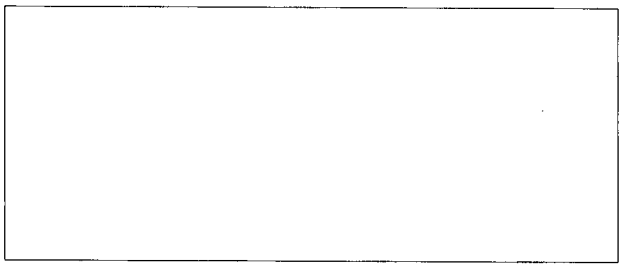
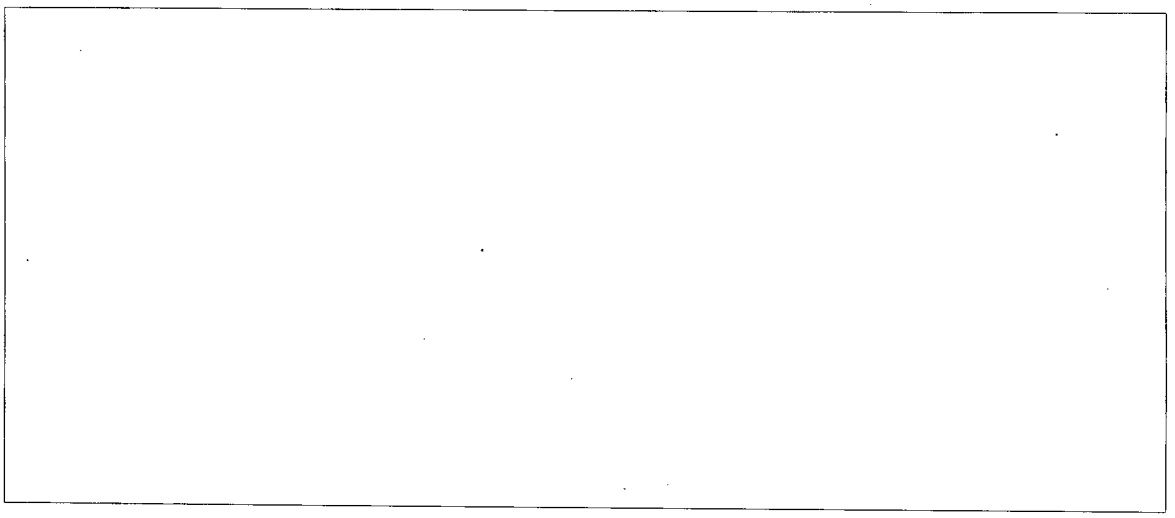
Top Secret

Soviet Planning for Front Nuclear Operations in Central Europe

An Intelligence Assessment





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This paper was prepared by the Office of Soviet Analysis, with contributions from of SOVA. It was coordinated with the National Intelligence Council. Comments and queries are welcome

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Soviet Planning for Front Nuclear Operations in Central Europe

Key Judgments

Information available as of 1 April 1983 was used in this report.

Soviet plans for conducting a war in Central Europe divide responsibility for nuclear operations between strategic forces and front tactical forces. A front is the major Warsaw Pact field command; it comprises some 300,000 to 400,000 men in ground, air, and sometimes naval units. If a NATO–Warsaw Pact war were nuclear from the outset, fronts in East Germany and Czechoslovakia would have nuclear targeting responsibility for about a third of West Germany. Strategic forces in the USSR would attack the rest of Central Europe. Soviet doctrine provides guidelines for the selection of targets and the damage to be levied against them during nuclear operations.

Once the Soviets decided that large-scale use of nuclear weapons was inevitable, they would prepare initial tactical nuclear strikes that would be massive, coordinated with strategic strikes, and delivered by fighter-bombers, short-range surface-to-surface missiles and rockets, and nuclear artillery. Soviet writings from the late 1970s indicate that 40 percent of a typical initial nuclear strike would be delivered by aircraft, 35 percent by missiles, and 25 percent by artillery. We estimate that Soviet nuclear forces and warhead inventories in East Germany, Poland, and Czechoslovakia are more than adequate for massive tactical strikes.

Classified writings and exercises clearly show that the Soviets would attempt to preempt NATO's use of nuclear weapons to preclude a large strike on their forces. Soviet planners expect that nuclear strikes probably would occur almost simultaneously with NATO strikes because of difficulties in timing a preemptive attack.

The most important front targeting objective during both conventional and nuclear operations, as identified in classified military writings, is the complete destruction of NATO's land-based nuclear delivery capability immediately opposite Soviet forces. Other high-priority tasks include the selective destruction of NATO's command, control, and communications facilities, major portions of its air defense network, and its main groups of forces. A typical initial strike by a single front in Central Europe would comprise about 300 to 400 weapons delivered to under 100 targets and would total

about 50 megatons (Mt) in an area 250 to 400 kilometers wide by 100 kilometers deep—an area about the size of Belgium. Virtually all of these weapons would be detonated in the air rather than on the ground, probably to limit the effects of radioactive fallout on Warsaw Pact troops, despite the greater effectiveness of ground bursts against some small, fixed targets like permanent warhead depots.

The Soviets believe that locating targets is the most difficult problem they would face in executing front nuclear strikes. Warsaw Pact writings indicate that most front targets would move frequently, making target location data highly perishable. Unless reconnaissance assets are able to track all front targets and report their coordinates in a timely manner, the Soviets see a risk that some targets would receive insufficient damage or escape targeting entirely. Nevertheless, the magnitude of the front strike could make many reconnaissance questions academic. Even if NATO units escaped direct strikes, collateral damage to troops and equipment could be severe enough to limit seriously their combat effectiveness.

[1] Soviet tactical missiles have available conventional warheads that could be used against some of these NATO targets. This paper, however, addresses only nuclear targeting.

The deployment of Pershing II ballistic missiles and ground-launched cruise missiles (GLCMs) to Europe will not significantly affect front nuclear operations because most of these missiles probably would be located beyond initial front nuclear targeting areas. Most nuclear targeting of Pershing and GLCM units, we believe, would be the responsibility of the strategic forces. Front targeting of those Pershing and GLCM units within range could probably be met by small increases in the number of warheads assigned to fronts.

New Soviet missile systems will enhance front nuclear capabilities. The SS-21 missile that is entering the force and the SS-23 that eventually may be deployed will offer significant increases in range, accuracy, and survivability over current front missiles. These systems will enable Soviet planners to allocate lower yield warheads and still meet current damage requirements against most front targets. The benefits of the improved accuracy of the SS-21 and SS-23 could be lost, however, if mobile targets are not detected or if timely and accurate target location data are not available.

Contents

Terminology

TMO	*Soviet operational planning divides Europe into three theaters of military operations (TMOs) as shown in figure 1. Classified writings indicate that the Soviets view the Western TMO as the most important.*
Front	*A front is a joint forces command, roughly analogous to the NATO Army Group and its associated tactical air force, which consists of about 300,000 to 400,000 men in three to five ground armies, air forces, combat support elements, and sometimes naval forces. Although front command and control elements exist in peacetime, fronts would be formally activated as commands only in wartime, as would high commands in TMOs. The total number of fronts committed to the three European TMOs could be seven to 15.*
	The Warsaw Pact envisions a basic force of three fronts in the Western TMO, for example, as the first echelon of attack in NATO's Central Region, with two to four fronts in rear echelons. The first-echelon fronts would be arrayed the length of West Germany from the Baltic Sea to the Alps, with most of the force concentrated in the center.
General Staff	*In wartime, the General Staff would be the executive agent of the Supreme High Command and thus the focal point for operational control of Soviet and Warsaw Pact forces.*
Strategic and Tactical	*The Soviets categorize their nuclear weapons as tactical, operational-tactical, and strategic. Tactical and operational-tactical weapons include the FROG rocket; Scud, SS-21, and Scaleboard SRBMs; nuclear-capable artillery; and nuclear-capable tactical aircraft. For simplicity, in this paper we refer to FROGs as missiles, and we use the designation "tactical" to include tactical and operational-tactical systems with ranges of less than 1,000 km. Strategic weapons are those based in the USSR with a range of 1,000 km or more.*

Soviet Planning for Front Nuclear Operations in Central Europe

Introduction

Soviet plans for conducting a war in Central Europe divide responsibility for nuclear operations between strategic and front forces. Soviet front forces stationed in East Germany and Czechoslovakia are initially given responsibility for nuclear targeting of about a third of West Germany. Soviet strategic forces are to strike the rest of Central Europe.

This assessment analyzes front nuclear operations. It identifies the doctrine that guides front nuclear planning and describes what a nuclear attack on NATO forces opposite Soviet fronts in Central Europe might look like—the targets struck, the damage to those targets that Soviet planners expect to achieve, and the yields and number of weapons required to inflict that level of damage.

