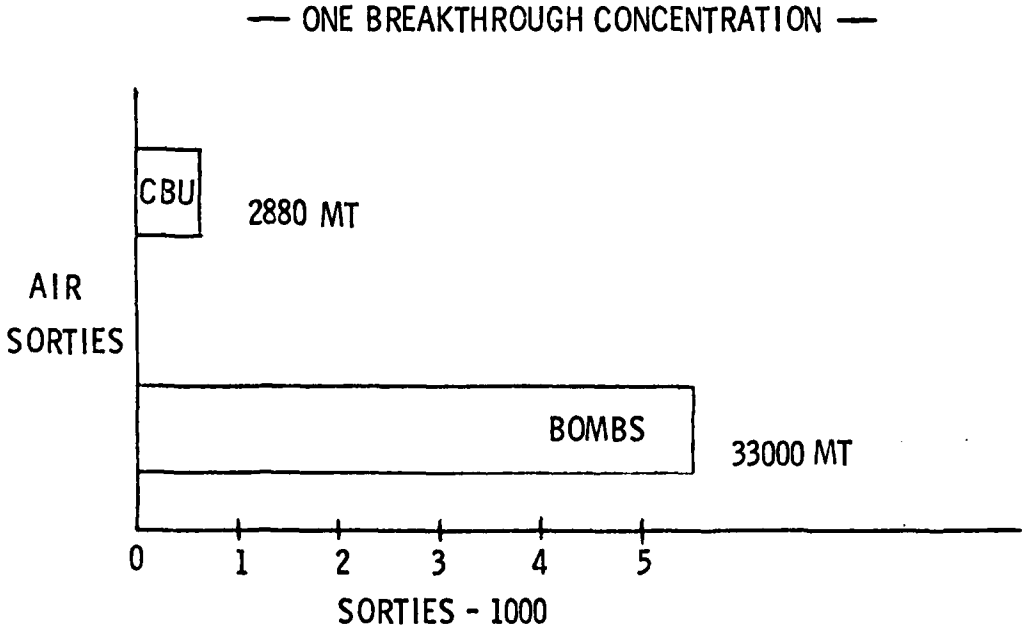


Figure 40. Requirements to Annihilate Two Divisions and Front Assets.

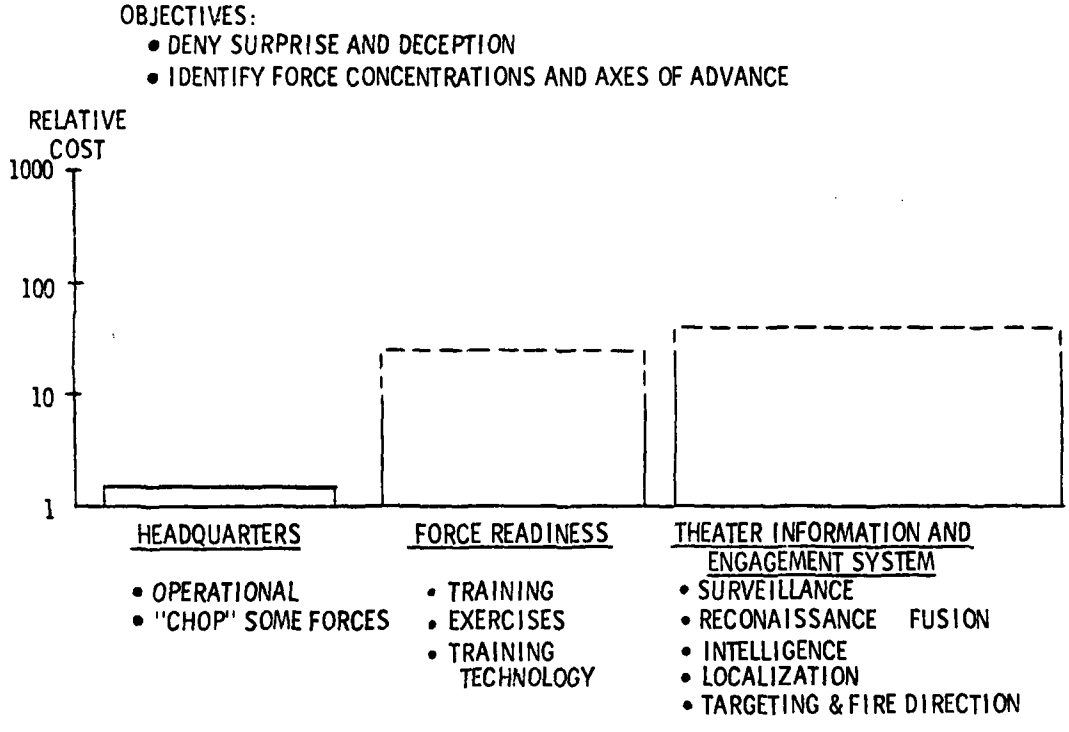


Figure 41. NATO Initiatives and Approximate Relative Costs.

