Director of
Central
Intelligence

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Soviet Capabilities for Strategic Nuclear Conflict Through the Late 1980s

National Intelligence Estimate
Volume I—Summary Estimate

[ ]

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THE DIRECTOR OF CENTRAL INTELLIGENCE

WASHINGTON, D. C. 20505

National Intelligence Officers

7 April 1978

MEMORANDUM FOR: Holders of NIE 11-3/8-77

SUBJECT: Errata Sheet for Volume I, Summary Estimate

REFERENCE: TCS 889101-77/I, SOVIET CAPABILITIES FOR STRATEGIC NUCLEAR CONFLICT THROUGH THE LATE 1980s, Dated 21 February 1978

The following pen-and-ink correction should be made in Volume I of NIE 11-3/8-77, Soviet Capabilities for Strategic Nuclear Conflict Through the Late 1980s, dated 21 February 1978:

Page 30, figure 13a, "Quantity and Quality of US and Soviet Forces for Intercontinental Attack, 1967-87": add the caveat FORMERLY RESTRICTED DATA to the TOP SECRET classification.

for Jayne Stevenson
Robert R. Bowie
Deputy to the DCI for National Intelligence

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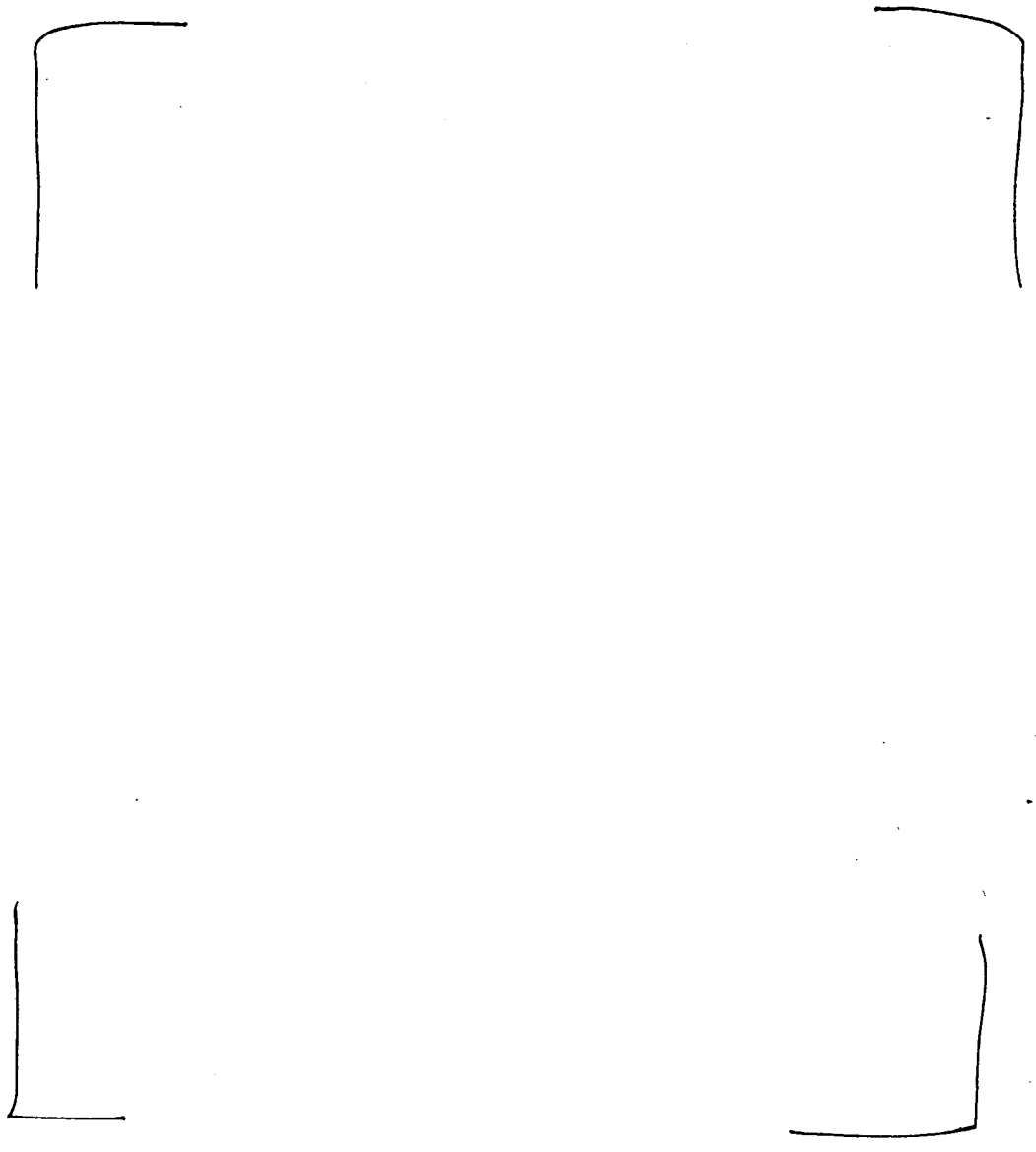


NIE 11-3/8-77

SOVIET CAPABILITIES FOR STRATEGIC NUCLEAR CONFLICT THROUGH THE LATE 1980s

Volume I—Summary Estimate

THIS ESTIMATE IS ISSUED BY THE DIRECTOR OF CENTRAL INTELLIGENCE.

THE NATIONAL FOREIGN INTELLIGENCE BOARD CONCURS, EXCEPT AS NOTED IN THE TEXT.

The following intelligence organizations participated in the preparation of the Estimate:

The Central Intelligence Agency and the intelligence organizations of the Departments of State, Energy, and Defense, and the National Security Agency.

Abstaining:

The Special Assistant to the Secretary for National Security, Department of the Treasury

Also Participating:

The Assistance Chief of Staff for Intelligence, Department of the Army

The Director of Naval Intelligence, Department of the Navy

The Assistance Chief of Staff, Intelligence, Department of the Air Force

SCOPE NOTE

This Estimate assesses present and future Soviet capabilities for strategic nuclear conflict. It estimates the numbers, types, and characteristics of Soviet offensive and defensive forces for strategic nuclear conflict and of their supporting elements over the next 10 years. It summarizes Soviet policies and doctrine applicable to strategic nuclear forces.

The Estimate differs from the 11-3/8s of the past few years in two important respects:

— This year the section of the Estimate covering Soviet policy and doctrine is confined to those aspects applicable to strategic nuclear forces. Questions concerning the relationship between, on the one hand, Soviet forces and policies for strategic nuclear conflict and, on the other hand, broad Soviet national and foreign policy goals and expectations will be addressed in the forthcoming NIE 11-4: *Soviet Goals and Expectations in the Global Power Arena.*

— This year's Estimate addresses for the first time Soviet strategic forces for attacking targets on the Eurasian periphery in addition to Soviet forces for intercontinental attack and strategic defense.

Thus, the Estimate treats the following elements of Soviet military forces:

— **Intercontinental attack:** intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), intercontinental bombers, and long-range cruise missiles.

— **Peripheral attack:** intermediate-range bombers, medium- and intermediate-range ballistic missiles (MRBMs and IRBMs), and certain older SLBMs.

— **Strategic defense:** ballistic missile warning systems, antiballistic missile (ABM) and antisatellite (ASAT) systems; surface-to-air missiles (SAMs), fighter interceptors, and supporting systems for defending Soviet territory against aircraft and cruise missiles; antisubmarine warfare (ASW) systems for use against nuclear-powered ballistic missile submarines (SSBNs); and the Soviet civil defense program.

