



Director of  
Central  
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# Soviet Short-Range Ballistic Missiles and the Impact of a Ban on Long-Range INF Missiles



Interagency Intelligence Assessment

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NI 11A 87-10006JX

March 1987

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SOVIET SHORT-RANGE BALLISTIC  
MISSILES AND THE IMPACT OF A  
BAN ON LONG-RANGE INF MISSILES



Information available as of 15 March 1987 was  
used in the preparation of this Assessment.



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## SCOPE NOTE

This paper assesses the current status and future prospects of the Soviet SRBM force, and it also examines the possible impact on this force of a US-Soviet arms control agreement that substantially reduces or eliminates the Soviet LRINF missile force. LRINF missiles are generally considered to be those land-based missiles possessing an operational range between 1,000 and 5,500 kilometers; the Soviet Union currently fields SS-4 and SS-20 missiles in this range category.<sup>1</sup> [redacted]

In the event of an elimination or substantial reduction of LRINF coverage of Western Europe, the Soviets would attempt to develop a compensatory targeting scheme. To completely cover the targeting responsibilities of the LRINF missile force would require the use of a combination of delivery vehicles including ICBMs, SLBMs, SRBMs, long-range cruise missiles, and aircraft. The Soviets would, in an LRINF-free environment, have numerous targeting and force structure options available, and it is not possible to predict confidently the mix of delivery vehicles and targeting assignments they would select under these circumstances. Nevertheless, the Soviets could use the current SRBM force to absorb immediately a small portion of the existing LRINF mission set, and a considerable augmentation of the SRBM force would permit the Soviets to use it to compensate more substantially in a targeting substitution scheme; those observations and the technical capabilities of the Soviet SRBM force have led officials in the Departments of State and Defense to request this assessment. [redacted]

The Agencies participating in this Assessment were: The Directorate of Intelligence, Central Intelligence Agency; The Defense Intelligence Agency; and the Bureau of Intelligence and Research, Department of State. [redacted]

<sup>1</sup> LRINF forces also include aircraft, but they are not included in the current INF arms control proposals of the Soviet Union or the United States; thus, an analysis of LRINF aircraft has not been included in this assessment. [redacted]

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## KEY JUDGMENTS

The Soviets' short-range ballistic missile (SRBM) force is becoming an increasingly important component in their operational combat planning against NATO. Developments observed in recent years reflect both the greater role the Soviets envision for their SRBM force against NATO, and their efforts to make this force even more capable in carrying out its mission. These developments include:

- The fielding in the 1980s of newer missiles—such as the SS-21 and in small numbers the SS-23—in launch units opposite NATO.
- The development of a series of improved conventional munition warheads, each with tailored antimaterial and antipersonnel characteristics to maximize their destructiveness against specific NATO targets.
- An increase in the number of refire missiles held by SS-21 launch units in East Germany.
- The ongoing restructuring of Soviet SS-21 forces in East Germany and Czechoslovakia by removing launch battalions from divisions and forming them into army-level missile brigades.
- A robust research and development program currently under way that is designed to improve SRBM accuracy, develop additional improved conventional warheads, and incorporate new missile technologies to enhance performance and reliability. [redacted]

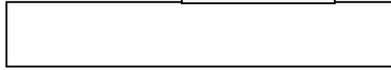
These improvements to the force are designed, in large part, to expand its effectiveness in conventional operations against NATO. SRBMs, however, continue to have a critical nuclear delivery role in Soviet fire-support doctrine, and their improved accuracy permits the Soviets, among other things, to use lower yield warheads to carry out strikes while maintaining acceptable probabilities of target destruction. The expanding role for SRBM operations in fire-support planning will motivate the Soviets to continue the modernization of their force through further deployment of newer missiles, and fielding priority will continue to be given to those launch units opposite NATO. The

pace of modernization, in the absence of arms control constraints, is generally forecast to be gradual. For example, we project that by 1996, even opposite NATO, there still will be more FROGs than SS-21s and more Scuds than SS-23s; the older missiles will be the dominant force component east of the Urals as well. The availability of these newer missiles, however, will permit some growth in the overall size of the force (to about 1,200 Soviet SRBM launchers opposite NATO, and 600 such launchers east of the Urals in 1996) as older systems "trickle down" to forces projected to be established, or to other units whose complement of launchers is forecast to be expanded. [redacted]

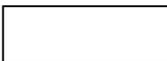
Should an arms control agreement be reached that reduces substantially or eliminates the long-range INF (LRINF) missile force, we believe that the Soviets would attempt to fashion a compensatory targeting scheme that maintains most, if not all, of their nuclear targeting coverage of Western Europe. A complete absorption of the LRINF targeting mission would involve numerous delivery vehicles—to the extent that they were not constrained by other arms control efforts—including intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), aircraft, long-range cruise missiles, and SRBMs. Indeed, we judge that the Soviets could cover all the time-urgent targets in the European theater by allocating a small percentage of their ICBM warheads to the theater. [redacted]

With respect to SRBMs, the SS-12 system, from positions now occupied in Eastern Europe, has the range capability necessary to reach most of the targets we judge are currently assigned to the long-range INF missile force; the SS-23 SRBM, if moved into the forward area, would be capable of reaching only a small percentage of those targets. Regardless, the number of warheads on SS-12 and SS-23 launchers in range of NATO currently is less than 5 percent of the number of such SS-20 and SS-4 LRINF warheads now deployed in the western USSR; and the Soviet SS-12 force opposite NATO currently is projected to grow by only some 25 launchers over the next 10 years (although the number of SS-23 launchers in the Soviet force opposite NATO is expected to expand more rapidly to almost 200 launchers by the mid-1990s). [redacted]

We cannot determine the compensatory targeting scheme the Soviets would select to substitute for LRINF targeting coverage, but we judge it likely that they would incorporate SRBMs—primarily the SS-12 and to a lesser degree the SS-23, both of which are in production—into such planning. Any plan that would in the main employ SRBMs to cover LRINF targeting responsibilities—a course of action by the Soviets that we judge to be unlikely—would require a considerable enlargement of the SRBM force structure facing NATO's Central



Region, a development for which we currently have no evidence. Such a targeting scheme also would require significant changes in the Soviet fire-support command and planning structure. Although these changes would be disruptive over the short term, we judge that the Soviets would be able to establish an SRBM force, command, logistic, and planning structure to prepare and carry out a modestly expanded nuclear targeting role within a few years. Large-scale expansion of the SS-12 and SS-23 forces to accommodate a considerable share of the targeting duties currently held by Soviet LRINF missiles would take at least several additional years and probably would be detectable by the US Intelligence Community within a year after deployments had begun. [redacted]