The evidence consists of Soviet and Warsaw Pact military writings detailing requirements and goals for nuclear operations, and analysis of Soviet nuclear force capabilities. Some of the Soviet writings on these subjects are dated, but the key requirements discussed in them are still valid.

This paper grew out of a large research data base assembled by the Central Intelligence Agency for Project SAMOA (Soviet Analytical Methods for Operational Assessment). Project SAMOA is an interagency effort to develop a better understanding of Soviet planning and force assessment procedures for theater operations

Soviet Concepts for Theater Nuclear Operations

Planning and Control

Soviet strategy for war with NATO in Central Europe is keyed to the combined-arms offensive—a carefully orchestrated, decisive campaign that involves a series of mutually supporting conventional and nuclear operations by tactical as well as strategic forces. Although the Soviets see the use of nuclear weapons as significantly changing the nature of a battle, nuclear operations are not treated as isolated events but are fully integrated into operational plans.

Nuclear planning originates in the Main Operations Directorate of the General Staff.[2] Before 1980 this Directorate would have directly supervised wartime front nuclear planning and operations. It assigned operational objectives to each front and specified the resources (including nuclear weapons) to accomplish them. In the early 1980s, however, the Soviets made formal provision for the establishment in wartime of high commands in the Western and Southwestern Theaters of Military Operations (TMOs), which would serve as intermediate commands between the General Staff in Moscow and the operating forces in the TMOs. Front objectives and resources would still be determined by the General Staff. Although remaining under its overall control, the high commands in TMOs would supervise front nuclear planning and operations and provide their subordinate fronts with detailed operational objectives. This guidance would direct the selection of targets and the timing of the initial strike.

Coordination of Front and Strategic Targeting

Soviet plans for nuclear operations in Central Europe call for massive strikes by front forces coordinated with similar strikes by the strategic forces. These plans—drawn up in peacetime—would be modified as conventional combat proceeded. The General Staff has assigned initial targeting responsibility for about a third of West Germany to front forces in East Germany and Czechoslovakia. Targeting of the rest of Central Europe is the responsibility of the strategic forces, principally the Strategic Rocket Forces (SRF).

Figure 1
Warsaw Pact Theaters of Military Operations (TMOs) in Europe

classified writings since the early 1960s indicate that the General Staff coordinates front and strategic targeting by means of a specific nuclear targeting demarcation line. The fronts' initial targeting zones prior to and at the start of conflict lie between this line and the border between East and West Germany. After conflict has begun, exercises and classified writings show that the line would be redrawn as the course of the war produced significant change in the geography of operations. In the 1960s the initial demarcation line lay 300 to 400 km west of the inner-German border. By the mid-1970s, it had been moved back to 250 km from the border. Limited data since 1977 show that the initial line is now about 100 km from the border (see figure 2).[1]

The substantial reduction in the size of front targeting zones probably is the result of Soviet efforts to align front targeting responsibilities more realistically with the front target array. Analysis shows that 90 percent of the targets of immediate operational concern to fronts would fall within 100 km of the battle line. This is true despite improvements in the range and accuracy of front nuclear delivery systems.

The elimination of initial responsibility for targets beyond 100 km would allow fronts to concentrate their nuclear assets against NATO forces close to the battleline. When initial nuclear planning areas extended out 250 km or more from the inner-German border, available front weapon systems were too limited in range and accuracy and too few in number to cover all potential targets

[1] The 100-km depth is a nominal figure used for front nuclear planning prior to and at the outset of hostilities. The Soviets consider the overall depth of a front operation to be 600 to 800 km and plan to conduct it in at least two phases.

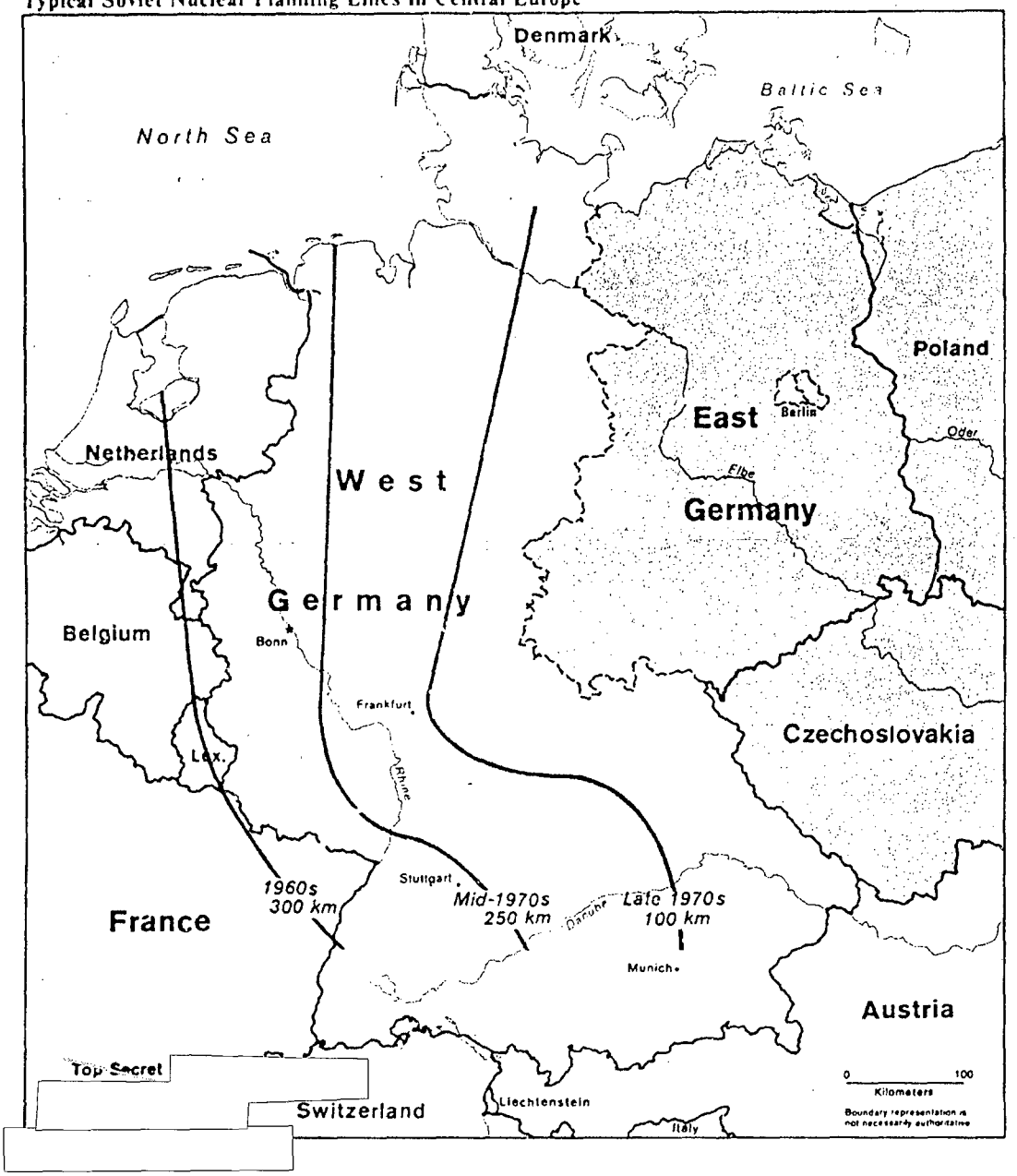
We believe that the Soviets currently plan no SRF strikes within front targeting zones. Nevertheless, about 20 to 25 SRF weapons still would be used against targets of concern to each front but beyond the targeting demarcation line. These would include airfields, Pershing units, air defense systems, nuclear storage sites, and key logistic facilities. Fronts would submit nominations for targeting to the General Staff or the high commands. Although the SRF support role has decreased

Front Nuclear Operations

Front nuclear operations would be concentrated against tactical targets throughout the targeting zone. Soviet classified writings indicate that the principal objectives of a Soviet front nuclear strike would include the destruction of NATO's nuclear delivery capability; the severe disruption of its command, control, and communications facilities at the corps level and below; widespread damage to main groups of its forces, especially along the intended front axis of advance; and the selective destruction of its air defense network.