In addition, the Estimate assesses those activities and organizations which support and integrate Soviet strategic nuclear forces. Notable among these are the Soviet command, control, and communications system, the readiness procedures and alert status of forces, and research and development programs.

To meet the needs of a variety of consumers, the Estimate consists of two volumes. The first is a Summary Estimate, which presents our analysis of prospects for the strategic environment, summarizes the main developments and trends in Soviet strategic programs, and assesses the implications of future Soviet strategic forces. The second comprises five chapters addressing Soviet strategic forces and programs in some detail, along with relevant aspects of Soviet doctrine, policy, and operational concepts. The second volume also includes an annex which discusses our future projections in further detail.

The cutoff date for information and analysis in the Estimate is 1 January 1978. We have extended this cutoff in a few instances, however, in order to take cognizance of more recently acquired evidence and preliminary analysis which could affect our judgments about future Soviet ICBM capabilities. These new developments and their possible implications are addressed in the notes following paragraphs 16, 27, and 86 and on figure 15.

CONTENTS

	Page
PART I: PROSPECTS FOR THE STRATEGIC ENVIRONMENT	1
A. Recent Trends in Soviet Strategic Programs	1
B. Probable Soviet Objectives for Strategic Forces	1
C. General Forecast for the Next 10 years	2
PART II. MAIN DEVELOPMENTS AND TRENDS	4
A. Military Doctrine	4
B. Economic Considerations	5
C. Developments in Offensive Forces	5
Land-Based Ballistic Missiles	5
Submarine-Launched Ballistic Missiles	8
Future Ballistic Missile Systems	11
Long Range Aviation	14
Long-Range Cruise Missiles	16
D. Developments in Strategic Defenses	16
Ballistic Missile Warning and Defense	16
Antisatellite Systems	19
Strategic Air Defense	19
Defense Against Ballistic Missile Submarines	21
Civil Defense	21
Advanced Technology	23
E. Operational Factors	23
Warning and Readiness	23
Command and Control	24
Targeting and Retargeting	24
Degradation of US Intelligence and Warning Capabilities	24
PART III. FUTURE FORCES AND THEIR IMPLICATIONS	25
A. Soviet Policy for Future Forces	25
B. Projections of Future Soviet Strategic Forces	25
C. Significance of Future Soviet Intercontinental Offensive Forces	28
Quantity, Quality, and Destructive Potential of Forces	29
Countersilo Capability and Prelaunch Vulnerability of Soviet Fixed ICBM Forces	33

		Page
	Prelaunch Vulnerability of SLBMs and Bombers	36
	Residual Capabilities of Forces	36
D.	Soviet Peripheral Attack Forces	45
E.	Capabilities and Limitations of Soviet Strategic Defenses	45
	Ballistic Missile Warning and Defense	45
	Antisatellite Systems	46
	Strategic Air Defense	46
	Defense Against Ballistic Missile Submarines	47
	Civil Defense	48
	Advanced Technology	49

SUMMARY ESTIMATE

PART I

PROSPECTS FOR THE STRATEGIC ENVIRONMENT

1. We believe the Soviets look with considerable satisfaction on the progress they have made in strategic nuclear capabilities over the past 20 years or so. They see this progress as having provided them with a powerful deterrent and as contributing in a major way to the recognition of the USSR as a superpower equal to the United States. They probably see their present intercontinental attack forces as roughly equal to those of their most formidable adversary, the United States, and see their peripheral attack forces as superior to the comparable forces of all likely adversaries—including China—combined.

A. Recent Trends in Soviet Strategic Programs

2. This past year Soviet strategic offensive and defensive programs have continued to display the broad scope, vigor, and persistence to which we have called attention in previous estimates. Soviet programs have proceeded much as forecast last year.

- In the offensive field, major current deployment activities include: the moderately paced conversion of ICBM silos to new systems; a nearly completed phase of SSBN construction; actual or imminent deployment of the USSR's first SLBM with multiple independently targetable reentry vehicles (MIRVs); probable initial deployment of mobile IRBMs; and production of Backfire bombers at somewhat increased rates. There is a somewhat better than even chance that silo deployment of the SS-16 solid-propellant ICBM has begun, but mobile deployment is evidently still deferred. Developmental activities include work at various stages on: several modified or follow-on ICBMs; a new, large SSBN/SLBM weapon system; a new aerial tanker and probably a new long-range bomber; and cruise missiles which may have ranges in excess of 600 kilometers. For the second consecutive year we have concluded that the current generation of Soviet ICBMs is somewhat more accurate than we had previously estimated. In addition, some of the modified or follow-on ICBMs under development are approaching the flight-test stage.
- In the defensive field, the Soviets' primary recent stress has been on research and development (R&D). Important R&D activities are under way in ABM and antisatellite systems, ground-based radars, a large airborne surveillance radar, low-altitude air defense fighters and SAMs, ASW sensors, and directed-energy weapons, notably lasers. This year the Soviets have continued working to improve their ballistic missile launch detection, acquisition, and tracking capabilities. They conducted flight tests of a high-acceleration ABM interceptor. In addition, we identified far more civil defense shelters than had been known to exist.

B. Probable Soviet Objectives for Strategic Forces

3. On the basis of recent trends, it appears that the Soviets have largely completed the expansion phase which established the size and composition of the strategic nuclear forces they now possess. Now a new phase emphasizing technological improvement is well under way with, as yet, mixed results—striking advances in ballistic missile technology but, as far as we can tell, little success to date in advanced R&D in defensive fields. It also appears—from the growing diversity of Soviet command, control, warning, and other systems to support the conduct of nuclear war—that the present phase stresses operational flexibility while maintaining highly centralized control.

4. We believe that in pursuing this new phase of force improvement the Soviets probably have the following general objectives for their strategic nuclear forces for the next 10 years:

— Continue to improve overall war-fighting and war-survival capabilities, including what US strategists would call counterforce and damage-limiting capabilities. In the Soviet view, such capabilities constitute the best deterrent. In addition, the Soviets see large, powerful forces as having political utility and as contributing to their long-term goals in the competition with the West.

— Ensure that their strategic forces and supporting elements will appear powerful in comparison with those of other nations (singly or in combination), will support the perception that the strategic balance is continuing to shift in the USSR's favor, and will increase the chances that the Soviet Union could emerge from a nuclear war in a better position than the United States. The Soviets probably do not expect all requirements to be fully satisfied during the period.

— Emphasize quality in strategic weapons development and deployment, but go slow on sacrificing quantity. The Soviets want to compete technologically to catch up with and, if possible, surpass the West, and in any event to avoid falling behind. They will try to achieve quantum leaps in selected technologies.

— Improve operational warning and command and control systems and increase readiness, targeting, and attack assessment capabilities. The objective of these efforts is apparently to enable the Soviets to employ limited nuclear options in theater warfare, to launch their intercontinental forces either in a preemptive attack or in response to tactical warning, and, if necessary, to launch a devastating retaliatory attack. The Soviets seek to be able to control their strategic forces in a nuclear war which they consider may last for some time.

C. General Forecast for the Next 10 Years

5. Available evidence and our understanding of the trends in Soviet strategic programs lead us to conclude that:

— Soviet forces for intercontinental attack will become more powerful and flexible. Even under constraints along the lines now being negotiated in the strategic arms limitation talks (SALT), Soviet intercontinental offensive strength will grow in relation to that of the United States between now and the early 1980s. After the early 1980s, the USSR will continue to gain in some aspects of strategic offensive potential, while in others, the relationship between Soviet and US forces will tend to stabilize as the destructive potential of each side increases. Under SALT conditions, advantages will probably remain mixed.