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## DISCUSSION

### Introduction

1. Since the late 1950s, tactical missiles and rockets have constituted the primary nuclear striking arm of the Soviet Ground Forces.<sup>2</sup> Early missiles and rockets—such as the Scud A and FROG-3—were inaccurate, which compelled the Soviets to develop and deploy nuclear warheads with yields of over 100 kilotons for these systems to compensate for their inaccuracy. In the mid-1960s, newer missiles and rockets became available—such as the SS-12 Mod 1, Scud B, and FROG-7—which had improved accuracy and system reliability. By the mid-1970s, these systems had been widely fielded with Soviet forces opposite NATO and in other theaters. During this same time, nuclear warheads of less than 100 kilotons and a high-explosive warhead were deployed, thereby providing Soviet short-range ballistic missiles (SRBMs) with low-yield nuclear and limited conventional capabilities against large and soft targets. The primary mission for the SRBM throughout this period, nevertheless, remained the delivery of nuclear fire in support of ground force operations. (See figures 1 and 2 for past trends in deployments.) [redacted]

2. Beginning in the late 1970s, two force development trends were emerging that made possible changes in the role of SRBMs in Soviet combat planning. First, nuclear artillery became available for the Soviet Ground Forces commander, providing a more effective means of delivering proximate, low-yield nuclear fire in support of maneuvering troops. Second, more accurate SRBMs—such as the SS-21, and, by 1985, the SS-23—began to be fielded along with improved conventional warheads. This enabled the Soviets for the first time to regard their SRBMs as dual-capable systems in terms of their delivery role, and to develop a comprehensive SRBM conventional strike mission as part of their operational planning

<sup>2</sup> The Soviets use the term "tactical missile" to refer to missiles subordinate to tank and motorized rifle divisions, and the term "operational-tactical missile" to refer to longer range missiles subordinate to fronts and armies. The US Intelligence Community classifies all missiles with ranges of less than 1,000 kilometers as short-range ballistic missiles. [redacted]

against NATO. Thus, we judge that the Soviets' perspective on the operational role of the SRBM now reflects a reduced requirement for close nuclear strikes to support maneuvering troops, and an expanded mission for conventional attacks throughout the depth of the enemy's defenses. [redacted]

### The SRBM Force Structure and Performance Characteristics

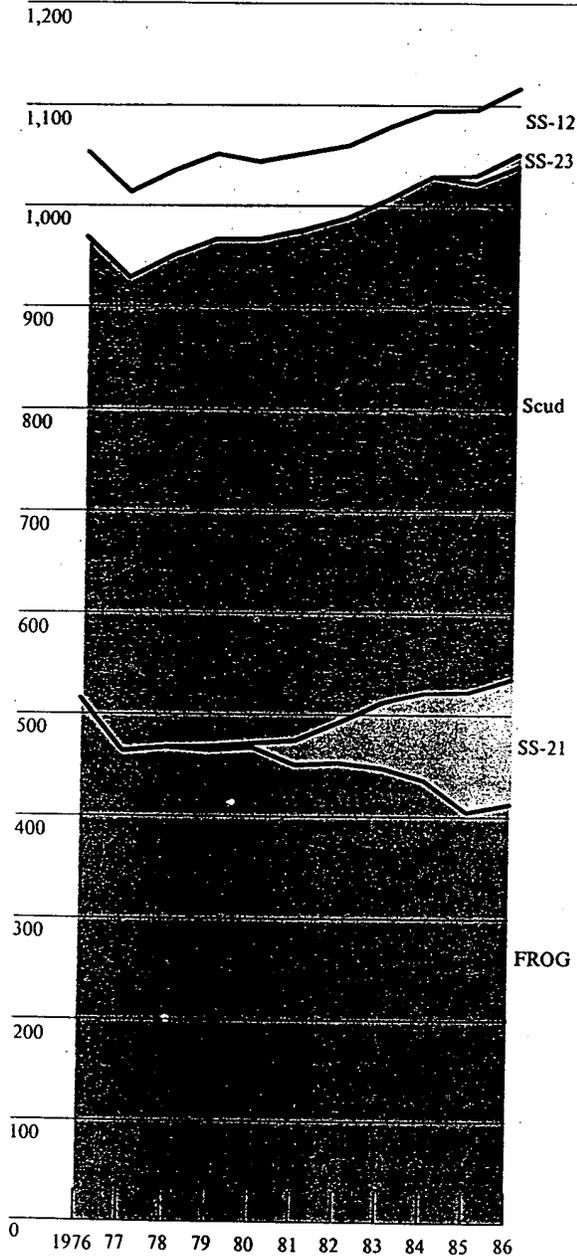
3. *Force Structure.* The Soviet SRBM force today is equipped primarily with the FROG-7, SS-21, Scud B, and SS-12 Mod 2.<sup>3</sup> The SRBM force is large in terms of the number of launchers fielded, as table 1 indicates, although its overall size has remained largely static during the 1980s. The limited force growth of the past four years reflects the phasing down and termination of older missile production, the FROG and Scud, by the early 1980s, and the limited fieldings of newer missiles, the SS-21 and SS-23, since that time. [redacted]

4. The SS-23 missile is forecast to replace the Scud on a one-for-one basis in selected missile brigades primarily opposite NATO. The Scud missile is fielded throughout the Soviet Union and Eastern Europe in army and front missile brigades that have 12, 18, or 27 assigned launchers. The initial operational fielding of the SS-23 occurred in the western USSR in 1985 in a single 12-launcher brigade. [redacted]

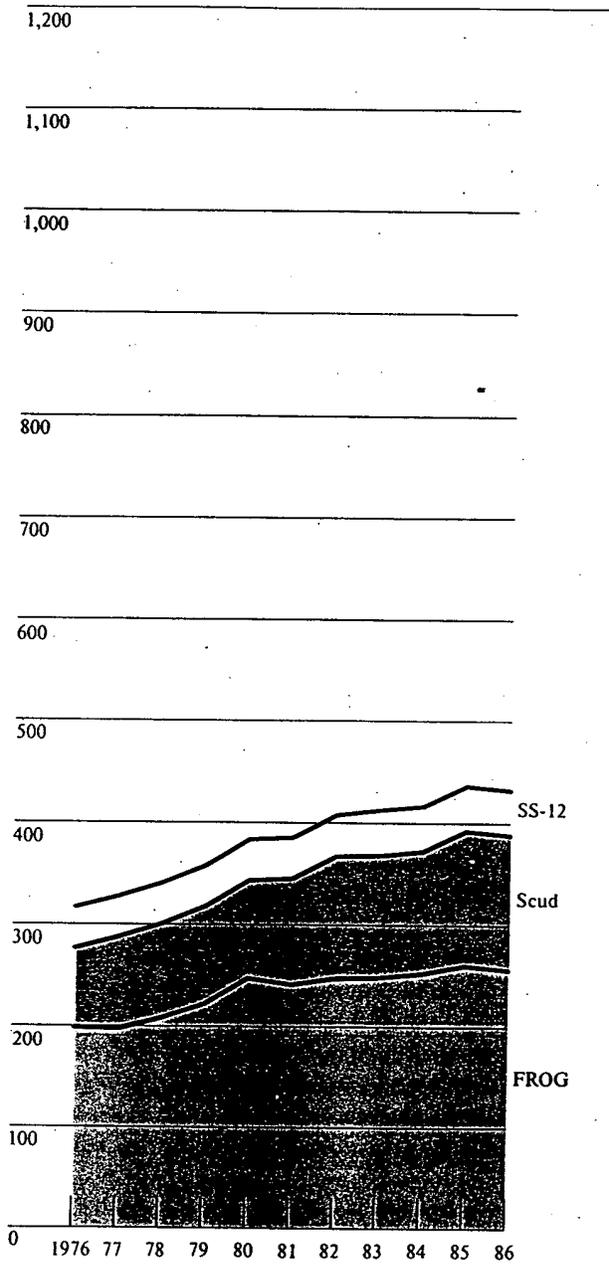
[redacted] suggests that a second SS-23 brigade may soon be operationally fielded. The relatively slow pace of SS-23 fieldings may be the result of developmental or production problems with the program—which was begun in the mid-1970s—although there is no evidence to confirm that this is the case. [redacted]