Soviet writings indicate that the most successful initial front nuclear strike would preempt a NATO nuclear attack a preemptive attack as one based on the Warsaw Pact's detection of NATO plans to launch a first strike. Since the mid-1970s, however, Soviet planners expect that nuclear strikes probably would occur almost simultaneously with NATO strikes because of their difficulties in timing a preemptive attack. Soviet doctrine stresses that an initial front strike should be massive. Some Soviet writings address the possibility of limited nuclear operations or selective strikes. These operations involve only small numbers of front assets and usually occur only a matter of

Figure 2
Typical Soviet Nuclear Planning Lines in Central Europe



hours before massed front strikes and strategic strikes. Both doctrine and exercises indicate that these limited nuclear operations represent only a minor variant in the Soviets' basic plans for war in Europe.

Front Nuclear Forces

The Soviets have assigned various forces to fronts for nuclear operations. Figure 3 describes the artillery, aircraft, and missiles currently available for front strikes. Nuclear artillery first appeared in Soviet forces in the 1970s and now feature modern self-propelled weapons. Nuclear-capable aircraft include the latest generation of Soviet tactical fighter-bombers as well as the MIG-25 Foxbat and SU-17 Fitter-H for reconnaissance. Since the late 1960s, the principal tactical missile systems have been the FROG and the Scud. Despite the development of new missiles that are more accurate, such as the SS-21 and SS-23, the slow rate at which these systems are being deployed suggests that the FROG and the Scud will continue to constitute the major part of the forces throughout the 1990s. Deployment of the SS-21 has begun in East Germany. The SS-23 has not yet appeared in Soviet forces, and its deployment is probably not imminent.

Another nuclear delivery system that might support front missions is the SS-12/22 missile, which has a range of 925 km. Although SS-12/22s are now deployed only within the USSR, the Soviets could deploy them in Eastern Europe at the outset of hostilities. Soviet writings indicate that SS-12/22s would be deployed 200 to 300 kilometers behind battlelines, and thus they would be capable of striking targets well beyond front targeting zones.

Soviet forces in Europe have large numbers of nuclear delivery vehicles. Almost 250 Scud, FROG, and SS-21 launchers are fielded with Soviet forces stationed in East Germany, Poland, and Czechoslovakia. The Group of Soviet Forces in Germany (GSFG) alone has 190 launchers to support the main Soviet advance through Europe. Each launcher can fire missiles equipped with conventional cluster and chemical warheads as well as with nuclear warheads, and each can be reloaded for additional strikes.

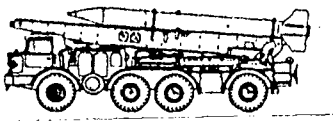
The GSFG is also rapidly acquiring a nuclear artillery force. Front and army artillery units in Germany are receiving long-range 152-mm guns—both self-propelled and towed—and long-range 203-mm self-propelled guns. Current delivery rates suggest that the Soviets may soon have at least 240 and possibly as many as 340 of these in the GSFG. In addition, the Soviets have apparently begun to deliver nuclear projectiles to units in the GSFG that are equipped with 152-mm gun-howitzers—a short-range system—indicating that another 700 guns at front, army, and division level are capable of firing nuclear rounds.

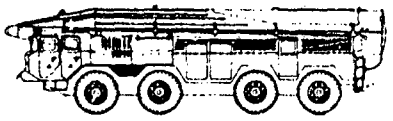
Soviet air forces in Europe have more than enough nuclear-capable aircraft to carry out the number of nuclear strikes they evidently plan to deliver. These forces consist of six regiments of fighter-bombers and light bombers in the GSFG, totaling some 255 aircraft. The Legnica Air Army includes 90 additional light bombers stationed in Poland and another 90 light bombers stationed in the Baltic Military District of the Soviet Union. The air forces in the GSFG, the Legnica Air Army in Poland, and the Central Group of Forces (CGF) in Czechoslovakia also have approximately 630 nuclear-capable fighters, but these fighters do not have a primary nuclear role—they probably constitute a reserve nuclear force.

These force estimates do not include non-Soviet Warsaw Pact (NSWP) nuclear forces, which could significantly augment Soviet front nuclear strike capabilities. At the same time these estimates do not account for attrition of either Soviet or NSWP forces during an initial conventional combat phase. Non-Soviet forces do not have independent access to nuclear weapons. East German, Polish, and Czechoslovak forces have available, however, a variety of nuclear systems including about 200 FROG and Scud launchers and over 200 fighter-bombers. Most of the aircraft are in air defense units, and only a few of their crews are trained for nuclear operations.

Figure 3
Selected Soviet Front Nuclear Delivery Systems

Tactical Missiles and Rockets	Warhead Yield	Range	Accuracy at 2/3 Range	Year Operational
SS-1 Scud B		300 km		1961
FROG-7		70 km		1965
SS-12 Scaleboard		925 km		1965
SS-21		120 km		1976?
SS-23		500 km		1981





2 meters

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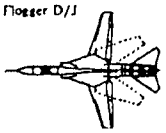
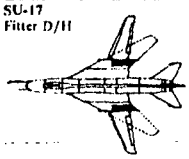
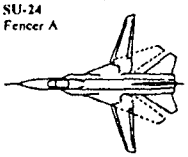
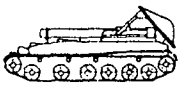
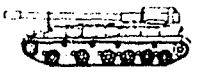
Figure 3 (continued)
Selected Soviet Front Nuclear Delivery Systems

Tactical Aircraft	Maximum Operational Radius *	Bomb Yield	Year Operational
MIG-27 Flogger D/J 	930 to 1,600 km	5 to 200 kt	1975/78
SU-17 Fitter D/H 	440 to 630 km	5 to 200 kt	1976/77
SU-24 Fencer A 	460 to 850 km	5 to 200 kt	1974

Self-Propelled Artillery	Main Armament and Yield	Maximum Range	Year Operational
M-1975 	203-mm gun 2/5 kt	37.5 km	1974
M-1975 	240-mm mortar 2/5 kt	9.6 km	1974
M-1981 	152-mm gun-howitzer 0.5 to 1 kt	28.4 km	1979

* The aircraft operational radii listed reflect the differences resulting from different flight profiles. The lower range numbers assume that a third of the mission is flown at sea level. The higher range numbers assume that most of the mission is flown at high altitudes. Front nuclear operations in the initial strike are normally conducted at a depth of 100 km or less.

Page# 8

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Guidelines for Front Targeting

Targets and Priorities

In general, the targets for Soviet front nuclear strikes fall into six main categories:

- Surface-to-surface missile (SSM) units.
- Nuclear storage sites.
- Airfields.
- Command and control sites.
- Surface-to-air missile (SAM) units.
- Ground force combat units.[a]

Other possible targets mentioned in Soviet writings include engineering or terrain features (such as bridges, dams, and mountain passes), whose destruction would impede the movement of enemy forces. Additional targets probably include rear elements of the enemy's logistic system, particularly depots and materiel support airfields. Many logistic targets, however, would fall outside front targeting zones. They would be either subject to strategic targeting or of low priority relative to other front targets.

Targets designated for nuclear strikes would also have the highest priority during any conventional operations. Soviet writings and exercises indicate that conventional air operations would be a key element in the attempt to destroy nuclear threat targets, such as Lance and Pershing missile units, before the onset of nuclear operations. Soviet writings suggest, however, that front planners may not expect many of these targets to be eliminated because of their capability to remain hidden.

Soviet military writings state that nuclear-related targets—missile units, staging airfields with nuclear-capable aircraft, nuclear artillery units along the main axis of advance, and nuclear weapons storage sites (both fixed and field locations)—would receive the heaviest concentrations of weapons. The destruction of such targets would inhibit NATO's ability to carry out nuclear strikes against Warsaw Pact forces. According to Soviet writings, the front commander's objectives and the axis of advance help determine the targets and priorities for the initial nuclear strike. In practice, however, the inherent importance of nuclear threat targets and command and control targets limits the front commander's ability to modify target lists in all but minor ways.

[a] Ground force combat units include infantry and tank divisions, airborne units, and artillery units—both conventional and nuclear capable—of at least battalion strength.

Table 1
Soviet Front Nuclear Damage Goals

Target Category	Minimum Required Damage Level [a] (*In percent*)
Nuclear delivery targets	
Nuclear artillery units	90-100
Missile units	90-100
Aircraft at airfields	90-100
Nuclear storage sites	90-100
Command and control sites	
Command posts	40-70
Control and warning centers	80-95
Airfields	35-60
Air defense sites	
Hawk, Nike-Hercules sites	90-100
Other	70-100
Divisions	30-40

[a] The minimum required damage is the percentage of the target that must be damaged to a certain level with 90-percent probability in order to satisfy target damage requirements. The Soviet criteria for damage to troops, equipment, and structures are total, severe, moderate, or light damage. Such damage can result in either the functional destruction or the neutralization of a target. The range in damage levels probably reflects varying priorities of targets within each group, differences in damage criteria, as well as variations in target hardness and size.