— The Soviets will continue to place primary reliance for intercontinental attack on ICBMs. The threat to US ICBM silos posed by Soviet ICBMs will become severe within the next few years. The vulnerability of Soviet silos will not change much until at least the mid-1980s. After that, it could increase considerably if the United States deploys the M-X ICBM or a comparable system. It is possible, therefore, that at some point the Soviets may shift emphasis more toward SLBMs and perhaps mobile ICBMs. They might increase their reliance on launching their forces upon receipt of tactical warning.

— The USSR's capabilities for nuclear attack against our NATO allies, China, and other areas on the Eurasian periphery will increase and will remain superior to those of its potential adversaries.

— The Soviets will almost certainly remain unable to prevent US alert bombers and at-sea SLBMs from being launched.

— We expect the USSR to respond to the US cruise missile threat by stressing defenses against it. Nevertheless, Soviet capabilities to counter large-scale air attacks including bombers, cruise missiles, and short-range attack missiles (SRAMs) almost certainly will remain low throughout the period of the Estimate.

— Soviet forces will remain able to inflict massive damage on the United States and on areas peripheral to the USSR in either initial or retaliatory attacks. At the same time, it is extremely unlikely that Soviet forces will be able to prevent massive damage to the USSR from retaliatory US attacks. US forces surviving even a surprise Soviet counterforce strike would comprise several thousand bombs and warheads having large lethal area and hard-target potentials.

6. For the mid-1980s and beyond, these judgments are subject to considerable uncertainty because of the unknowns about future Soviet programs and because present US planning is in flux. However, it seems clear that, for at least the next few years, the general picture will be one of a Soviet Union continuing both to

deploy and to develop improved systems which increase its overall strategic capabilities, while the US effort remains largely developmental. The actual strategic significance of increases in Soviet striking power may be debatable, especially in view of the many Soviet vulnerabilities and the retaliatory power of the United States. But there is likely to be a perception of continued Soviet momentum and of strategic trends unfavorable to the United States and its allies. How and for what purposes the Soviets might seek to exploit this perception to their political advantage will depend on the course and thrust of Soviet foreign policy during the period in question. These issues will be examined in the forthcoming NIE 11-4.

PART II

MAIN DEVELOPMENTS AND TRENDS

7. The development of Soviet strategic nuclear forces has been and is influenced by a variety of factors, some more variable than others. Among the more variable factors are the Soviet leadership's perceptions of the scope and vigor of developments in US and third-country strategic nuclear capabilities and doctrine, as well as the technological progress the Soviets anticipate in both the United States and the USSR. The more permanent factors include:

- A leadership whose strong commitment to powerful military forces stems from historical experience in which such forces have succeeded in defending the USSR, in expanding its influence, and in turning it into an acknowledged global power.
- A weapons development and procurement process which stresses continuity and an incremental approach to improving strategic capabilities.
- The institutional interests of the several branches of the Soviet armed forces, design establishments, and military industries.
- A military doctrine which calls for ever-better war-fighting capabilities, supported by a political perception that strategic nuclear power is central to the USSR's security and national aspirations.

A. Military Doctrine

8. Soviet military doctrine calls for capabilities to fight, survive, and win a nuclear war. According to this doctrine, it is essential to acquire and improve countermilitary capabilities—that is, weapons capable of attacking nuclear and other forces, command and control facilities, and supporting elements. It is also essential to provide for the active and passive defense of the homeland. Soviet development of hard-target offensive weapons, continued strengthening of already extensive strategic defensive forces, strategic hardening, and civil defense programs are all consistent with the main tenets of this doctrine.

9. The Soviets recognize that a state of mutual deterrence is an operative reality today, but they publicly reject US notions of strategic stability and sufficiency. They apparently perceive "mutual assured destruction" as neither a desirable nor a lasting basis for the US-Soviet strategic relationship. They believe that a superior Soviet war-fighting capability, including what US strategists would call counterforce and damage-limiting capabilities, is the best type of deterrent. To our knowledge, however, Soviet military doctrine does not meaningfully describe the conditions which would constitute winning a nuclear war, and no Soviet official has asserted in this decade that nuclear conflict is a feasible or practical means for implementing Soviet policy.

10. The predominant impression conveyed by Soviet statements and actions is that the Soviet leaders see nuclear war as a disaster to be avoided if possible. For the foreseeable future the Soviets evidently regard the likelihood of such a war as low. They apparently see little chance of a US first strike, although they do not exclude the possibility. We believe Soviet initiation of an unprovoked, deliberate first strike against the United States is also highly unlikely.

11. Nevertheless, the Soviets are evidently striving to be in a position where, if nuclear war does occur, the USSR can fight and survive it and emerge from it in a better position than the United States. They are examining a variety of ways that nuclear war could begin and are structuring their strategic nuclear forces in ways designed to increase the options available to the leadership under widely varying crisis and conflict circumstances.

12. Fifteen or so years ago, Soviet [redacted] assumed that any clash involving the United States and the USSR would immediately escalate to intercontinental nuclear war and that theater war would be inseparable from that larger conflict. Now, [redacted] describe intercontinental conflict as beginning either by escalation from a theater conflict or by a massive US surprise attack. In the first of these circumstances, which is clearly considered the more likely, the Soviets envisage an indeterminate period of large-scale conventional war-

fare preceding a NATO decision to begin theater nuclear operations. In their view, escalation to the intercontinental level would be likely at any point during the theater conflict, although restriction of the use of nuclear weapons to the theater level is not entirely ruled out. In the second and, in the Soviet view, much less likely circumstance, conflict would begin with a large-scale US intercontinental strike followed closely by theater nuclear operations. A "threatening period" in advance of hostilities is evidently thought likely, at least in the first circumstance. Allowance for the absence of such a period is made in the second.

13. Soviet forces and supporting elements apparently are expected to be able to begin strategic nuclear operations in any one of three ways: preemption, launch on tactical warning, and retaliation. The generally low day-to-day readiness—by US standards—of Soviet strategic nuclear forces is consistent with the Soviet view that strategic nuclear conflict most likely would occur under circumstances in which there would be time for increases in readiness status. However, there is evidence that a substantial portion of the Soviet ICBM force is capable of quick reaction, even if not routinely maintained at high readiness, and that the Soviets are making efforts to improve tactical warning capabilities.

B. Economic Considerations

14. The sheer size of Soviet strategic programs can be appreciated by estimating what they would have cost if purchased in the United States. In dollar terms in 1976:

- The procurement and operation of Soviet strategic offensive forces would have cost about two and a half times what the United States spent, although about one-third of it would have been for intermediate-range forces having no direct US counterparts.
- Procurement and operation of defensive forces, excluding ASW and civil defense, would have cost about seven times what the United States spent.
- Research and development supporting the entire military establishment, a large but unknown portion of which is applicable to strategic systems, might have cost roughly two-thirds more than what the United States spent.

These dollar cost estimates measure neither the effectiveness of the Soviet programs, which is mixed, nor their impact on Soviet human and material resources, which is burdensome.