<sup>3</sup> The SS-12 Mod 2 originally was given the designator SS-22 when first fielded in the late 1970s because the US Intelligence Community believed that it was a new missile. Subsequent information and analysis revealed [redacted] and the designator was changed to SS-12 Mod 2. The entire SS-12 force is assessed as equipped with the Mod 2. [redacted]

**Figure 1**  
Soviet SRBMs Located West of the Urals, 1976-86



**Figure 2**  
Soviet SRBMs Located East of the Urals, 1976-86



**Table 1**  
**Fielded Soviet SRBM Launchers, 1986**

	Opposite NATO <sup>a</sup>	Other Theaters <sup>b</sup>
FROG	412 (218)	256
SS-21	124 (8)	0
Scud	502 (149)	132
SS-23	12 (0)	0
SS-12	66 (0)	44

<sup>a</sup> Soviet forces opposite NATO include those stationed in East Germany, Poland, Czechoslovakia, Hungary, and the Baltic, Belorussian, Carpathian, Moscow, Leningrad, Odessa, Kiev, Transcaucasus, North Caucasus, Ural, and Volga Military Districts. Additional SRBM launchers held by the non-Soviet Warsaw Pact forces are indicated in the parenthetical notations.

<sup>b</sup> Soviet forces in other theaters include those in the Turkestan, Central Asian, Siberian, Transbaikal, and Far East Military Districts.

This table is ~~Secret~~ [redacted]

5. The SS-21 is fielded in four launcher battalions assigned to motorized rifle and tank divisions in Eastern Europe and the western USSR; but, [redacted]

[redacted] the Soviets are restructuring this force by removing SS-21s from divisions in East Germany and Czechoslovakia and forming them into army missile brigades, each probably consisting of 18 launchers. The new command arrangement is judged to be designed to improve SS-21 fire-planning integration and responsiveness. [redacted]

6. The SS-12 is fielded in the Soviet Union and Eastern Europe in front/military district missile units containing four, 12, or 18 launchers. [redacted]

[redacted]

7. In addition to launchers assigned to operational units, the Soviets also field a small number of launchers with training units and at missile test facilities. There could, in addition, be other launchers kept in long-term storage. [redacted]

[redacted]

8. *System Characteristics.* The primary technical upgrades in newer SRBMs are accuracy, lethality, and

ease of operation under battlefield conditions (see figure 3). An SRBM must possess the improved accuracy offered by the newer systems in order for it to carry out conventional fire strikes successfully against NATO point targets. In addition, the SS-23 has a greater range than the Scud, which permits it to be used against targets positioned more deeply in NATO's rear. [redacted]

9. *SRBM Warheads.* The Soviets currently have a variety of warheads available for their SRBMs. [redacted]

[redacted]

10. *SRBM Refire Capability.* All Soviet SRBM launchers have a missile refire capability. [redacted]

[redacted]

11. Refire missiles are stored with SRBM launch units, logistic units, and at several central storage depots located in the USSR. [redacted]

[redacted]

<sup>4</sup> The US Intelligence Community judges that the SS-12's current role in Soviet operational planning probably is restricted to the delivery of nuclear warheads. The Community does assess, however, that a high-explosive and chemical warhead could be available for the SS-12. [redacted]

[redacted]

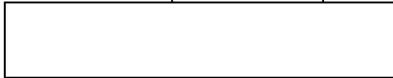
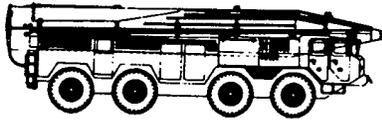
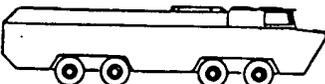
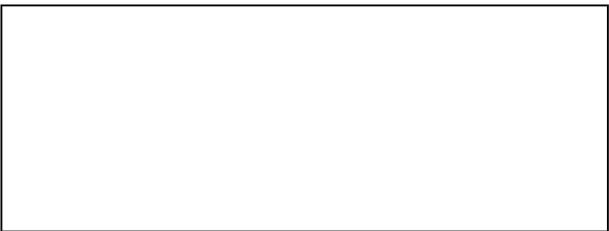


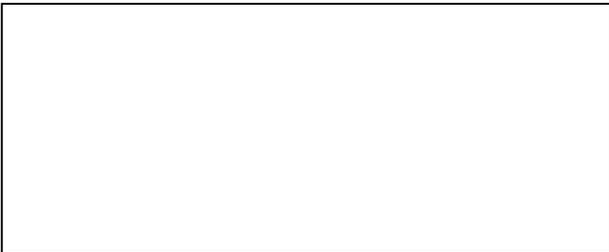
Figure 3  
Principal Soviet Short-Range Ballistic Missiles

		Warheads	Maximum operational range		Year deployed
SS-12 Mod 2 Scaleboard		Nuclear; HE; possible chemical; possible cluster	900 km		1977
SS-23 Spider		Nuclear; possible HE; chemical; probable cluster	400 km <sup>b</sup>		1985
SS-1 <sup>a</sup> Scud B		Nuclear; HE; chemical; cluster	300 km		1961
SS-21 Mod 2 Scarab		Nuclear; HE; chemical; cluster	80-100 km		1981 (DIA) 1984 (CIA)
FROG-7		Nuclear; HE; chemical; cluster	70 km		1965



<sup>b</sup> The DCI's Weapons and Space Systems Intelligence Committee, on the basis of new analysis, has assessed the maximum operational range of the SS-23 as 400 kilometers, vice 500 kilometers. Maximum operational range is defined as the farthest the missile is designed to be flown.