Target Damage Goals

Soviet front nuclear planning is keyed to the achievement of specific damage goals against targets. Damage goals are usually expressed as the percentage of the target to be damaged or destroyed with high probability. Table 1 summarizes classified Soviet writings on the damage goals for front nuclear targeting.

The damage goal varies with the type of target, its size, and its hardness. Soviet writings identify most front targets as area targets, defined in terms of their large operation zones, rather than as distinct location points. Soviet writings also identify overpressure as the primary means of inflicting damage. Some target components—radars and electronic equipment, aircraft, and exposed personnel—are highly vulnerable to the overpressures generated by even low-yield nuclear weapons. Other target components such as bunkers, tanks, or personnel in protective shelters offer more resistance to overpressure damage. Soviet targeting doctrine emphasizes achieving damage to the target's most vulnerable feature, which will impair its function. Soviet damage calculations do not usually include secondary effects like fire or fallout. Fallout is probably not included as a primary damage mechanism because the high-altitude bursts planned by the Soviets would not generate much residual radiation.

Target Location Requirements

The Soviets believe that locating targets is the most difficult problem they would face in planning front nuclear strikes. Warsaw Pact writings state that 70 to 80 percent of a front's potential targets will change locations frequently, making most targeting data highly perishable. The Soviets expect that target data would have to be continuously updated, requiring extensive use of available reconnaissance systems to track and communicate the locations of all potential targets.

Front planners have available various technical and human reconnaissance means. Among these are:

- Overhead reconnaissance from remotely piloted vehicles (RPVs), aircraft, and satellites.
- Electronic reconnaissance, including radio direction finding, signal intercept, radar, and laser rangefinding.
- Agents.
- Armed Special Purpose (SPETSNAZ) Forces that would conduct reconnaissance and destruction missions.

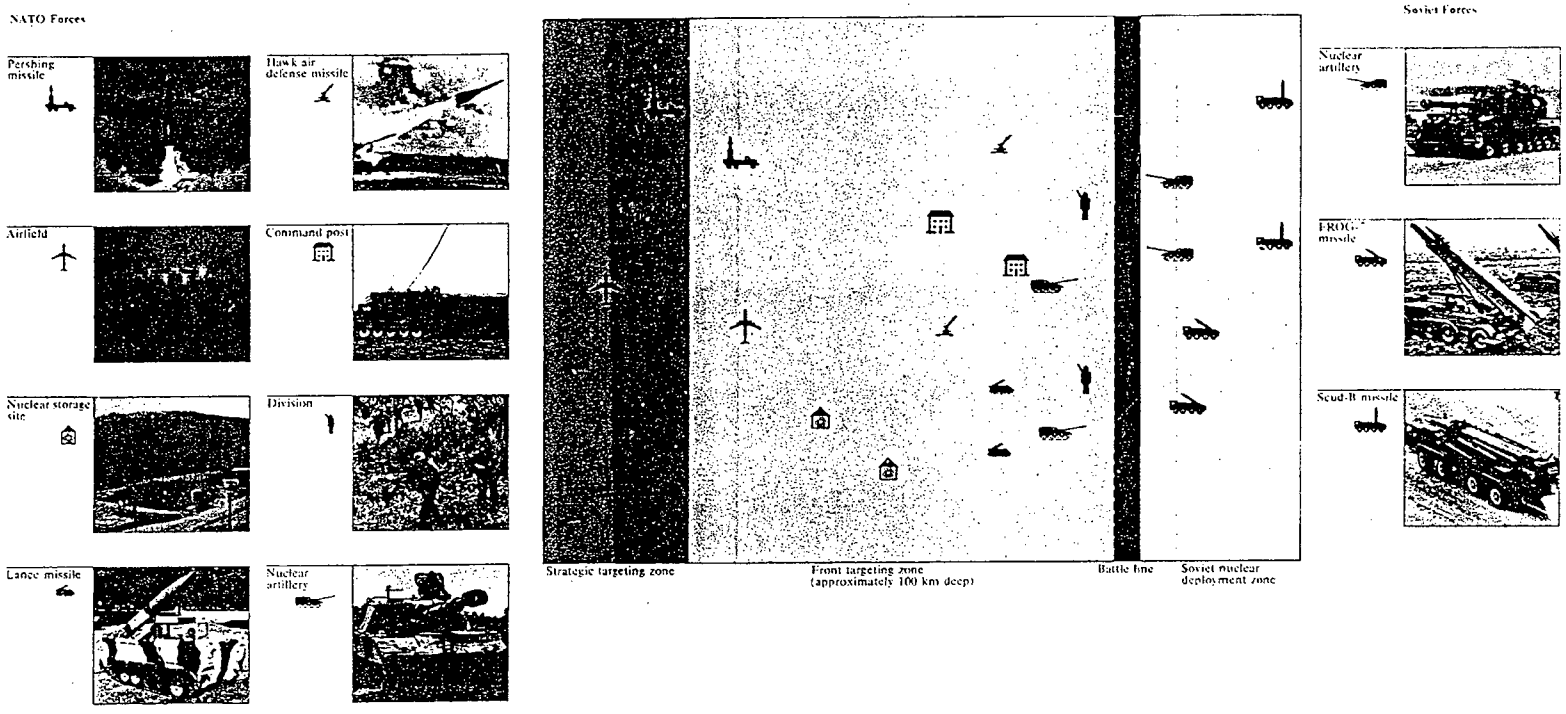
Warsaw Pact writings provide specific guidelines for the level of target location accuracy required when planning the use of nuclear weapons. These guidelines are based on the range, accuracy, and warhead yields available for each type of nuclear delivery system. They state that for highly effective strikes, target location data should be accurate to within 30 meters for artillery targets, 100 to 150 meters for FROG targets, and 175 to 200 meters for Scud targets. We have no information on accuracy requirements for aircraft targets. Targets meeting these criteria would normally be assigned artillery or missile strikes. Remaining targets would either be assigned airstrikes or remain unassigned pending the availability of more accurate target location data

The reconnaissance process that supports front nuclear planning is complex; it includes the assignment of reconnaissance missions, the collection and transmission of coordinate data, collation of that data with data from other sources, the assessment of the overall accuracy of the information, and the incorporation of location data into targeting calculations. For this process to function in a timely and efficient manner, targets must be identified quickly and accurately. Classified Pact military writings from the mid-1970s indicate that available reconnaissance systems probably will be able to provide sufficiently accurate target coordinates under most circumstances once a target has been found. The problem will be finding the target.

Classified writings have indicated concern that existing reconnaissance means will fall short of providing the timely and complete information on all front targets needed to guarantee the effectiveness of the initial front nuclear strike. The strike's size would be determined largely by high target damage requirements. If data are incomplete or old, there is a risk, in the Soviets' view, that important targets could receive insufficient or no damage, thus decreasing the attack's effectiveness.

There is little evidence to confirm the problem of reconnaissance cited in Pact military writings.

Figure 4
Representative Soviet Front Nuclear Targeting Zone



Page# 12

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to use their most versatile and accurate assets—for example, SPETSNAZ Forces—to increase the likelihood that high-priority nuclear threat targets, such as Pershing and Lance units, would not escape targeting. Because information on target reconnaissance is limited, we are unable to judge the real extent of the problem. It is unlikely, however, that authoritative Soviet military writings would address the problem if planners did not think it was important.