15. As we noted last year, the Soviets have long borne a peacetime burden of military expenditures that is extremely high by Western standards and much greater than we had previously understood. The Central Intelligence Agency now estimates that the overall Soviet defense budget absorbs about 12 percent of the Soviet gross national product, as compared with 6 percent for the United States. When measured in rubles, expenditures for the procurement and operation of Soviet strategic offensive and defensive forces in 1976 constituted about one-quarter of Soviet defense expenditures. (See figure 1.) In the coming decade we expect the growth rate of the Soviet economy to decline, thereby making choices in the allocation of scarce resources more difficult. In our judgment, however, it is unlikely that there will be any decline in the recent growth rate of 4 to 5 percent evident in overall defense spending. Were the Soviets to decide to slow the growth in defense outlays in favor of accelerating economic growth projects, we think it would nevertheless be highly unlikely that planned future outlays for strategic forces would be reduced.

C. Developments in Offensive Forces

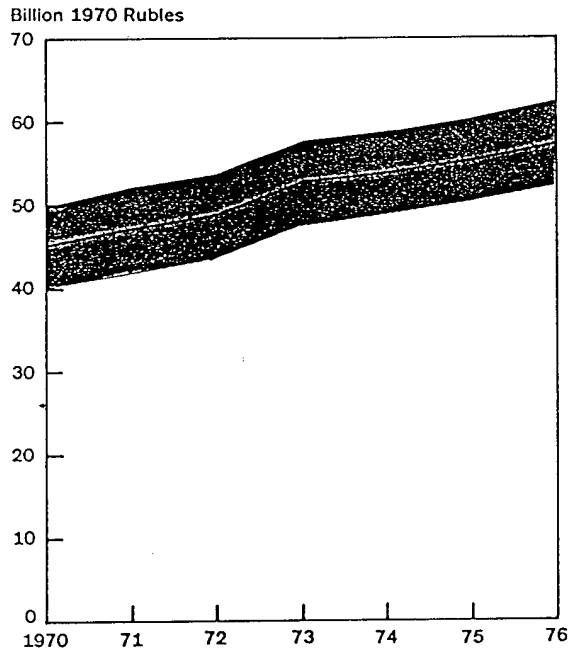
Land-Based Ballistic Missiles

16. The Soviets had 1,442 ICBM launchers at operational complexes as of 1 January 1978. Of that force, 1,267 ICBM launchers were operational, 134 were under conversion, and 41 were in the process of being dismantled as required by the SALT Interim Agreement. Silos continue to be converted for the new SS-17, SS-18, and SS-19 ICBMs at the overall moderate pace projected last year. All three of these new ICBMs have been tested with MIRVs, and most of those deployed are believed to be so equipped. At the beginning of January the Soviets had operational 344 silos with these new systems—134 of them with the heavy SS-18s. SALT limitations aside, the evidence available to us indicates that the Soviet program has called for about 920 such silos to be operational by 1981; SALT II limitations would reduce this to 820. The program may also include the conversion of the 60 SS-13 silos for the new solid-propellant SS-16,

Figure 1

Estimated Soviet Expenditures for Defense, 1970-76

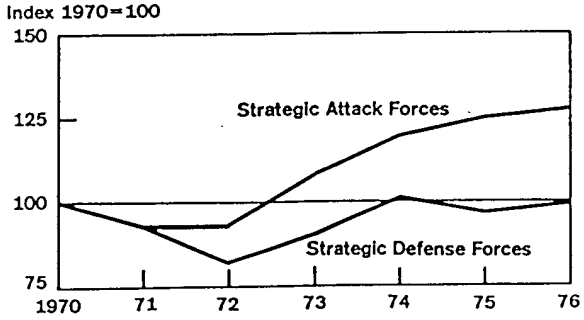
A. Estimated Total Expenditures



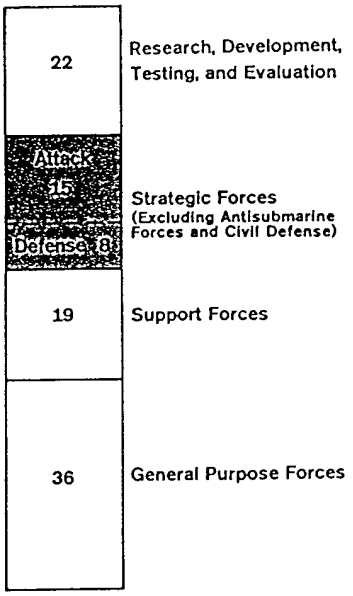
Estimate defined as the Soviets might view their defense effort. This is a broad definition including such activities as stockpiling, some NASA-type programs, and foreign military assistance.

Estimate defined for comparison with US accounts.

B. Index of Growth of Estimated Total Expenditures for Procurement and Operation of Strategic Attack and Defense Forces (Calculated in 1970 Rubles)



C. Percentage Distribution of Estimated Total Expenditures (Calculated in 1970 Rubles)



The expenditures shown in charts B and C for forces for strategic conflict represent spending on procurement for and operation of these forces, and are derived from our order-of-battle data on deployed forces. Such expenditures accounted for more than one-fifth of total Soviet defense spending during the period 1970-76. Outlays related to forces for strategic conflict actually consume a substantially larger share of total Soviet defense outlays, however, for the following reasons:

- Outlays for military research, development, testing, and evaluation (RDT&E) —about 22 percent of total outlays—and for support forces—about 19 percent—clearly impact on strategic forces.
- Costs for those naval forces which have an antisubmarine capability are included in the outlays for general purpose naval forces, although we realize they have in part a mission against ballistic missile submarines.
- Costs of nuclear materials are not available on a weapon-by-weapon basis. Because the largest portion of these materials is used by offensive systems, all costs are included within the strategic attack category.
- No estimate of the overall cost of the Soviet civil defense program is available.

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which has not been tested with MIRVs to date. (Figure 2 shows selected characteristics of Soviet ICBMs.)

Note: We have assumed in our SALT-limited projections of Soviet forces for intercontinental attack that, under a limit of 820 ICBMs of types counted as MIRVed, the Soviets would deploy 308 launchers equipped with SS-18s, 410 with SS-19s, and 100 with SS-17s. (These projections are addressed in part III of this Summary Estimate.) Recent evidence of construction activity at Soviet ICBM complexes suggests that the Soviets are planning to deploy a mix which contains 100 fewer SS-19s and 100 more SS-17s than assumed in our projections. For the implications of this difference, see the note following paragraph 86.

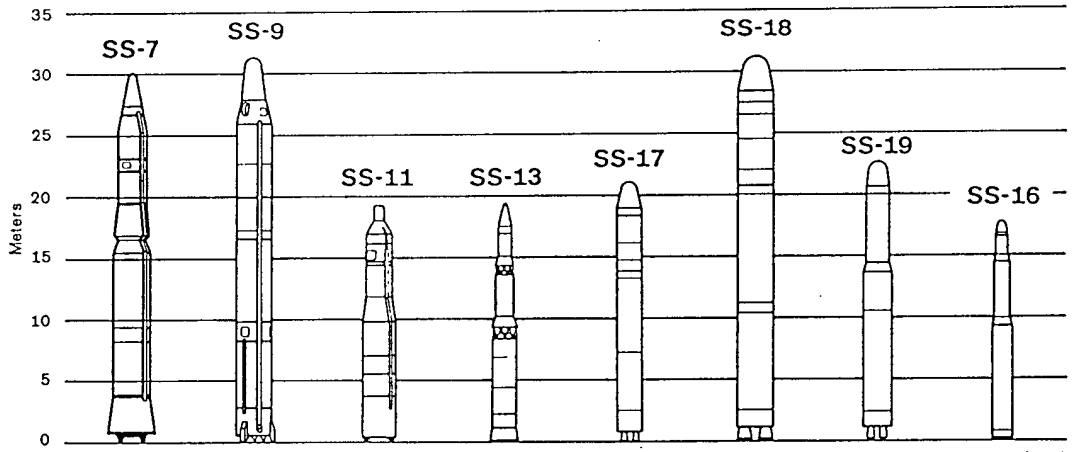
17. For the second consecutive year, we have been able to refine our estimates of the accuracies of the new ICBMs and have learned that they are somewhat more accurate than previously estimated. The accuracies of these Soviet ICBMs probably will continue to be improved somewhat over the next few years.