12. We assess that the total missile per launcher ratio for the FROG-7, SS-21, Scud, and SS-23 could be as high as 12:1 and probably is not less than 10:1. The ratio for the SS-12 is assessed as 6:1 because of more limited unit missile lift and transport capabilities, and because the SS-12's role is assessed as restricted primarily to nuclear delivery. These ratios include refire missiles held with the launch units, logistic units, and at the central storage depots. [redacted]

13. [redacted] the Soviets are increasing the number of refire missiles held by SS-21 and possibly Scud launch units in East Germany. [redacted]



[redacted] An increase in the number of refire missiles held by Soviet launch units in East Germany is indicative of the expanded conventional role Soviet planners envision for these forces in combat operations against NATO. [redacted]

**The Future of Soviet SRBM Forces**

14. *Force Structure.* We project that the modernization of the Soviet SRBM force with the SS-21 and SS-23 will proceed at a moderate pace through the mid-1990s, in the absence of any drastic change in other theater nuclear systems. Once SS-23 production is fully under way, for example, the Soviets could deploy two brigades per year by the early 1990s, and three per year thereafter. This estimate reflects the likely patterns of unit conversion and training activities, and it is consistent with historical patterns. The large size of the SRBM force prevents dramatic or swift changes to its composition, and even an accelerated pace of modernization beyond that currently projected would still take years to implement widely. Equipment modernization, however, will permit some

**Table 2**  
**Projected Fielded Soviet SRBM Launchers, 1996**

	Opposite NATO <sup>a</sup>	Other Theaters <sup>b</sup>
FROG	312 (203)	266
SS-21	224 (32)	28
Scud	382 (138)	216
SS-23	180 (24)	28
SS-12	90 (0)	68

<sup>a</sup> Soviet forces opposite NATO include those stationed in East Germany, Poland, Czechoslovakia, Hungary, and the Baltic, Belorussian, Carpathian, Moscow, Leningrad, Odessa, Kiev, Transcaucasus, North Caucasus, Ural, and Volga Military Districts. Additional SRBM launchers held by the non-Soviet Warsaw Pact forces are indicated in the parenthetical notations.

<sup>b</sup> Soviet forces in other theaters include those in the Turkestan, Central Asian, Siberian, Transbaikal, and Far East Military Districts.

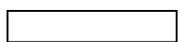
This table is ~~Secret~~ [redacted]

growth in the overall size of the force as FROG, and especially Scud, launchers are assigned to units projected to be established and are used to increase the number of launchers in some units. [redacted]

15. As in the past, SRBM forces opposite NATO will receive priority in modernization programs (see table 2). The SS-21 will continue to replace the FROG, although we project that in 1996 FROGs will still outnumber SS-21s. The SS-23 fielding pattern is expected to be gradual but steady as the Soviets selectively replace the existing Scud force. By 1996 about two-thirds of the force opposite NATO should still remain Scud-equipped, and the Scud—which is judged to have a shelf life of at least 25 years—is projected to remain in the SRBM force well into the next century. (This is possible because liquid-propellant missiles can be refurbished on an ongoing basis to permit a long service life.) Even with widespread deployment of the SS-23, the Scud would still have an operational role in Soviet military planning, especially in the delivery of nuclear strikes from 100 to 250 kilometers behind NATO's frontline. If the Soviets retrofit an improved guidance system on the Scud, [redacted]

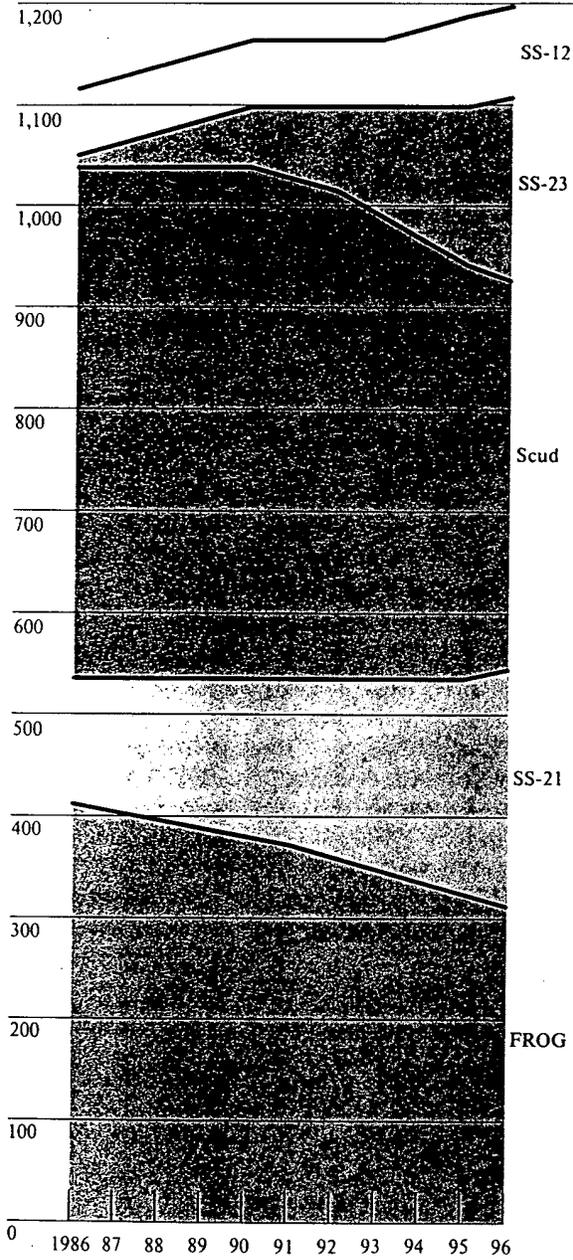
[redacted] they could prolong its useful operational life and thereby not have to replace the entire force with the more expensive SS-23 (see figure 4). [redacted]

16. The Soviet SRBM force in other theaters will experience limited modernization and some growth over the next 10 years; it still will be dominated by



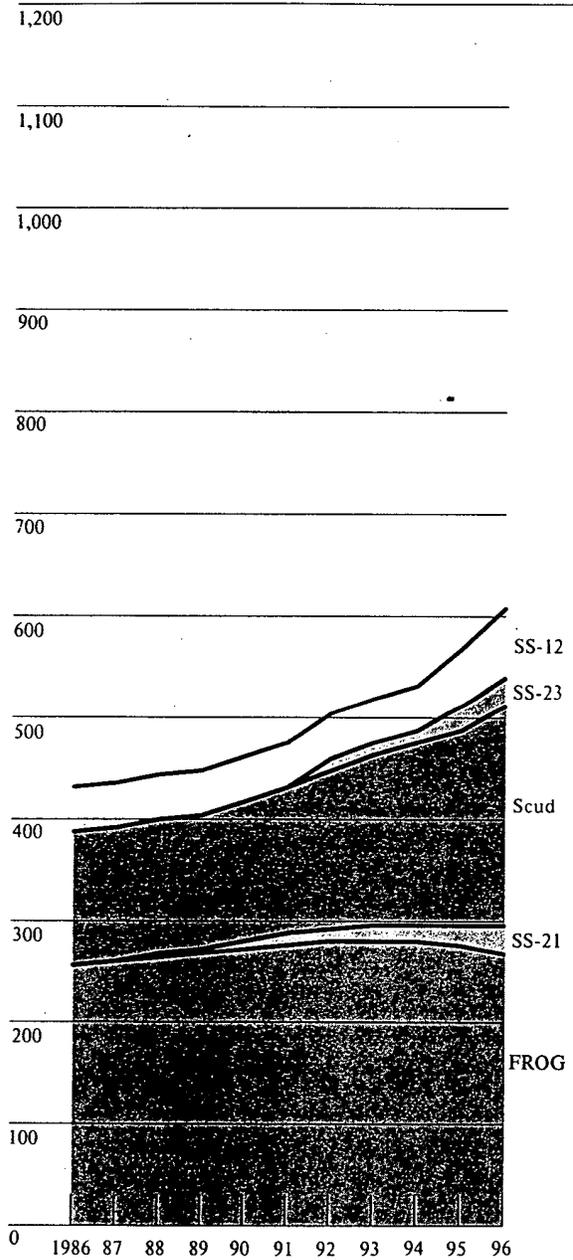
**Figure 4**  
Soviet SRBMs Located West of  
the Urals, 1986-96