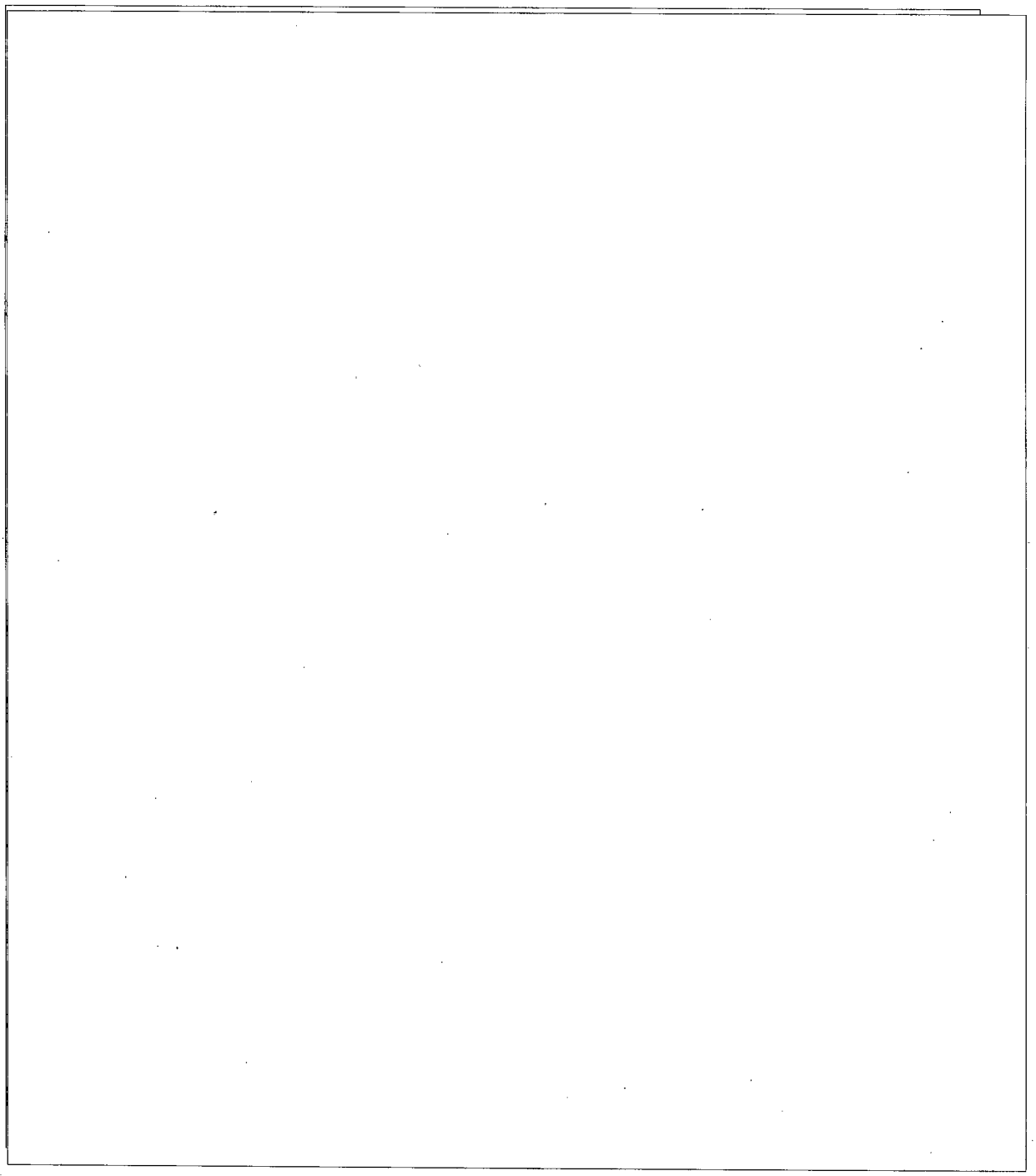
Such concerns may be more important theoretically than objectively. A typical Soviet front nuclear strike would consist of a large number of nuclear weapons delivered to a relatively small area. Such a concentrated strike conceivably could fall short of achieving expected damage levels against all targets, but even a strike only partially successful by Soviet standards could seriously damage NATO forces. Collateral damage, although not considered in Soviet damage requirements calculations, could fundamentally impair NATO units—killing and injuring troops, damaging essential equipment, and limiting unit mobility. Even those NATO forces that escaped Soviet strikes could be isolated from their support units or command elements.

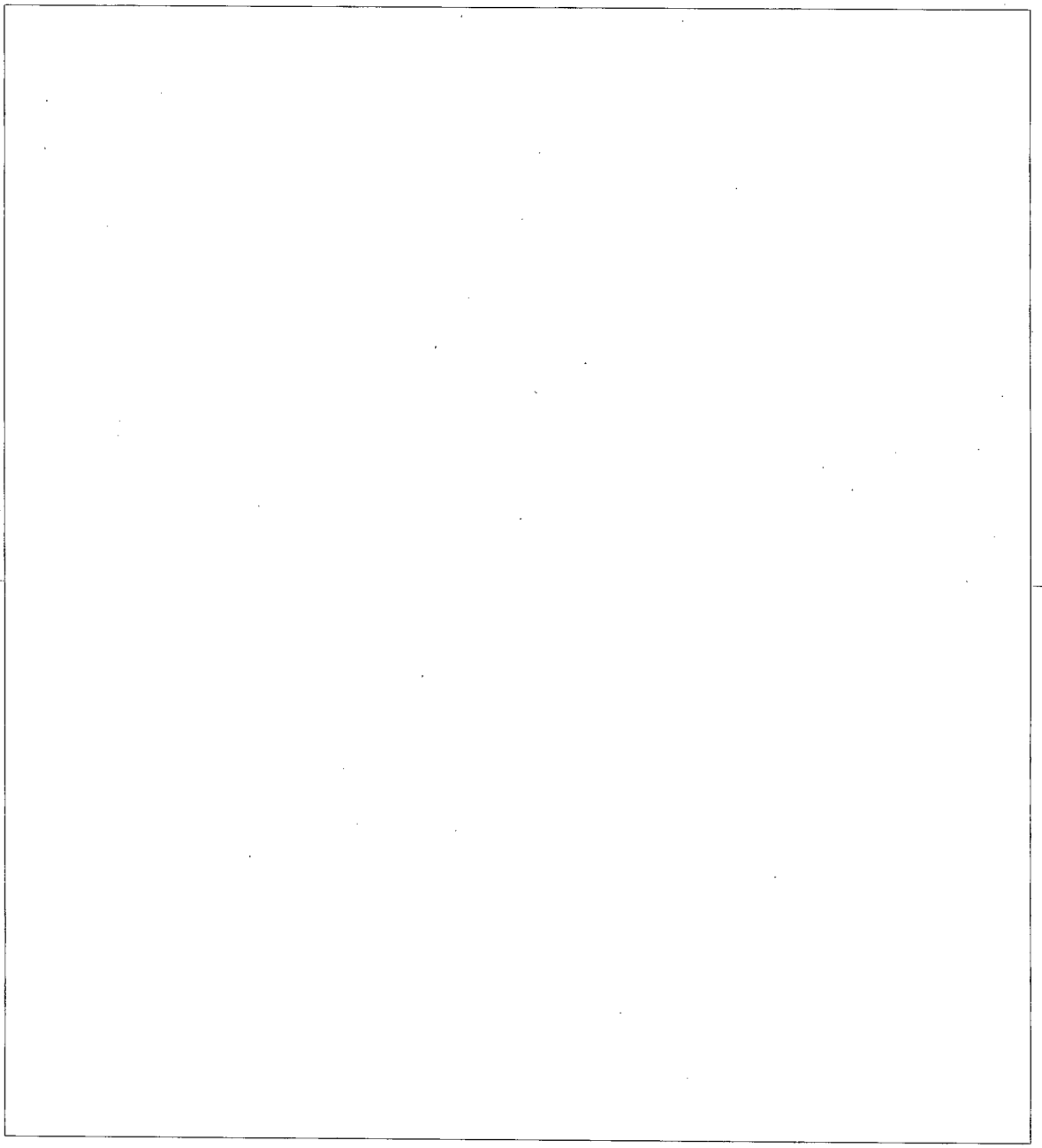
The targeting patterns discussed in this paper represent allocations of nuclear weapons to targets and are not keyed to any specific scenario. An actual allocation in wartime might differ from these patterns. Because of target priorities and damage requirements, however, the number and yield of weapons delivered in a Soviet nuclear strike is relatively insensitive to the circumstances and would probably not vary significantly from the patterns we observed.

front nuclear forces typically deliver yields totaling 300 kt or more against small, usually mobile, unhardened targets.

Targeting Strategies

Nuclear targeting generally follows the guidelines suggested in Soviet classified writings for the appropriate weapon employment strategies against various target categories. Scud targeting was focused primarily on nuclear-related fixed targets, such as airfields and nuclear storage sites. This strategy is consistent with writings that describe missile strikes as most effective against fixed targets or targets with locations firmly established—usually within 100 to 200 meters.