18. The SS-17, SS-18, and SS-19 have also been tested with large, single reentry vehicles (RVs). These single-RV variants have good capabilities against hard targets such as US ICBM silos and launch control centers. The individual RVs of the MIRV variants have considerably less hard-target capability because of their lower yields, but they have more flexibility for use against either soft or hard targets than does the SS-11, which still constitutes a large share of the ICBM force. Our new estimates of the CEPs and yields of the SS-18 and SS-19 indicate that the MIRV variants of these two systems have hard-target capabilities that are about equal to each other and are somewhat greater than the capability of the SS-17 MIRVed variant.

19. If the Soviets are able to target two of their MIRVs against each US silo, they could significantly enhance the hard-target capabilities of their ICBM

Figure 2

Estimated Characteristics of Soviet ICBMs



	SS-7	SS-9	SS-11	SS-13	SS-17	SS-18	SS-19	SS-16
Number of RVs	1	1 RV or 3 MRVs	1 RV or 3-6 MRVs	1	1 RV or 4 MIRVs	1 RV or 8-10 MIRVs	1 RV or 6 MIRVs	1
Yield (each RV)								
CEP	1,900 m (1.0 nm)	925-1,900 m (0.5-1.0 nm)						470 m (0.25 nm)
Operational mode	Triple Silos	Single Silo (groups of 6)	Single Silo (groups of 10)	Single Silo (groups of 10)	Single Silo (groups of 10)	Single Silo (groups of 6 or 10)	Single Silo (groups of 10)	Single Silo (groups of 10)
Year operational	1963	1966	1966	1969	1975	1974	1975	1977*

*See the text for a discussion of the deployment status of the SS-16.

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force. We estimate that at least the MIRVed variants of the SS-18 and SS-19 could be used to conduct two-on-one targeting by either of two methods: from the same booster (in line) or from different boosters (cross targeting). All agencies believe that the in-line technique would be feasible for use in large-scale attacks. The use of the cross-targeting technique would result in somewhat greater damage expectancy against hard targets. It would, however, present the Soviets with difficult but not insurmountable operational problems. We have no direct evidence of Soviet intentions to use either technique. In this Estimate, therefore, we treat two-on-one targeting against silos as a variable to reflect our uncertainty, and we use the cross-targeting technique in our calculations to establish an upper bound. (For a comparison of damage expectancies against hard targets using one-on-one and two-on-one targeting by these and other Soviet ICBMs, see figure 3.)

20. A divergent view is that two-on-one cross-targeted attacks with near-simultaneous impacts (that is, about five to 20 seconds apart) to increase the probability of the destruction of a hardened point target are not operationally feasible. The holder of this view believes that the two-on-one cross-targeting tactic used in this Estimate overstates Soviet hard-target capabilities and that Soviet planners, because of the large uncertainties involved, would find the high risks of such an attack unacceptable.[1]

21. There continues to be uncertainty regarding the status of the SS-16 solid-propellant ICBM program. Available evidence indicates that the missile is still being produced, though at a low rate. Recent activity leads us to believe that the chances are somewhat better than even that SS-16s have now been installed in perhaps 20 SS-13 silos at modified sites.[redacted]

[redacted]On the other hand, while we cannot confirm whether or not mobile SS-16 deployment has occurred, we continue to believe that such deployment has been deferred, in part because of SALT considerations. Continuing construction activity at the Plesetsk missile test center appears, however, to be related to the SS-16 mobile program, and deployment there could begin quickly.

22. The Soviets have been preparing to deploy their new mobile intermediate-range ballistic missile, the SS-20; initial deployment of a few launchers has probably now occurred at the first of nine identified mobile ballistic missile bases under construction. The Soviets have[redacted] launchers for the SS-20 and equip each unit with multiple missiles for refire purposes. Given the pace of activities to date, this deployment program is likely to be completed in the early 1980s. We expect this much more effective MIRVed missile eventually to replace most, if not all, of the current force of about 550 older IRBMs and MRBMs, thereby improving the Soviet peripheral attack capability even though the number of launchers will be fewer. (Figure 4 shows SS-20 coverage capabilities and characteristics of the SS-20, the SS-5 IRBM, and the SS-4 MRBM.)

23. The range of the SS-20 could be extended if the Soviets chose to do so. The greatest extension could be achieved through the addition of the third stage, postboost vehicle, and single RV of the SS-16, which in effect would convert the SS-20 to an SS-16 ICBM. In view of the evidence that the SS-20 force is a replacement for existing Soviet MRBM and IRBM forces, we think it highly unlikely that the Soviets would plan to modify it for use against the United States.