Number of Launchers



**Figure 5**  
Soviet SRBMs Located East of  
the Urals, 1986-96

Number of Launchers



older systems in the mid-1990s. SS-21 fieldings are projected to proceed slowly because new deployments are expected to be concentrated in forces opposite NATO; less than one-tenth of the current FROG force in other theaters is projected to be SS-21 equipped by 1996. We project a significant increase in the number of Scuds fielded with Soviet forces in the Asian theater as Scuds now opposite NATO are replaced by the SS-23 and "trickle down" to units projected to be established or are used to increase the number of launchers in some units. At the same time, brigades located in the Asian theater are expected to receive a small number of SS-23 launchers (see figure 5). [redacted]

17. The Soviets are expected to develop and field a new SS-12-class missile with improved performance characteristics including better accuracy, and the overall size of the force of this class of missile is projected to expand by almost half over the next 10 years as this new missile is deployed. We base that conclusion on the expectation that the Soviets will reconstitute the SS-12 brigades that were moved from the western USSR into Eastern Europe in 1984. Any new SS-12-class missile system would not reach initial operational capability before the early 1990s, and we project that new fieldings will be focused on upgrading existing unit holdings. The Soviets could then use the displaced SS-12 Mod 2s to reconstitute the SS-12 units, but it is also possible that they will retire these older missiles and form additional units using the new missile once all existing units are completely re-equipped. If they choose the latter, then the expansion of the SS-12 force would not begin to occur before the late 1990s. [redacted]

18. *System Characteristics.* We judge that improving SRBM accuracies through the development of terminal guidance systems and a maneuvering reentry vehicle is one of the Soviets' most important SRBM research and development objectives. [redacted]

[redacted]

[redacted] This would improve substantially the capability of SRBMs to execute successfully both conventional and low-yield nuclear fire missions. [redacted]

[redacted]

[redacted]

[redacted]

21. Improved SRBM accuracy also increases the lethality of nuclear weapons, permitting more effective use of lower yield nuclear weapons, and it is possible that the Soviets would reduce the warhead yield required for strikes against certain targets if they were delivered by more accurate missiles. For numerous operational reasons, the Soviets almost certainly would wish to employ the lowest yield possible in nuclear deliveries while simultaneously maintaining acceptable probabilities of target destruction. In addition, greater SRBM accuracies would enable the Soviets to develop extremely low-yield warheads—as they

have done in their nuclear artillery shells—to destroy small targets without the collateral damage or extensive areas of contamination that accompany large nuclear blasts. [redacted]

[redacted] small yields would be especially useful in striking targets in areas where friendly forces may soon be operating, or where there are assets that the Soviets plan to capture largely intact. [redacted]

22. The Soviets could also choose in the future to develop a multiple independently targetable reentry vehicle capability for their SS-12 SRBM. [redacted]

[redacted]

### SRBM Targeting Responsibilities

23. *Current Role.* The Soviets currently assign a wide variety of NATO targets to their SRBMs. [redacted]

[redacted]

[redacted] a primary function of such strikes has remained the destruction of NATO's nuclear weapon facilities and delivery systems. In their planning, however, the Soviets now reflect a greater reliance on their SRBMs to attack these targets during *conventional* operations using improved conventional warheads. [redacted]

24. We judge that SRBM force trends observed during the 1980s, including the fielding of newer missiles, the robust research and development programs to improve SRBM accuracy and produce improved conventional warheads, and the increase in the number of refire missiles held by SRBM units in East Germany, are manifestations of a Soviet plan to use these weapons more extensively in conventional combat. [redacted]

[redacted]

[redacted]

25. The operational advantages offered by greater reliance on SRBMs to fulfill fire-support requirements are considerable. The SRBM can reach deep targets more quickly than any other Ground Forces weapon, execute missions with high system reliability, and reach even heavily defended targets with virtual impunity since NATO currently has no capabilities to defend against ballistic missiles. These characteristics are critical when attacking the large number of time-sensitive targets the Soviets plan to destroy. With a variety of improved conventional warheads, the Soviets could tailor attacks to maximize their effectiveness against specific types of targets. In addition, newer SRBMs are truly dual-capable systems that can be used in conventional and nuclear operations. Such operational flexibility improves the Soviets' fire-support targeting strategy by permitting them to use SRBMs in conventional operations while withholding part of the force for nuclear strikes. [redacted]

26. The SRBM, nevertheless, retains its role as a primary vehicle for delivering nuclear strikes against NATO in Soviet operational planning. [redacted]

[redacted]

[redacted] Under any circumstances, the SRBM will maintain this critical fire-support function in Soviet operational planning. [redacted]

27. *Future Force.* We project that the expanding role for SRBMs in Soviet conventional combat strike planning against NATO will necessitate growth in the force. Force expansion, in the absence of hard evidence, is forecast to be gradual; it will be largely accomplished by retaining older launchers in the active inventory while newer systems are introduced into operational units. This would enable the Soviets to establish additional launch units and increase the number of launchers assigned to existing units. The end of older missile production and the moderate pace

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

of deployment projected for newer systems, however, will prevent substantial short-term increases in the size of the overall SRBM force. The Soviets' program to increase the number of refire missiles available per launcher might lead them to expand the size of the launcher force more gradually. [Redacted]

### Assumption of LRINF Nuclear Targeting Coverage

28. *Theater-Strategic Targeting.* SRBMs, artillery, and aircraft are the primary nuclear delivery means of the Soviet front commander. The front is responsible for developing and executing fire missions associated with the accomplishment of its objectives. These targets typically will be located within 100 to 200 kilometers of the most forward positions of Soviet frontal forces. The targets falling within front operations would be adjusted as the course of conflict produced significant changes in the geography of operations.<sup>6</sup> Soviet theater-strategic forces would be responsible for targets located beyond this range. The Soviet General Staff would be responsible for coordinating nuclear targeting for both frontal and theater-strategic forces.<sup>7</sup> [Redacted]

29. The Soviet LRINF arsenal available for employment beyond the frontal zone in nuclear strike operations consists of bombers and land-based and submarine-launched missiles. The land-based strategic missiles available for use in theater-strategic targeting of NATO include the SS-20, the SS-4, and some intercontinental ballistic missiles (ICBMs)—the SS-19, SS-17, and SS-11. The SS-20 force comprises the largest number of delivery vehicles and warheads in the Soviets' theater-strategic arsenal. We estimate that the Soviets currently have plans to target 270 SS-20 launchers (with three warheads per launcher) against NATO, and all targets in Europe are within their range. [Redacted]