must be increased and more rapid target acquisition and fire direction systems provided. Improved munitions for artillery would allow the disruption of concentrations of Soviet artillery with fewer rounds. Anti-tank missiles are needed in greater numbers. The number of armor protected anti-tank systems in a Brigade may have to be increased by three to four times. Finally, the stockpiles of improved area munitions for air and artillery, all weather PGM's, and quickly deliverable mines must be provided.* (Figure 42)

The third set of initiatives should be concerned with providing more high firepower conventional systems to NATO. These initiatives require research and development and, if pursued, could enter the NATO inventory five to ten years from now. The objectives behind these recommendations are:

(1) The ability to hold first echelon Soviet Army concentrations at annihilation risk

(2) Be able to neutralize frontal air attacks, and

(3) Hold at risk echeloning Armies and Fronts. (This latter task may be extremely difficult to achieve with conventional forces. Theater nuclear forces are probably the only practical solution available for achieving this objective.)

The high firepower systems could be provided by relatively inexpensive surface-to-surface or air-to-surface cruise missiles. (Figure 43)

The development and procurement costs of our high firepower systems will be significant. We estimate that 10 to 20,000 missiles may have to be purchased. These systems will provide great flexibility for fire missions to planners of Divisions, Corps, and Army groups. The technologies needed for the systems are in hand.

The much improved ground attack forces of the Soviet Union require NATO to improve its air defenses through a variety of passive measures and active defenses of several classes of fixed sites. NATO's field armies also need improved defenses.

The problem of developing conventional forces to hold at risk the second echelon armies and fronts is formidable. Theater nuclear forces may be the only practicable method for accomplishing this objective.

*NOTE:

The sizing calculations suggest minimum stockpiles of several hundred thousand metric tons of improved area munitions and thousands of all weather PGMs. We emphasize that larger stocks will be required.

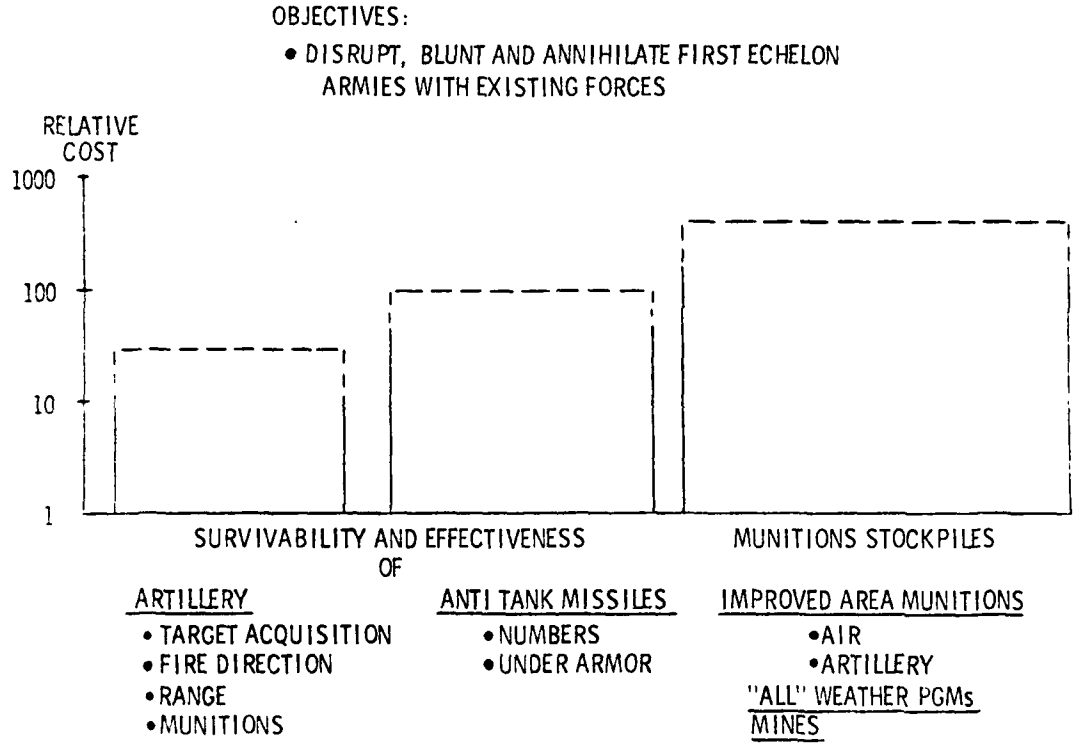


Figure 42. NATO Initiatives and Approximate Relative Costs.