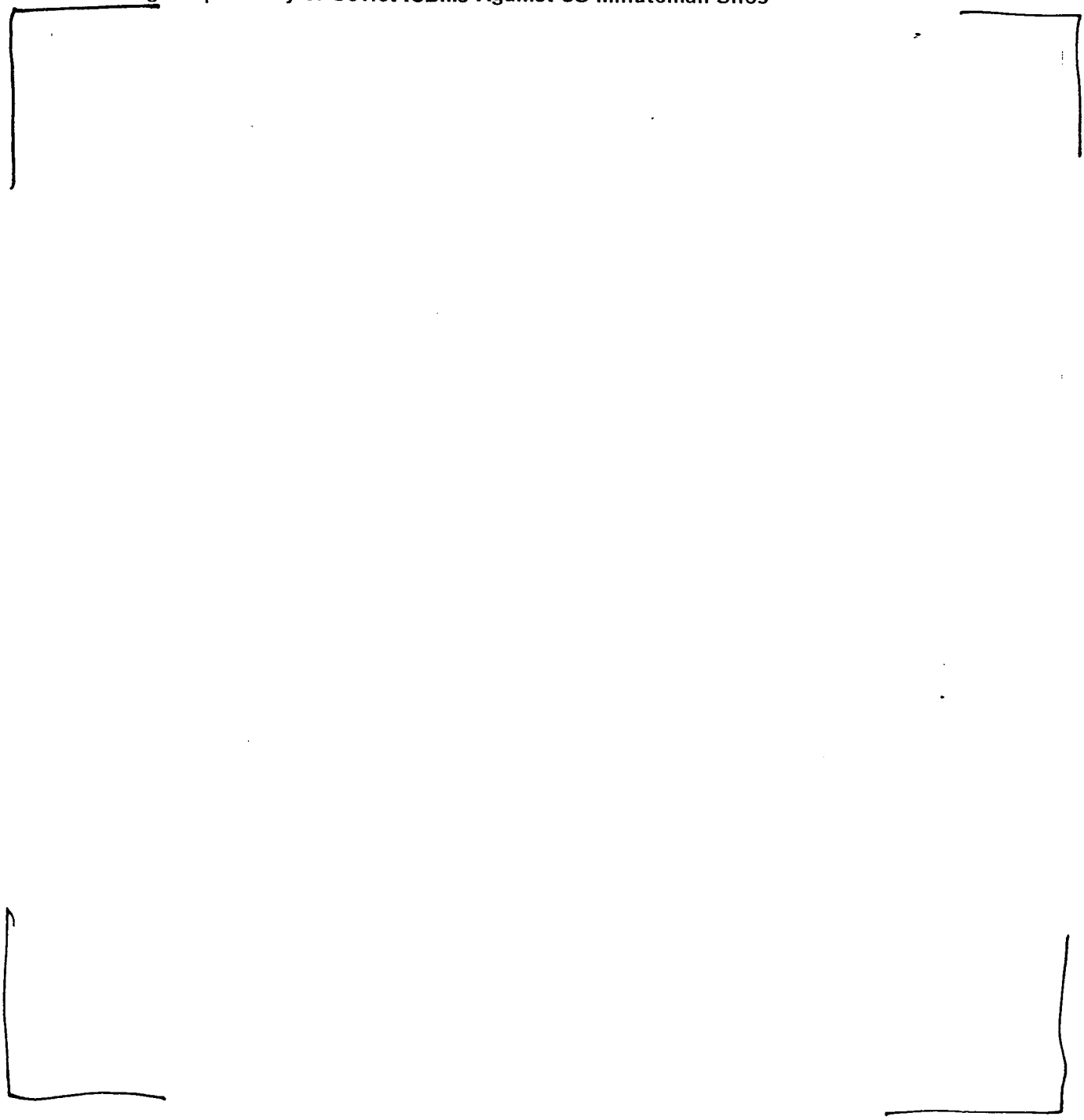
Submarine-Launched Ballistic Missiles

24. The USSR has a large, versatile, and flexibile SLBM force for use against a broad range of soft targets, primarily in the United States. (Figure 5 shows characteristics of the principal Soviet SSBNs and SLBMs.) As of 1 January 1978, the Soviets had 950 SLBM launchers on 69 nuclear-powered ballistic missile submarines and on two diesel submarines modified to carry modern missiles. Of these, 62 modern SSBNs and all of the 950 SLBM launchers were SALT accountable—exactly the ceiling permitted the USSR under the Interim Agreement. (The Soviets also have 18 diesel submarines equipped with 54 launchers for older SLBMs. Neither the submarines nor the launchers are SALT accountable.) Eight units of the new version (D-III) of the latest class of SSBN have been launched—six are operational and two are fitting out. These units carry a total of 128 launchers for the Soviets' first MIRVed SLBM, the SS-NX-18, which is now or soon will be operational. SALT limitations aside, the Soviets will have a force of 1,030 modern SLBMs and 67 modern SSBNs by about 1980, when the few D-class units remaining in the construction pipeline have become operational. The present informal extension of the Interim Agreement may have delayed the start of sea trials of one D-III and could delay sea trials of one or more others.

[1] *The holder of this view is the Assistant Chief of Staff, Intelligence, Department of the Air Force.*

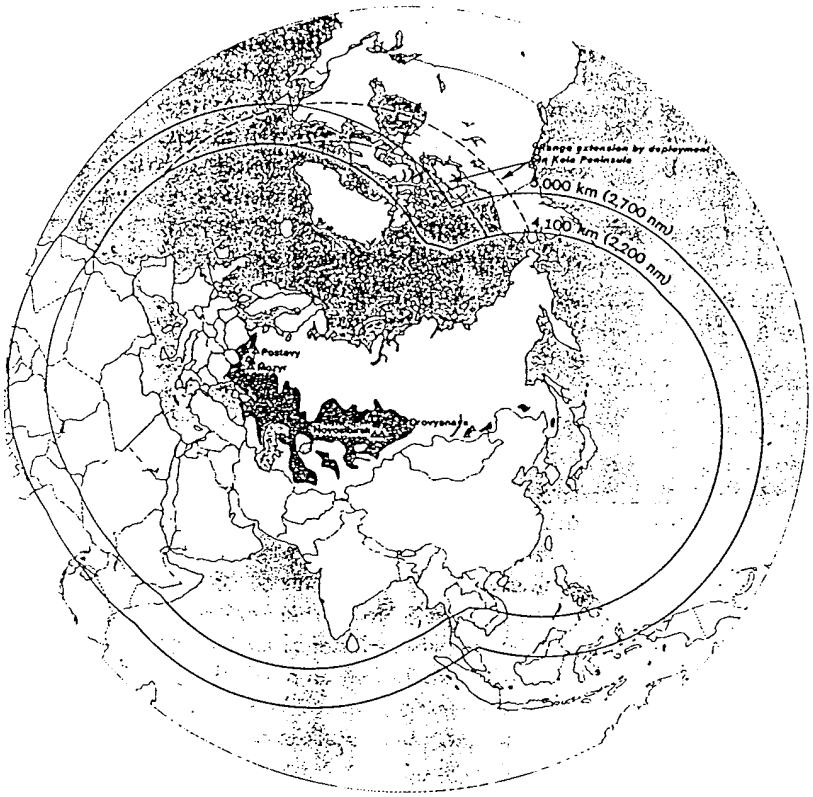
Figure 3

Damage Expectancy of Soviet ICBMs Against US Minuteman Silos*

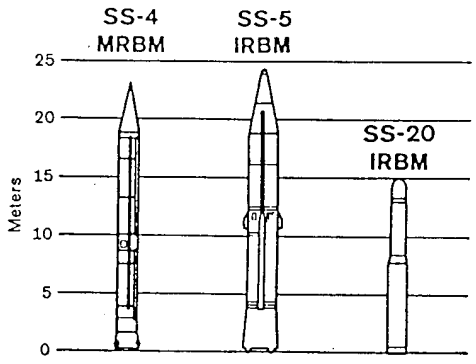


Likely Deployment Areas and Target Coverage of SS-20

Figure 4



Estimated Characteristics of Soviet MRBMs and IRBMs



	SS-4 MRBM	SS-5 IRBM	SS-20 IRBM
Number of RVs	1	1	3 MIRVs
Yield (each RV)			
CEP	2,300 m (1.2 nm)	1,100 m (0.6 nm)	375 m (0.20 nm)
Operational mode	Soft pads or quadruple silos	Soft pads or triple silos	Mobile
Year operational	1958	1961	1977

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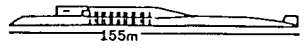
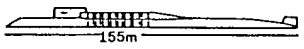
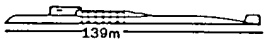
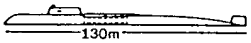
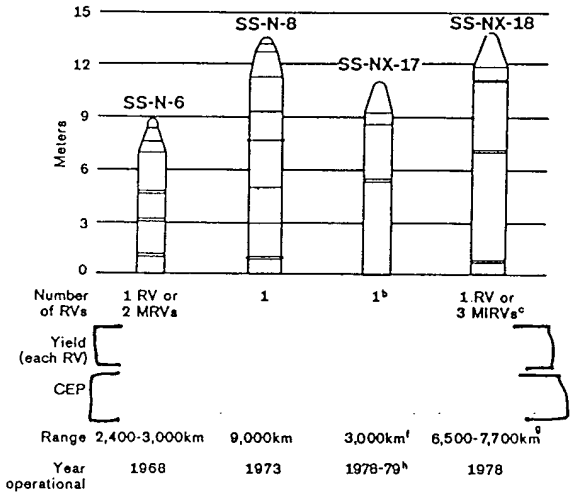
Figure 5

Estimated Characteristics of the Principal Soviet SSBNs and SLBMs

Class	Year operational	Missile
D-III 	1977[a]	16 SS-NX-18
D-II 	1975	16 SS-N-8
D-I 	1973	12 SS-N-8
Y-I 	1968	16 SS-N-6 (12 SS-NX-17 with major modifications)



[a] We estimate that the D-III SSBN reached operational status in 1977 even though the SS-NX-18 SLBM was not yet operational.