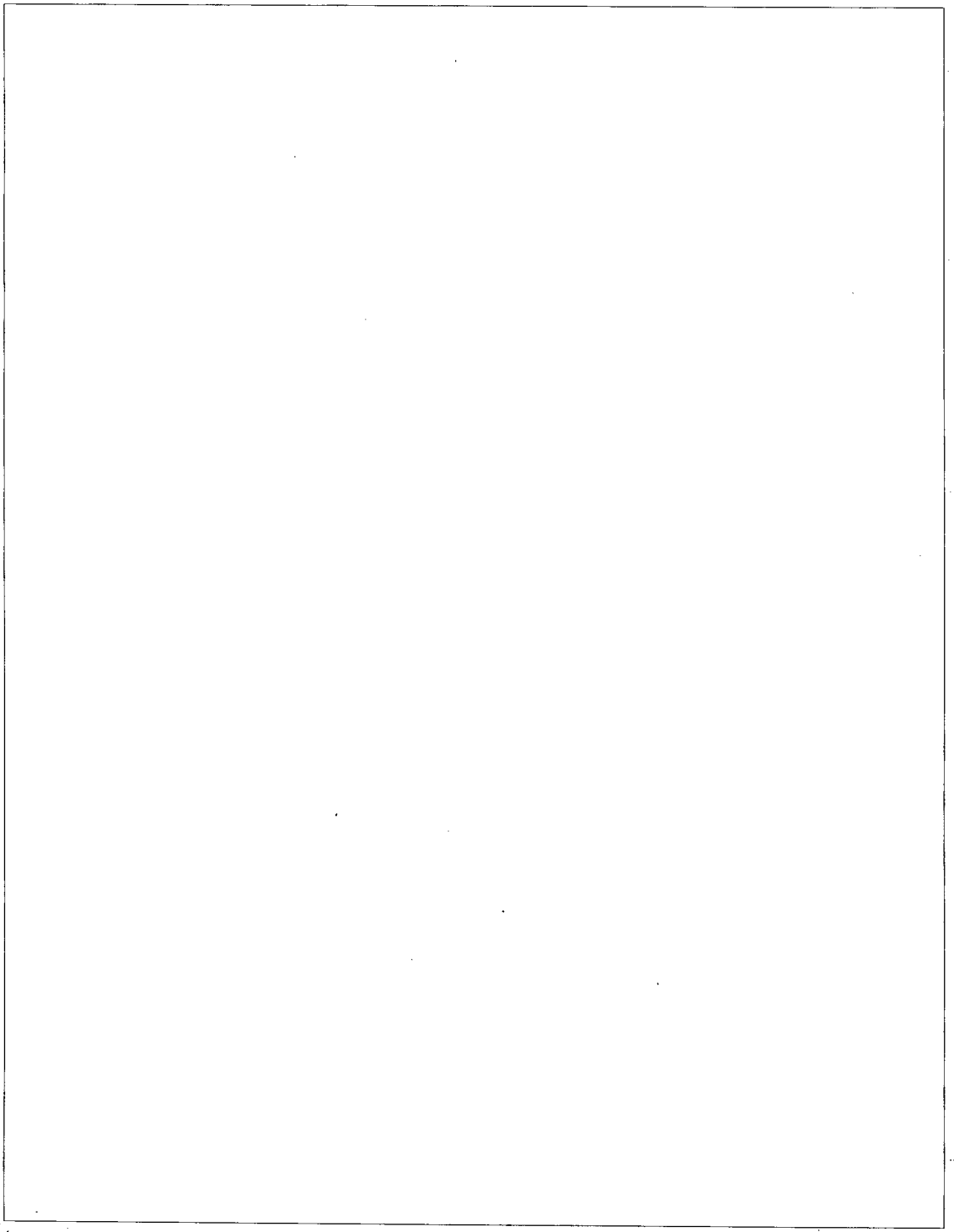
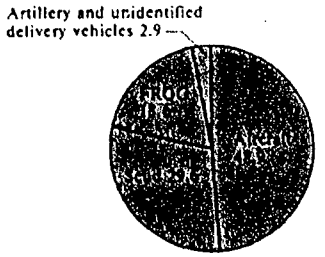


Figure 6
Distribution of Delivery Vehicles for the Initial Nuclear Strike

Percent



The Soviets evidently do not plan to use ground bursts against front targets, probably to limit the effects on their own troops. Despite the greater effectiveness of ground bursts against some small, fixed targets like permanent warhead depots, the Soviets plan to use heights of burst (HOB) mostly between 600 and 1,100 meters for missile warheads of 200 kt or more. Classified Soviet weapons effects literature identifies such HOBs as high to very high. Burst heights for lower yield weapons would be proportionally lower. High bursts would minimize residual radioactive contamination, thus allowing troops to traverse targeted areas within hours after a strike. Other Soviet writings discuss the advantages of impeding an enemy's mobility by using ground bursts against terrain and engineering targets; however, that the Soviets are more concerned with assuring the mobility of their own forces.

Targeting Efficiency and Yield Patterns

Doctrinal writings indicate that Soviet nuclear planners assign great importance to the efficient allocation of nuclear weapons. Pact military writings that discuss "economy of means" make clear that the number of missiles or aircraft assigned to a target should be minimized, even at the expense of allocating excessive yield to the target. As a consequence, the Soviets tend to use single, large-yield warheads that, according to US standards, would significantly overkill a target, even if multiple, low-yield strikes could more closely satisfy damage goals.

Soviet plans are less constrained by collateral damage considerations. Of overriding concern to Soviet planners is the capability to damage targets to specified levels. Other than troop safety considerations, no collateral damage effects are considered in Soviet weapon requirement calculations. Furthermore, the use of high yields close to the battle zone indicates that Soviet troop safety requirements are less restrictive than NATO's

Although most front targets area targets and would be vulnerable to multiple, low-yield nuclear strikes spread over the target area. Those targets receiving more than one weapon usually were targets spread over a large area, high-priority nuclear missile units, or targets that could not be damaged to the required level by single, high-yield nuclear weapons.

The Soviets evidently plan minimal use of warheads at the extreme ends of the yield spectrum.

Although a greater variety of yields for front nuclear forces would allow Soviet targeters to meet damage requirements more efficiently, the current limited mix of warheads offers several advantages. A high-yield warhead usually satisfies target damage requirements regardless of the configuration and vulnerability of the target. A Scud strike on a Lance battery, for example, would meet all damage goals against exposed or protected troops and equipment with large allowances for error in target location. To produce casualties among exposed troops in a Lance battery, according to Soviet calculations, a strike totaling would be required. This figure is based on the assumption that Soviet targeters can confirm the location of the battery to within 200 meters of its actual position, the nominal location accuracy required for Scud targeting.

In addition, limiting warheads to high and low yields simplifies nuclear weapon logistics. A slight change in the configuration of a target or the accuracy of its location data would not necessarily require changing the warheads or launchers assigned to it.

Targeting Patterns Against Selected Targets

NATO Missile Units. The Soviets target NATO Pershing and Lance missile units with high-yield warheads that are delivered over the units' entire operating areas each targeted battery is allocated a number of warheads sufficient to guarantee coverage of all potential launch positions within its operating area. For Pershing units, damage goals dictate a strike of six Scud warheads per battery.[6] For Lance units this requirement is one warhead per battery (three warheads for each Lance battalion).

Unclassified Warsaw Pact writings on weapons effects indicate that such high-yield targeting of Pershing and Lance units will destroy them by overpressure. Because Lance and Pershing units operate in wooded areas, however, fires generated by such attacks could destroy almost three times as much forest area as would be destroyed by overpressure alone. Yet such fire damage is considered important by the Soviets only insomuch as it affects the ability of their troops to move through the targeted area.

Airfields and Nuclear Storage Sites. strikes against airfields supporting nuclear aircraft usually consist of one Scud warhead—regardless of the size of the airfield. Soviet literature on weapons effects indicates that such high yields are unnecessary if damage to aircraft in the open is the primary consideration. Even aircraft protected in reinforced hangarettes would sustain heavy damage from a lower yield attack. The use of high yields against airfields probably is related to other factors than aircraft damage requirements, including the lack of intermediate-yield warheads for the Scud missile, a requirement for high damage levels against buildings and troops, the large area of the target, and the presence of nuclear weapon storage facilities away from the main concentration of buildings, runways, and aircraft. Although Soviet writings from the early 1960s identify the areas to be damaged at an airfield, do not indicate what the various subtargets might be.

[6] According to Soviet classified writings, a Pershing battery operates in an area 10 by 15 km and consists of three launch platoons with a total of nine launchers. A Lance battery operates in a 3-by-5 km area and consists of two missile launchers

Nuclear storage facilities would also receive a single Scud warhead. The earth-covered concrete bunkers that NATO uses for nuclear weapons storage are not designed principally for protection from nuclear attack but to prevent the propagation of an explosion from one storage building to another. For this reason, roofs and doors are designed to be weaker than the sides and backs of the structures. A nuclear detonation substantially lower than would cause widespread structural damage to the shelters and would probably satisfy Soviet damage requirements. Use of the warhead may be related to the lack of intermediate yields for the Scud, but it also may indicate that Soviet planners have miscalculated the hardness of these storage sites.

Ground Force Combat Units. Although divisions made up 36 percent of the targets they received 70 percent of the warheads delivered by fronts in the initial strike. Aircraft delivered 60 percent of the strikes against divisions. Unlike other targets, divisions occasionally received simultaneous strikes by both aircraft and missiles. Such cross-targeting, however, was limited to 10 percent of the divisions.

Warhead allocation patterns against divisions varied more than those against other targets.

Soviet norms for targeting divisions evidently are highly flexible.