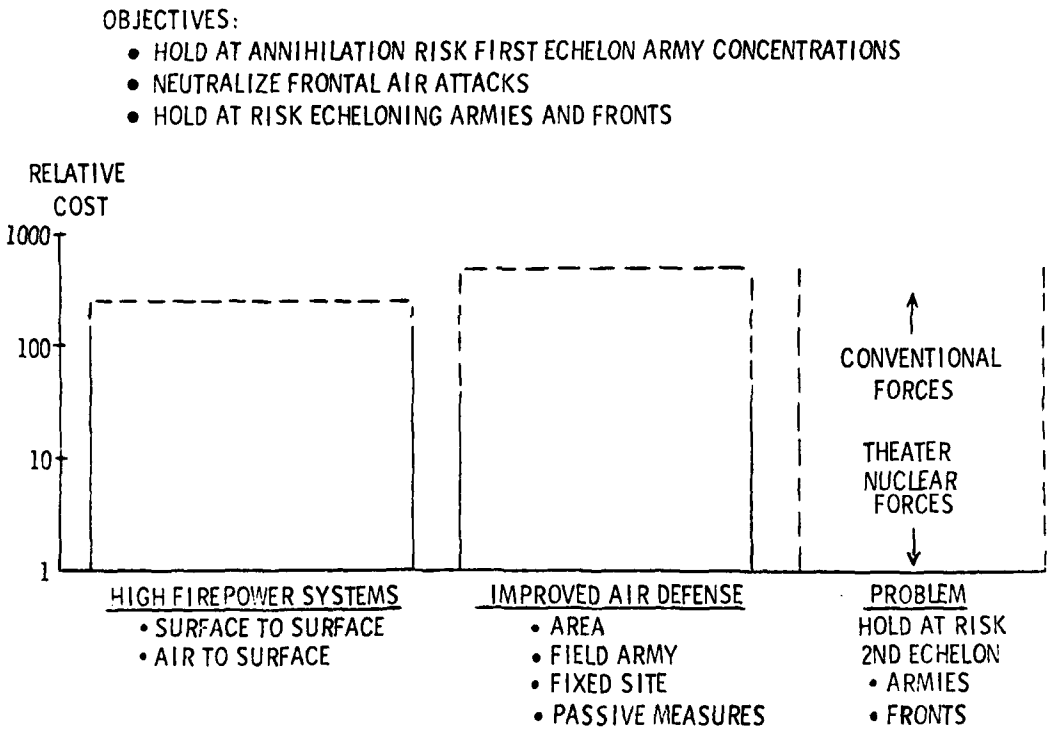


Figure 43. NATO Initiatives and Approximate Relative Costs.

7. CONCLUSION

If a war develops in Europe, it will probably occur with little warning. High rates of attrition must be anticipated.

For NATO forces it is particularly important that peacetime operational headquarters control ready and well-trained forces that are equipped and stocked for a high intensity campaign. Redeployment plans worked on so diligently for the past twenty-five years cannot affect the early phases of the war. If modern combined arms warfare makes sense at all, it must achieve its objectives quickly.

An operational characterization of the Soviet air and ground threat to NATO shows:

a. The Soviets have made impressive gains in the combat potential of their Frontal forces.

b. In some cases, the operational effectiveness of their deployed military technologies is comparable to that available in the West.

c. The probability of a surprise attack by in-place Soviet forces in the German Democratic Republic and Czechoslovakia has increased.

NATO can deal with the emerging Soviet threat with a few near term initiatives and a well directed long term development and investment strategy. For example:

a. NATO can deny the Soviets strategic and tactical surprise and identify expected Soviet offensive operations through the establishment of peacetime operational headquarters, appropriate information and engagement systems, and NATO-wide force readiness improvements. The costs associated with the creation of operational headquarters and the theater information engagement system are modest.

b. The cost associated with increasing the survivability of artillery and ATGMs and stockpiling munitions are significant but affordable, when spread over several years. Reallocation of the already appropriated funds to these areas may in fact be possible in some NATO countries.

c. New weapons development should stress the improvement of NATO's long-range conventional systems of high firepower. The competition in conventional and theater forces of mass-destruction continues. Improvements in the combat potential of NATO forces can be realized and an adequate deterrent and defensive force maintained into the future.

Conventional capabilities can be increased, thereby raising the nuclear threshold. Modernized theater nuclear weapons will add to NATO's deterrent posture.

DOCUMENTATION TO ACCOMPANY

"AN ASSESSMENT OF SOVIET FORCES FACING NATO -- THE CENTRAL REGION AND SUGGESTED NATO INITIATIVES

By

BRADDOCK & WIKNER

NOTE 1. A list of 29 source documents is attached below under the heading "REFERENCES".

NOTE 2. In documenting this paper, these methods have been used:

a. The statement requiring reference data is noted, at the end of the key passage, with the interlined number of the page, a dash, and the number of the successive footnote for that page only. Thus an interlined "22-3" indicates the third footnote for page 22.

b. The footnotes themselves use "short title" references from the outset, rather than carrying the full citation at first use. Full citation is found, by corresponding number, under the appended "REFERENCES."

NOTE 3. a. The number totals for Soviet equipment and personnel have been directly extracted or derived from a data base consisting of the following unclassified references:

Reference 1, Air Force Magazine

Reference 5, F.R.G White Paper

Reference 21, Armor Reference Data

Reference 22, Artillery Reference Data

Reference 25, US Army FM 30-40

The footnote in such cases will read, "Ref. Data Base."

b. The Data Base figures have been subsequently compared to those appearing in Reference 4, The Soviet War Machine, a very recent publication (Fall 1976), and the figures are closely approximate.

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