[b] Only one RV has been tested to date. Capability may exist for up to three MIRVs.

[c] Only two RVs have been tested to date with the MIRVed version.

[f] This is booster range capability only.

[g] See text for a discussion of the status of the SS-NX-17 and its potential for deployment.

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25. The Soviet Navy continues to maintain only a small number of SSBNs—normally about seven—on operational patrol at any given time. But patrol procedures are being diversified, evidently to enhance the flexibility and survivability of the force. In addition, since the missiles on D-class submarines can reach the United States from the vicinity of their home ports, the number of Soviet SLBMs within firing range of the United States on a day-to-day basis has increased as D-class units have become operational. (See figure 6.) We do not expect the Soviets to increase the numbers of modern SSBNs continuously on patrol by more than one or two units within the next several years. The operations of the older G- and H-class submarines probably will continue to be limited to occasional open-ocean patrols or local operations. These submarines probably are assigned peripheral targets in Western Europe and the Far East.

26. [redacted]

Future Ballistic Missile Systems

27. Improvements in Soviet ballistic missiles will not stop with the current systems. A modified SS-18 Mod 2 MIRVed ICBM (called the SS-18 Mod 4) was tested for the first time late in 1977. In addition, [redacted] new or modified ICBMs evidently are sufficiently far along in R&D to begin flight-testing within the next few years. Modification of silos at the Tyuratam missile test center begun in the past year indicates that, SALT limitations aside, flight-testing of three of these systems is scheduled to begin within a year or so. We believe that these and other new Soviet ICBMs will incorporate improvements in many technical areas, particularly in accuracy.

[redacted]

Figure 6

Potential Soviet SSBN Deployment Areas and Coverage of US Targets

Y-class patrol area

Portions of North America covered by SS-N-6 missiles fired from Y-class patrol areas

D-class patrol area

Area from which D-class submarines have complete coverage of the United States with SS-N-8 missiles–assuming 9,000-km range

Area from which D-class submarines have partial coverage of the United States with SS-N-8 missiles–assuming 9,000-km range

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[redacted]

28. We also believe that new ICBM systems beyond those we have identified to date are being developed for flight-testing within the next 10 years.[redacted]

[redacted]Not all missiles developed and flight-tested will necessarily be deployed. (For a summary of estimated Soviet strategic nuclear land- and sea-based ballistic missile developments through the mid-1980s, see table 1.)

29. We continue to accumulate evidence that a new, large SLBM is being developed and that an associated new, large ballistic missile submarine is being built. This new SSBN/SLBM system could reach initial operational capability (IOC) by about 1981 at the earliest. A weapon system IOC date of 1982 is believed more likely; this is two years later than forecast last year. The Soviets continue to develop a solid-propellant SLBM, the SS-NX-17, using an extensively modified Y-class submarine. This SLBM could be installed in additional such SSBNs if they are

Table 1

Estimated Future Soviet Strategic Ballistic Missile Testing Programs Through the Mid-1980s [a]

[redacted]

ICBMs	
Modified SS-16 (first test in 1978)	
Medium-size, solid-propellant ICBM [b] (1978 or 1979)	Modified or follow-on SS-19 (1981 or 1982)
Medium-size, liquid-propellant ICBM [b] (1978 or 1979)	Possible new liquid-propellant ICBM (size class uncertain) (mid-1980s)
Large liquid-propellant ICBM (follow-on to SS-18) [b] (1978 or 1979)	
Modified or follow-on SS-17 (1980 or 1981)	
IRBM	
	Modified SS-20 (before 1980)
SLBMs	
New large SLBM (1978 or 1979)	Follow-ons to SS-N-6 and/or SS-N-8 (early 1980s) [c]

[a] These projections are [redacted] without considering possible SALT II limitations.

[b] [redacted]

[c] *The Director of Naval Intelligence, Department of the Navy, believes that the SS-NX-17 is the intended SS-N-6 follow-on system.*

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comparably modified. The Soviets could develop and deploy follow-on missiles for retrofitting into Y- and D-class SSBNs in the 1980s.

30. None of the SLBM systems currently deployed or being tested have or are expected to attain the accuracy and yield combination needed to threaten US hard targets. In the mid-1980s the Soviets probably will have SSBN navigational and SLBM guidance systems on a par with those currently employed by the United States. It is unlikely, however, that any operational Soviet SLBM system will have the combination of accuracy, yield, and numbers of warheads sufficient to present a threat to large numbers of hard targets during the period of this Estimate.

Long Range Aviation

31. As of 1 January 1978, Long Range Aviation (LRA) included some 85 Bison and 105 Bear aircraft (of which about five Bears are configured as reconnaissance aircraft and 35 Bisons as tankers) and about 40 Backfire bombers. The remainder of the LRA force consists of 620 Badger and Blinder intermediate-range bombers. (Figure 7 shows key characteristics of LRA bombers.) We continue to believe that over the next 10 years the Soviets will retain a relatively small intercontinental bomber force to complement their large ICBM and SLBM forces and that they will maintain a sizable intermediate-range bomber force. The intercontinental bomber force probably would be used to follow up initial ballistic missile attacks on the United States, with strikes primarily against preassigned targets. The intermediate-range bombers would be used primarily for strikes against targets in Europe and Asia.

32. The Backfire bomber continues to be deployed to Long Range Aviation and Soviet Naval Aviation (SNA) units. As of 1 January 1978, some 125 Backfires had been built, and production had increased as expected to a rate of about 2.5 aircraft monthly. Assuming a normal production learning curve and no change in the present allocation of plant capacity, we believe the Soviets could complete somewhat more than 500 Backfires by mid-1987. If under a SALT II agreement they maintain the current production rate, some 400 aircraft would be completed by then. We believe that future Backfire deliveries will be about evenly divided between LRA and SNA.

33. No new evidence which would have helped to resolve our uncertainties regarding the Backfire's performance has been acquired during the past year, and the differences of opinion within the Intelligence Community have not been narrowed. Differing interpretations of the available evidence and differing technical assumptions made by the concerned agencies result in estimates which range from an aircraft capable of intercontinental operations without air-to-air refueling to one with marginal intercontinental capabilities under the same conditions. Although extensive reanalysis has been performed and efforts to resolve the differences will continue, we are not confident that we will be able to narrow the differences significantly, nor are we confident that we will acquire additional information in the next year or so that would resolve the issue. (Figure 7 shows the results of the differing technical analyses within the Intelligence Community.)

34. All Backfires observed to date have refueling probes. Air-to-air refueling operations with Bison tankers were conducted as part of the Backfire test program, [ ] The use of air-to-air refueling would enhance the Backfire's capabilities for peripheral attack and naval missions and considerably increase its capability for intercontinental operations, even in the case of the lower estimate of its performance. Recent evidence supports the view that a new aerial tanker is being flight-tested and may be in production; the aircraft which it will refuel is not known.

35. There is no direct evidence about current or future Soviet intentions to employ the Backfire in intercontinental operations. We believe that it is likely that Backfires will continue to be assigned to theater and naval missions and that it is correspondingly unlikely that they will be assigned to intercontinental missions. We cannot exclude the possibility that some portion of a growing Backfire force would be employed against targets in the United States, although it is more likely that a new intercontinental bomber would be deployed for such use. If the Soviets decided to assign a substantial number of Backfires to intercontinental attack, they almost certainly would upgrade the range and radius performance of the aircraft or deploy a force of compatible new tankers to support them.