For strikes against divisions the Soviets require a high probability of achieving 30- to 40-percent coverage of the target. Factors such as differences in target deployment patterns, differing exercise scenarios, and varying levels of reconnaissance accuracy probably explain the variance in weapon allocations against divisions in exercises. In any case, the data make clear that NATO divisions remain a prime Soviet nuclear target and almost certainly would come under heavy fire during a front nuclear attack.

Outlook

The improvement and expansion of NATO nuclear forces in the decade ahead will affect Soviet nuclear targeting in Europe. The Soviets attach great political and strategic military significance to NATO's deployment of Pershing II ballistic missiles and ground-launched cruise missiles (GLCMs). The capability of these systems to strike hardened targets in the Soviet Union as well as in Eastern Europe makes them important not only to front targeters but to strategic targeters as well. Although many of the Pershing II and GLCM units probably would be located deep in NATO's rear and beyond front initial targeting zones, both front and strategic planners will have to be prepared to target them. Like other important nuclear threat targets, Pershing IIs and GLCMs will probably be targeted extensively during conventional operations. Because of the distance from the battleline at which they operate, Soviet conventional targeting may rely on airstrikes and SPETSNAZ commando operations.

Current US plans call for the replacement of all US Pershing I missiles with Pershing IIs. Soviet military writings describe Pershing I units as highly mobile, high-priority targets that would be difficult to locate in wartime. Pershing II units will share the same features. Nevertheless, no additional units, and hence no additional targets for Soviet planners, will be introduced. We conclude that Soviet front nuclear targeting of Pershing II units will probably be no more extensive than it is against Pershing Ia units.

Most nuclear targeting of Pershing units, we believe, will continue to be primarily the responsibility of the strategic forces.

NATO plans call for deployment of 464 GLCMs (116 launchers) throughout Europe, 96 (24 launchers) of which would be in Germany outside the front targeting area. Although we have no specific evidence indicating how Soviet nuclear planners might target these units, they would probably be struck much the

same as Pershing units. If, as we expect, most GLCMs would be deployed beyond initial front targeting areas, the number of Soviet front nuclear weapons needed to attack any GLCM units in front areas could probably be met by small increases in the number of warheads assigned to fronts or by warheads held in reserve.

The rapid acquisition of nuclear-capable artillery by front forces may significantly alter the way Soviet fronts conduct nuclear operations. Nuclear artillery strikes could replace many of the nuclear airstrikes planned against close front targets, particularly divisions, which make up a large portion of front targets. The increase in artillery could free additional aircraft for conventional operations. There is no direct evidence, however, to indicate how it would affect specific front targeting patterns.

The deployment of new Soviet missile systems will enhance front targeting capabilities. The SS-21 is deployed with Soviet forces and will replace the FROG-7. The SS-23 will eventually replace the Scud-B.[1] The SS-21 and SS-23 offer an average 75-percent increase in range and an average 50-percent improvement in accuracy over their predecessors. Because front initial nuclear targeting is presently confined to a zone about 100 km deep, the improved range will allow front commanders to strike targets from deeper behind the battle zone, thus enhancing the survivability of these missile systems during NATO offensive operations.

The improved accuracy of the SS-21 and the SS-23 will allow Soviet planners to modify their targeting strategy in either of two ways. They can reduce either the yield or the number of warheads allocated to a target. Soviet weapon requirement calculations indicate, however, that only in rare instances would both yield and warhead savings be realized. The Intelligence Community estimates that the SS-21 has a maximum warhead yield of and the SS-23 a maximum yield of In contrast, the Scud-B has yields up to using weapon requirements based on Soviet damage calculations, compares current Scud warhead requirements to destroy Lance and Pershing missile units with those for the SS-21 and SS-23. Improved accuracy, even when degraded by significant reconnaissance error, would enable Soviet planners to allocate lower yield warheads and still meet current damage requirements against Pershing and Lance. Yet the accuracy of the SS-21 and SS-23 will not reduce the number of warheads needed to achieve required damage levels.

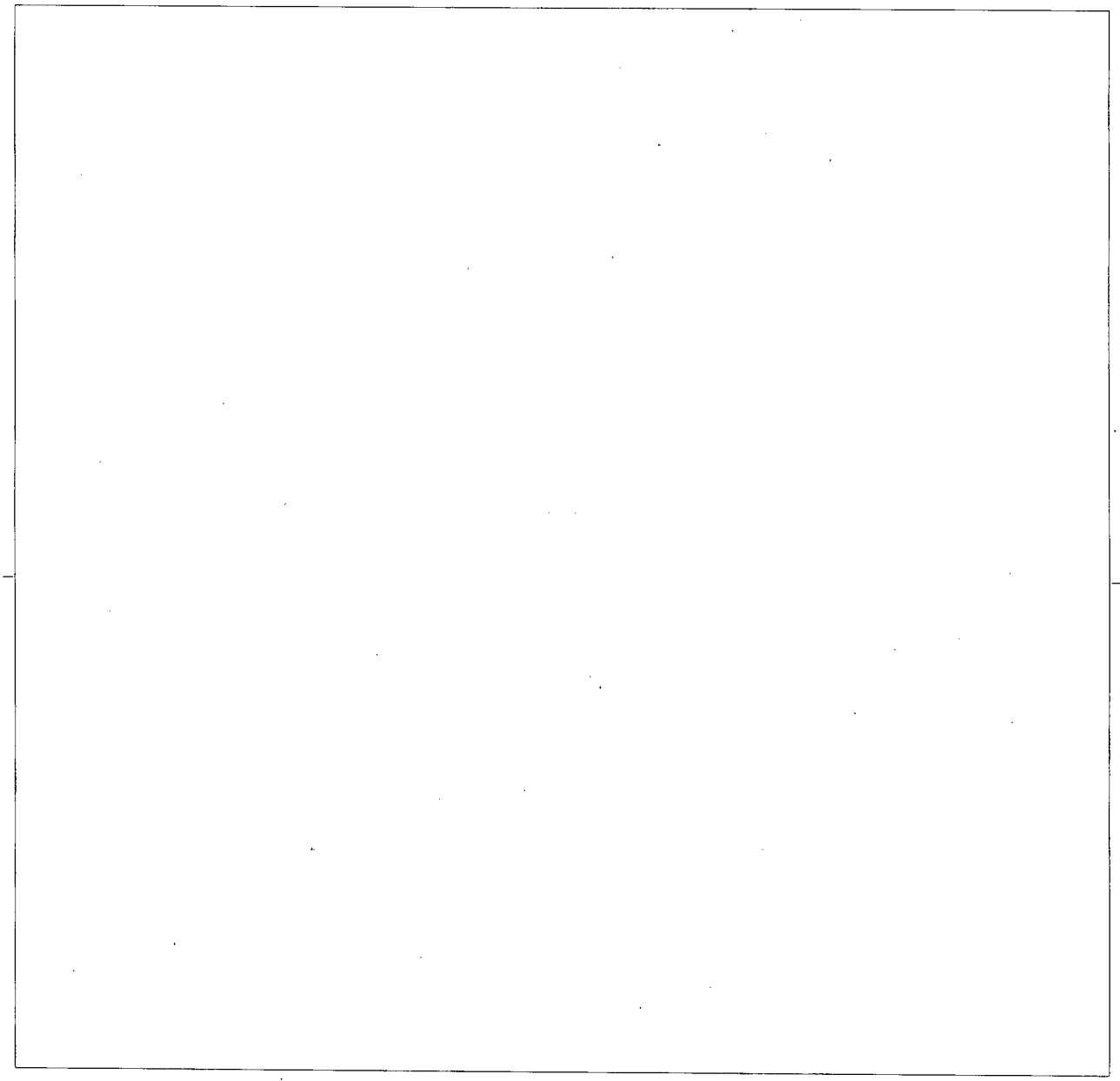
The benefits of the improved accuracy of the SS-21 and SS-23 could be lost if mobile targets are not detected or if accurate target location data cannot be provided in a timely manner. Thus, the optimum use of these new missiles, even more than of current systems, will depend on front reconnaissance capabilities.