<sup>6</sup> Frontal forces are expected to engage in direct battle with opposing forces, moving across enemy territory within prescribed zones, in prescribed time periods, and at prescribed rates of advance to secure specific, immediate, and subsequent objectives. [Redacted]

<sup>7</sup> Strategic offensive forces are organized into the Strategic Rocket Forces, the Air Forces, and the Navy, and they are based in peacetime in the USSR. Strategic weapons vary, in terms of range, from those that can attack only theater targets on the USSR's periphery to those that can attack both peripheral targets and targets at intercontinental range. In this context, the contribution of strategic weapon systems to a coordinated theater strike is referred to as the "theater-strategic" attack. [Redacted]

[Redacted]

30. The Soviets also are developing another LRINF missile—the SSC-X-4 ground-launched cruise missile (GLCM). This system, which is projected to become operational within the next year, could attack fixed or less mobile targets in the LRINF mission set. Current deliberations indicate that any LRINF arms control agreement would include GLCMs as well as ballistic missiles; thus, this system would be unavailable to serve in a compensatory role in an LRINF-free environment. [Redacted]

31. We estimate, [Redacted]

that the Soviet theater-strategic targeting base in Western Europe includes some 1,900 fixed and mobile targets that can be roughly divided into four categories: NATO's capability to wage nuclear war; NATO's capability to employ nonnuclear forces; the military-economic establishment; and, governmental-administrative control. Just over half of these targets probably would be considered by the Soviets as time urgent—to be attacked promptly at the commencement of large-scale nuclear operations because they are critically important in a conflict. The vast majority of the targets in NATO Europe are "soft" targets—highly vulnerable to the effects of nuclear weapons—and many are collocated. [Redacted]

32. Of the theater targets assigned to strategic forces, some 750 fixed targets could be considered time urgent, [Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[redacted]

34. *Targeting Requirements Under Phased Reductions.* We have calculated the Soviets' warhead requirements for targeting time-urgent targets in Europe both under the current INF levels, and under levels that might exist under phased INF reductions, for example, 140, 70, and zero LRINF missiles. Table 3 compares the number of warheads on LRINF missiles that would be available and reliable under these different INF levels with the number that would be needed to meet Soviet requirements against fixed targets, as well as to attack suspected operating areas of dispersed Pershing-II and GLCM units. [redacted]

35. *Shortfall.* Table 3 shows that, with 270 SS-20 and 112 SS-4 launchers, the number of available and reliable LRINF warheads is adequate to attack fixed time-urgent targets beyond the area of frontal responsibility and operating areas of Pershing-II and GLCM launchers. As LRINF systems are reduced, however, the Soviets experience a shortfall in LRINF warheads. At the final reduction level, zero SS-20 launchers, the shortfall rises to 500 warheads. At each reduction level, however, the Soviets can eliminate the shortfall by replacing SS-20s with other systems, as shown in the table. [redacted]

36. Soviet planning requirements, however, probably would necessitate the allocation of more weapons to meet targeting goals than depicted in table 3. [redacted]

[redacted]

[redacted] Overall, these additional planning factors would raise by at least 10 to 20 percent the number of weapons depicted in table 3. [redacted]

37. *The Potential Offset.* Table 3 shows hypothetical allocations of candidate replacement weapons, both central and shorter range systems, which could be used to compensate for the shortfall in SS-20 warheads. At the first reduction level, for example, the Soviets can eliminate the shortfall in SS-20s with 120 ICBMs and SRBMs, or with an alternative mix of 300 ICBMs and SRBMs. (All Soviet ICBMs except the SS-18 have been flight-tested at short ranges of 1,000 to

2,000 kilometers.) Many other combinations of systems are possible to replace SS-20s and make up the shortfall, depending on the course of the conflict and the available nuclear reserve. Even if the SS-20 force is reduced to zero, the reallocation of about 140 ICBMs and 50 SRBMs, or 90 ICBMs and 280 SRBMs, could achieve Soviet damage goals against all time-urgent targets in NATO Europe. This retargeting, however, could adversely affect the fulfillment of missions currently assigned to the reallocated systems. [redacted]

38. Other solutions are possible through shifting the burden to available alternate weapon systems, such as using aircraft or SLBMs against some time-urgent targets, or through adjustments in operational and targeting practices by concentrating the attack on the most important targets. For example, the Soviets could focus their attack against Pershing-IIs and GLCMs—a critical subset of targets in the NATO target set—and cover operating areas for these with about one-fifth the number of warheads needed against fixed time-urgent targets. [redacted]

39. This analysis suggests that, in the absence of other arms control constraints, even if the USSR gives up all of its SS-20s in exchange for the elimination of all Pershing-IIs and GLCMs, it would still be able to cover the NATO time-urgent target set by relying on other systems. The Soviets could meet their targeting requirements by allocating 10 percent of the current ICBM warheads to the theater, or less than 10 percent if the shorter range SS-12s and SS-23s are used to cover some of the closer time-urgent targets. [redacted]

40. Whether or to what extent such reallocations of weapons would upset overall Soviet nuclear targeting plans, however, is unclear. Although the substitution of ICBMs and SRBMs for LRINF systems is simple to conceive, it may be difficult for the Soviets to execute in some operational situations. Allocating large numbers of ICBMs and SRBMs to strategic missions in Europe, for example, could be at the expense of Soviet capabilities to complete intercontinental or frontal missions, especially if the Soviet arsenal were severely damaged by a large-scale US and NATO nuclear attack. Nevertheless, the fact that the Soviets have proposed reducing LRINF missiles in Europe to zero suggests that they have thought through the operational problems associated with offsetting shortfalls in SS-20s. [redacted]

41. *Compensatory Targeting Schemes.* The existing SRBM force, by itself, could only partially substitute for LRINF coverage because many targets lie beyond its range, and the Soviets would have to rely

[redacted]

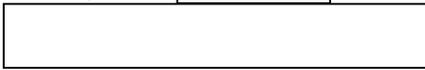
**Table 3**  
**Illustrative Allocations of Soviet ICBMs and SRBMs**  
**To Offset Reductions in Longer Range INF Missiles:**  
**Attacks Against Time-Urgent Targets in NATO Europe**