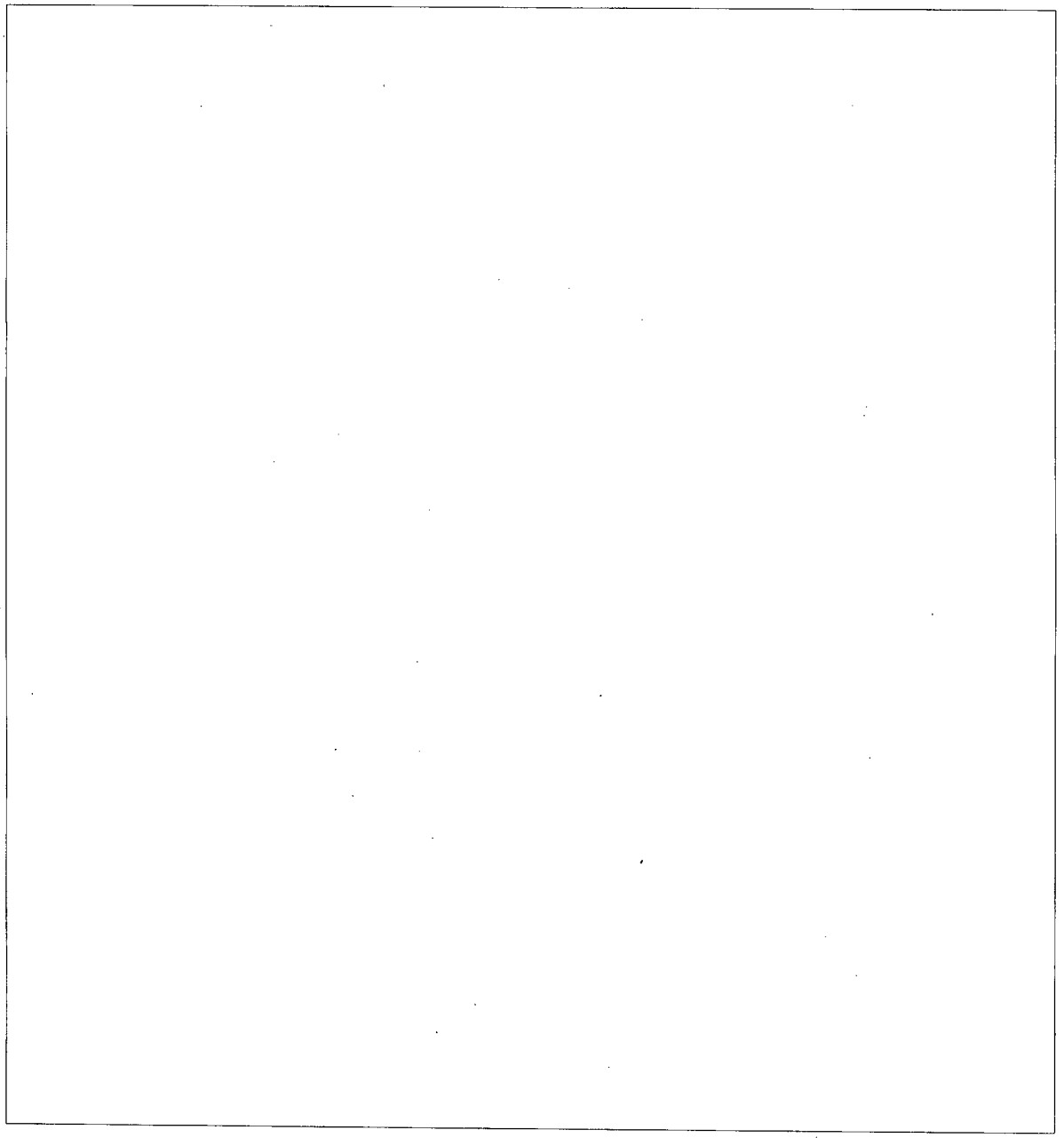
[1] Available data now seem to indicate that the Scud-B will continue to be in the Soviet inventory longer than we expected and that the fielding of the SS-23, particularly in the GSFG, is not imminent.

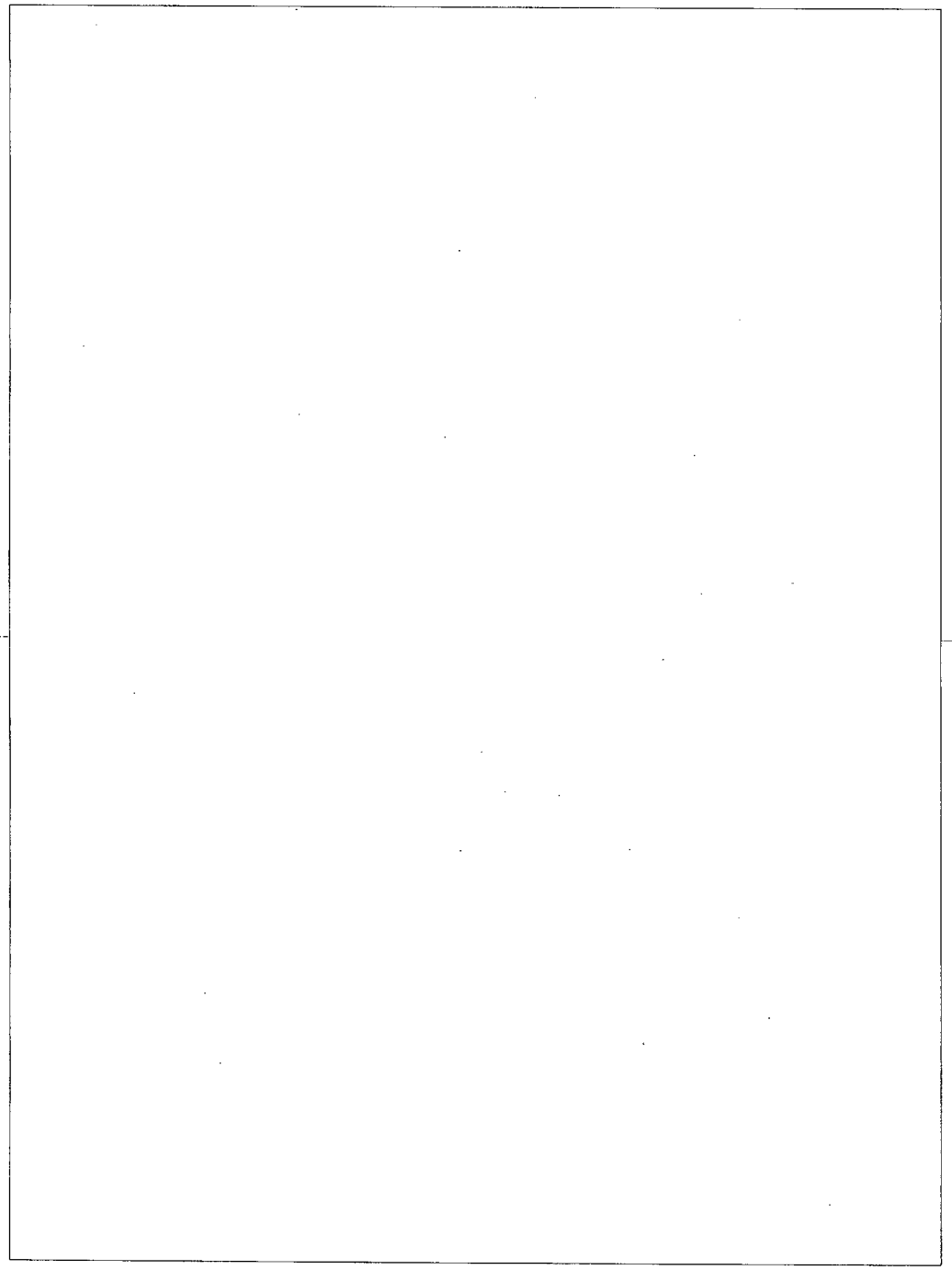
Because the Soviets have identified target reconnaissance as critical in planning front nuclear strikes, we expect them to initiate improvements in front reconnaissance capabilities. These improvements probably will gradually enhance Soviet capabilities to track and pinpoint targets and transmit information on them in a timely fashion. The goal, we believe, is to provide targeting data for mobile, deep targets that is as accurate and current as data for close targets. Reconnaissance improvements over the next decade will probably emphasize long-range, real-time systems and might include:

- The development of real-time photoreconnaissance satellites.
- The use of ground positioning satellites to help reconnaissance forces quickly determine precise target coordinates relative to their own positions.
- More extensive use of advanced reconnaissance aircraft, such as the MIG-25 Foxbat and the SU-17 Fitter-H, with high-altitude side-looking radars, and the introduction of a reconnaissance version of the SU-24 Fencer. In addition, strategic air reconnaissance regiments could provide data on front targets.
- Improved communications equipment for more rapid and accurate transmission of reconnaissance data to front planning staffs.

We have evidence of Soviet programs to develop such capabilities. Warsaw Pact writings from the mid-1970s indicate that a reduction in the time necessary to locate potential targets, determine their coordinates, and communicate that information back to front staffs would result in the most immediate benefits. These writings stress that obtaining reconnaissance data from the General Staff in a timely manner and transmitting it to front planning staffs are necessary to employ front nuclear forces most effectively.







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