Current Soviet Inventory and Possible LRINF Limits (Launchers)	LRINF Ballistic Missile Warheads Available and Reliable	Ballistic Missile Warheads Required Against Time-Urgent Targets <sup>a</sup>	Shortfall in LRINF Ballistic Missile Warheads	Allocations of ICBMs and SRBMs To Compensate for Shortfalls			
				System	Type	Delivery Vehicles	Available and Reliable Warheads <sup>b</sup>
270 SS-20s <sup>c</sup> and 112 SS-4s deployed (current inventory)	664	605	0				
140	285	602	317	SS-19	ICBM	56	275
				SS-11	ICBM	12	10
				SS-12	SRBM	54	38
				<b>Total</b>		<b>122</b>	<b>323</b>
				or			
				SS-19	ICBM	24	120
				SS-11	ICBM	9	8
				SS-12	SRBM	54	38
				SS-23	SRBM	212	153
				<b>Total</b>		<b>299</b>	<b>319</b>
70	143	539	396	SS-19	ICBM	73	357
				SS-11	ICBM	12	10
				SS-12	SRBM	54	38
				<b>Total</b>		<b>139</b>	<b>405</b>
				or			
				SS-19	ICBM	42	210
				SS-11	ICBM	6	5
				SS-12	SRBM	54	38
				SS-23	SRBM	216	156
				<b>Total</b>		<b>318</b>	<b>409</b>
0	0	500	500	SS-19	ICBM	99	489
				SS-11	ICBM	39	34
				SS-12	SRBM	54	38
				<b>Total</b>		<b>192</b>	<b>561</b>
				or			
				SS-19	ICBM	70	344
				SS-11	ICBM	23	20
				SS-12	SRBM	54	38
				SS-23	SRBM	223	161
				<b>Total</b>		<b>370</b>	<b>563</b>

<sup>a</sup> These requirements are for the maximum number of time-urgent targets in the European target set and thus represent the upper bound of Soviet requirements. Targets include some 750 fixed targets [redacted]

<sup>b</sup> The number of allocated warheads does not exactly match the LRINF shortfall because targeting with ICBMs and SRBMs is not always as efficient as targeting with SS-20s. [redacted]

This table is ~~Secret~~ [redacted]



on other delivery vehicles to compensate fully for lost targeting coverage. Moreover, the number of warheads on SS-12 and SS-23 launchers in range of NATO currently is less than 5 percent of the number of such SS-20 and SS-4 LRINF warheads now deployed in the western USSR. The type of compensatory targeting scheme the Soviets would choose would depend on many factors, including whether an arms control agreement:

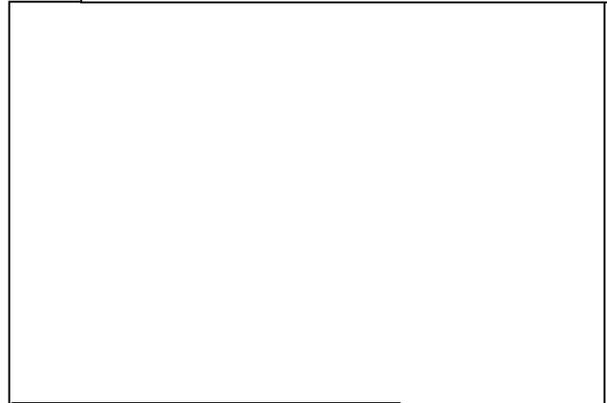
- Eliminated or only reduced the LRINF force.
- Affected the SRBM force, such as by freezing or reducing its size or mix of systems; or if it constrained only certain SRBMs, for example, by regulating missiles with ranges of 500 or more kilometers.
- Limited ICBMs, SLBMs, or heavy bombers.
- Affected the availability of other nuclear delivery systems, such as tactical aircraft, that also could be employed to attack NATO targets.



42. In compensating fully for lost LRINF missile coverage of Western Europe, the Soviets would have to use strategic systems to reach the most distant SS-20 targets. Although the Soviets already target some bombers and probably some ICBMs and SLBMs against Western Europe, we cannot determine what additional percentage of delivery systems, if any, they would be willing to divert from intercontinental and other missions; a willingness to divert a significant number of strategic systems to theater attacks would depend in part on how such systems are limited by an arms control agreement. The Soviets might want the Strategic Rocket Forces (SRF) to retain targeting responsibilities now assigned to LRINF coverage. 

43. *Use of SRBMs.* An assessment of the locations of the targets included in the Soviets' theater-strategic mission indicates that the majority of them are within 900 kilometers of the borders with the Warsaw Pact states. *Forward-based SS-12 missiles would possess the range but not the number of warheads on launchers necessary to cover many of these targets in an initial strike from Warsaw Pact territory. The SS-23 could be targeted only from forward deployments in Eastern Europe against the small percentage of theater-strategic targets that fall up to 400 kilometers beyond the forward position of Pact forces. Because of their range limitations, the Scud, SS-21, and FROG would be unsuited to cover from home bases targets currently contained in the theater-strategic mission.* 

44. 



*Except for a few targets, greatly improved accuracies and new nuclear warheads for SRBMs would, therefore, not be necessary for this force to conduct nuclear strikes now assigned to the LRINF missile force.* 

45. In using the SRBM force to substitute for LRINF missile targeting coverage, Soviet planners would have to rely almost exclusively on the SS-12. In using this missile, however, the Soviets would probably design attack plans around East European-based SS-12s—currently 42 launchers—because only launchers positioned there could reach theater-strategic targets from home bases (see figures 7 and 8).<sup>9</sup> The Soviets may also believe that some opportunity might exist prior to the onset of combat to move USSR-based SS-12s to Eastern Europe—there are another 24 launchers in the western military districts of the USSR. 

46. The time required for an SS-12 or SS-23 unit to redeploy from the Western USSR to Eastern Europe would depend heavily on the sense of urgency attached by the Soviets to the move. At a minimum, an SS-12 or SS-23 unit could complete the redeployment in six days. The movement of SS-12 units from the Asian military districts to the Western USSR would require a minimum of two weeks, depending on the peacetime location of the unit. This estimate reflects the time required for the unit to prepare to vacate its garrison, proceed to a rail station, load equipment on the train, complete the journey, offload the train, conduct equipment checks and maintenance, proceed to an operational position, and establish operational readiness. 

<sup>9</sup> SS-12s were first deployed with Soviet forces in Eastern Europe beginning in 1984 as a response, according to Soviet officials, to US Pershing-II and GLCM deployments in Western Europe. Existing SS-12 units were redeployed from the USSR into East Germany and Czechoslovakia. 



Figure 7  
SS-12 Coverage of Europe



Boundary representation is not necessarily authoritative.  
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**Figure 8**  
**Scud and SS-23 Coverage of Europe**



Boundary representation is not necessarily authoritative

47. *Augmenting SRBM Production.*

[redacted] it appears that many Soviet defense industry plants normally operate at much less than their total production capacity. This theoretically gives a plant the capacity to increase production substantially; however, without increasing subsystem production, the Soviets would be able to maintain this increase for a only relatively short period of time. If the Soviets decided to utilize this additional capacity, the increase in production would be initiated over a period of several months, probably by increasing the number of work hours per employee and by using reserve plant space. Problems inherent in the Soviet economy—such as slow supply of raw materials, fluctuating quality control, and social problems like drinking on the job—would probably restrict the actual production capabilities of these production plants to something less than the estimated total capacity. [redacted]

48. The Soviets might choose, for politically expeditious reasons, to get as much immediate increase out of the existing component facilities and missile assembly facilities as possible, perhaps by as much as 10 percent during the first year after an LRINF agreement is reached. Any significant increase in production capability, however, would involve considerable effort and take a longer period of time. An increase in production of 25 percent might be reached after the first two years, with a further increase to 50 percent in an additional year. [redacted]

49. This increase of 25 to 50 percent in SRBM production would probably have to be done in one of two ways:

— Production facilities for missiles and missile-associated equipment that are banned by an LRINF agreement could be modified for SRBM production. This modification would involve retooling of the production lines and retraining of the labor force. Lines to be modified would include those for guidance and control production, motor case and canister fabrication, solid-propellant rocket motor production, production of other missile components, and missile assembly, as well as production lines for missile-associated ground support equipment. We estimate that this process could take anywhere from one to two years, depending on the complexity of the components being produced and the machinery required to produce them.

— New assembly buildings could be built and fitted out. This would typically take three or more years. If new subsystem production areas were also necessary, then an increase in missile production would be constrained by longer construction times (five years) for more complex subsystem production areas such as those for solid motor production. [redacted]

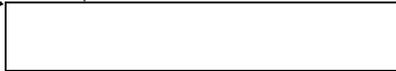
50. *Force Structure.* If the Soviets were forced to rely exclusively on their SRBMs to compensate for lost LRINF missile targeting coverage, there probably would be considerable changes in the SRBM force structure compared with that projected earlier, and a reduction in the number of targets that could be covered because of range restrictions on SRBMs. Changes in the SRBM force could include:<sup>10</sup>

— A significant increase in the SS-12 force beyond that already projected. Currently, the SS-12 force, unconstrained by arms control, is projected to increase to approximately 160 launchers (about a 50-percent increase) by the mid-1990s, and equipment modernization will occur as an SS-12 follow-on is introduced.

— The basing of an expanded SS-12 force probably would be concentrated in the western USSR. Currently, only one SS-12 brigade is stationed in this region, and we project the Soviets will reconstitute the units that were redeployed into Eastern Europe in 1984. In addition, new SS-12 units could also be created.

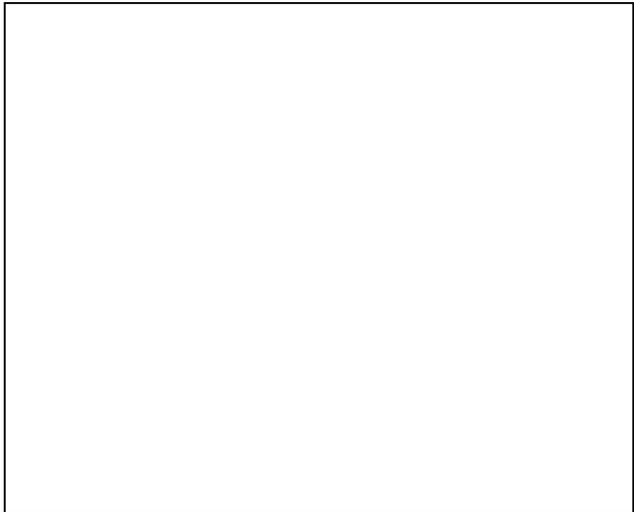
— Additional SS-12 launchers could be added to existing units in Eastern Europe, or new SS-12 units could be established there unless an arms agreement restricted such actions. (The Soviets already have stated the SS-12 units will be withdrawn from Eastern Europe back into the USSR upon the signing of an LRINF agreement.) The establishment of SS-12 or SS-23 units in Eastern Europe would require four to six months of construction to build new installations to house them. The Soviets currently have 42 launchers stationed in the forward area which, given the estimated 2:1-missile-per-launcher ratio held by launch units, could provide a minimum of 84 missiles for use against both time-urgent and non-time-urgent targets.

<sup>10</sup> The following judgments are highly dependent on the provisions of any LRINF agreement, particularly any limits on the size of the SS-12 and SS-23 forces, or on missiles with ranges of less than 1,000 kilometers. [redacted]



- A substantial growth in the number of SS-12 refire missiles. The availability of large numbers of refires, and the ease of reloading SRBM launchers—which is practiced regularly by units—suggest that the Soviets would cover some NATO targets with refire missiles in follow-up strikes, particularly those that are not time urgent. To the extent that the Soviets identified additional non-time-urgent targets in NATO, there would be less of a requirement for expanding the SS-12 launcher arsenal.
- Command of the SS-12 force might revert back to the SRF. When originally fielded in the 1960s, the SS-12 system was subordinate to the SRF. In about 1970, command of the system was transferred to the Ground Forces. If the SS-20 force were eliminated or substantially reduced, it is possible that the SRF would wish to reacquire the SS-12 because of its suitability in delivering theater strikes. The transfer of the SS-12 force would require a significant alteration in the SRF command, control, and communications structure, especially if units continued to be based in Eastern Europe.
- If the SS-12 remained with the Ground Forces, those opposite NATO's Central Region almost certainly would be directly subordinate to the High Command of Forces in the Western Theater in wartime. A key function of the High Command is to plan and direct fire missions throughout the depth of the theater. The success of attacks involving SRBMs, air forces, naval forces, and perhaps other strategic delivery vehicles would be dependent on their coordination and execution. The theater commander, in accordance with Soviet General Staff guidance, probably would be best suited to plan and direct this activity.
- Because SS-23s stationed in East Germany and Czechoslovakia could reach only a small percentage of the targets assigned to LRINF missiles, it is possible that the Soviets might devote some portion of the force for this purpose. The SS-23, however, is primarily a frontal system, and its limited operational range seriously inhibits its utility against such targets. Therefore, we judge that few SS-23s would be assigned to fill in for LRINF missiles. If they were used in this role, the missiles probably would also be under the direct supervision of the theater commander.

- Although we consider it unlikely, it is also possible that, with a substantially reduced or eliminated LRINF missile force, the Soviets might attempt to develop a new or modified SRBM with a range between the SS-23 and SS-12. Such a missile would be able to assume a greater portion of theater target coverage than the SS-23, and it would allow the SS-23 to be used exclusively in frontal operations—as the Soviets originally intended in developing the missile. A longer range SRBM also would permit the Soviets more targeting flexibility and not compel them to rely primarily on the SS-12 in fulfilling SRBM theater fire missions.



51. The extent to which the Soviets would rely on SRBM forces to cover theater targets previously assigned to the LRINF missile force would be difficult to determine immediately. If the Soviets chose to use SRBMs to assume coverage of a sizable number of theater targets, we would anticipate seeing several developments that, over time, could provide a good indication of the SRBM's role in the revised targeting scheme. These probably would include:

- An increase in the SRBM force structure and the table of organization and equipment of SRBM units. Significant changes in the SRBM force would become apparent relatively quickly.
- An increase in the SRBM-associated nuclear storage, logistic, and transport capability to support expanded nuclear delivery missions.





— An increase in SRBM missile and launcher production through increased output at existing facilities, the conversion of existing plants to SRBM production, and the construction of new SRBM facilities.   


52. Over the short term, adjustments to the SRBM force to accommodate expanded targeting responsibilities would be disruptive. Some planning problems

would be difficult to overcome easily, such as the greater susceptibility—particularly as perceived by Soviet planners—of forward-based SRBMs to attack by NATO when compared with USSR-based strategic missile systems. We judge, nevertheless, that the Soviets would be able to develop the SRBM force structure and operational planning required to carry out expanded targeting responsibilities effectively. 