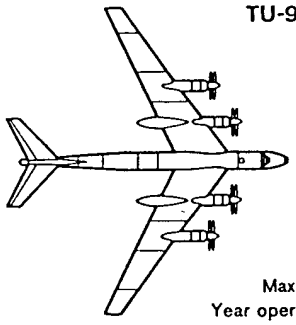
36. A divergent view is that the available evidence on employment of the Backfire indicates only that peripheral and naval attack are its current primary missions. Since the Soviets could use the Backfire's intercontinental capabilities at their initiative, this view holds that the Backfire clearly poses a threat to the United States, even without the deployment of a

Figure 7

Soviet Long-Range and Intermediate-Range Bombers

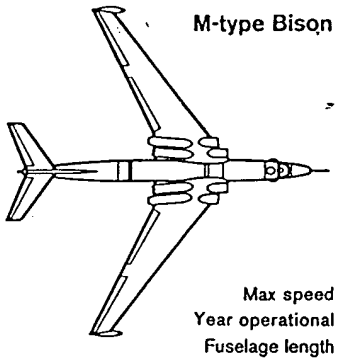
Drawings approximately to scale

TU-95 Bear



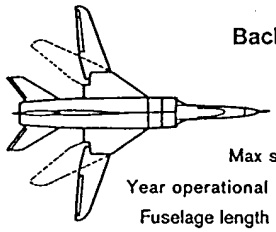
Max speed 500 kn
Year operational 1956
Fuselage length 44 m

M-type Bison



Max speed 540 kn
Year operational 1956
Fuselage length 47 m

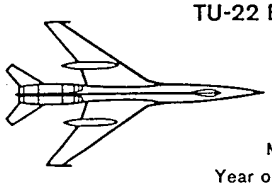
Backfire



	CIA Assessment	DIA/Army/Air Force Assessment
Max speed	1,050 kn	1,150 kn

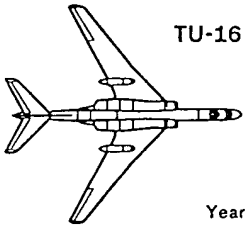
Year operational 1974
Fuselage length 39 m

TU-22 Blinder



Max speed 1,030 kn
Year operational 1962
Fuselage length 39 m

TU-16 Badger



Max speed 540 kn
Year operational 1954
Fuselage length 35 m

Capabilities for High-Altitude Subsonic Mission[a]
—values are in nautical miles (and kilometers)—

	Unrefueled		One Refueling	
	Radius	Range	Radius	Range
Bear A Bomber	4,500 (8,300)	8,800 (16,300)		
Bear ASM Carrier[b]	3,950 (7,300)	7,150 (13,200)	5,050 (9,350)	9,200 (17,000)
Bison B/C Bomber	3,050 (5,650)	5,950 (11,000)	4,150 (7,700)	7,900 (14,600)
Backfire Bomber[c,d]				
CIA	1,825-2,150 (3,380-3,980)	3,525-4,150 (6,500-7,700)	2,825-3,200 (5,230-5,900)	5,475-6,225 (10,000-11,500)
DIA/Army/Air Force	2,900 (5,370)	5,400 (10,000)	4,000 (7,400)	7,500 (14,000)
Badger Bomber[e]	1,550 (2,870)	2,950 (5,460)	2,200 4,100)	4,150 (7,700)
Blinder Bomber[e]	1,700 (3,150)	3,250 (6,000)	2,350 (4,350)	4,450 (8,240)

[a] For aircraft with bombs, with one exception, the combat range and radius have been normalized with a 4,500-kg payload. The DIA/Army/Air Force assessment of the Backfire assumes a 9,400-kg payload.

[b] Assumed payload is one AS-3 weighing 11,000 kg.

[c] Backfire aircraft can also carry ASMs. See volume II for the Backfire's range and radius with ASMs.

[e] Badger and Blinder ASM carriers are also in the Soviet inventory, but for purposes of this Estimate only the capabilities of the bomber versions are shown.

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compatible tanker force or the upgrading of the aircraft's performance.[2] There is an additional view that Soviet planners will devise Backfire missions to use the full capability of the aircraft. Consequently, in this view, at least part of the Backfire force will have preplanned missions against targets in the contiguous United States.[3]

37. As we noted last year, there is limited evidence that the Soviets have a new long-range bomber in the preflight stage of development, although a prototype has not been observed and no flight-testing has been detected. If a new bomber prototype were completed in the near future and if the Soviets followed past procedures, the first unit might be operational in the early 1980s. Such limited evidence as we have suggests that about 1983 would be more likely, but there is considerable uncertainty as to whether the Soviets will actually deploy a new intercontinental bomber.

Long-Range Cruise Missiles [4]

38. The Soviets have considerable experience in the development and deployment of cruise missiles, mostly with ranges of less than 600 kilometers, for a variety of tactical and some strategic applications. In 1960 they began to equip LRA Bear bombers with the large AS-3 air-to-surface missile (ASM). [redacted] the maximum system range of the AS-3 is estimated to be about 680 kilometers, which could make it a SALT-accountable air-launched cruise missile (ALCM). It should be noted, however, that [redacted] the Soviets may argue that it is not SALT accountable.

39. Efforts by the Soviets in SALT to impose tight constraints on long-range cruise missiles suggest that they believe that US deployment of large numbers of such systems would severely stress their air defense, that the present technological advantage in such systems rests with the United States, and that geographical and other asymmetries between the United States and the USSR make cruise missile limitations favorable to them. The Soviets do not appear to have strong military reasons to develop cruise missiles with ranges on the order of 2,500 kilometers for use against the United States, although they might find them useful for peripheral missions.

40. Countervailing considerations could at some stage persuade the Soviets to develop and deploy new, long-range ALCMs. If evolving SALT limitations leave the USSR with the option to deploy some number of ALCM carriers at no sacrifice in other weapons (as now seems likely), this could contribute to a Soviet decision to develop and deploy new long-range ASMs. Thus, it is possible that some portion of the Soviet intercontinental bomber force may be equipped with such missiles.

41. If the Soviets decide to add long-range cruise missiles to their arsenal in the near term, they could do so in two ways, either of which could result in cruise missiles with hard-target capabilities. They might modify any one of six existing air- and sea-launched cruise missiles. Such a modified system could be operational by the early 1980s. Alternatively, by the early to mid-1980s they could deploy a new, large long-range cruise missile. Recent evidence indicates that the Soviets are preparing to test one or more new cruise missile systems which may have ranges in excess of 600 kilometers, but our information is insufficient to determine whether any will have such a range capability or to determine their intended missions or launch platforms. We believe that small, highly accurate, long-range cruise missiles similar to US designs could not be deployed before the 1985-90 period.

D. Developments in Strategic Defenses

Ballistic Missile Warning and Defense

42. The Soviets have completed the deployment of their original series of ballistic missile early warning (BMEW) detection and tracking radars. Work is now in progress on four new, large phased-array radar facilities which will expand and improve BMEW coverage of the current missile threat as well as close a possible future gap in coverage. (See figure 8.) The Soviets also are working on two additional attack warning systems, one comprising over-the-horizon radars and the other infrared launch detection satellites. We believe that, in combination, these two additional systems will provide reliable launch detection of a US ICBM attack, but they are incapable of providing the accurate tracking data obtainable from the conventional BMEW radars.

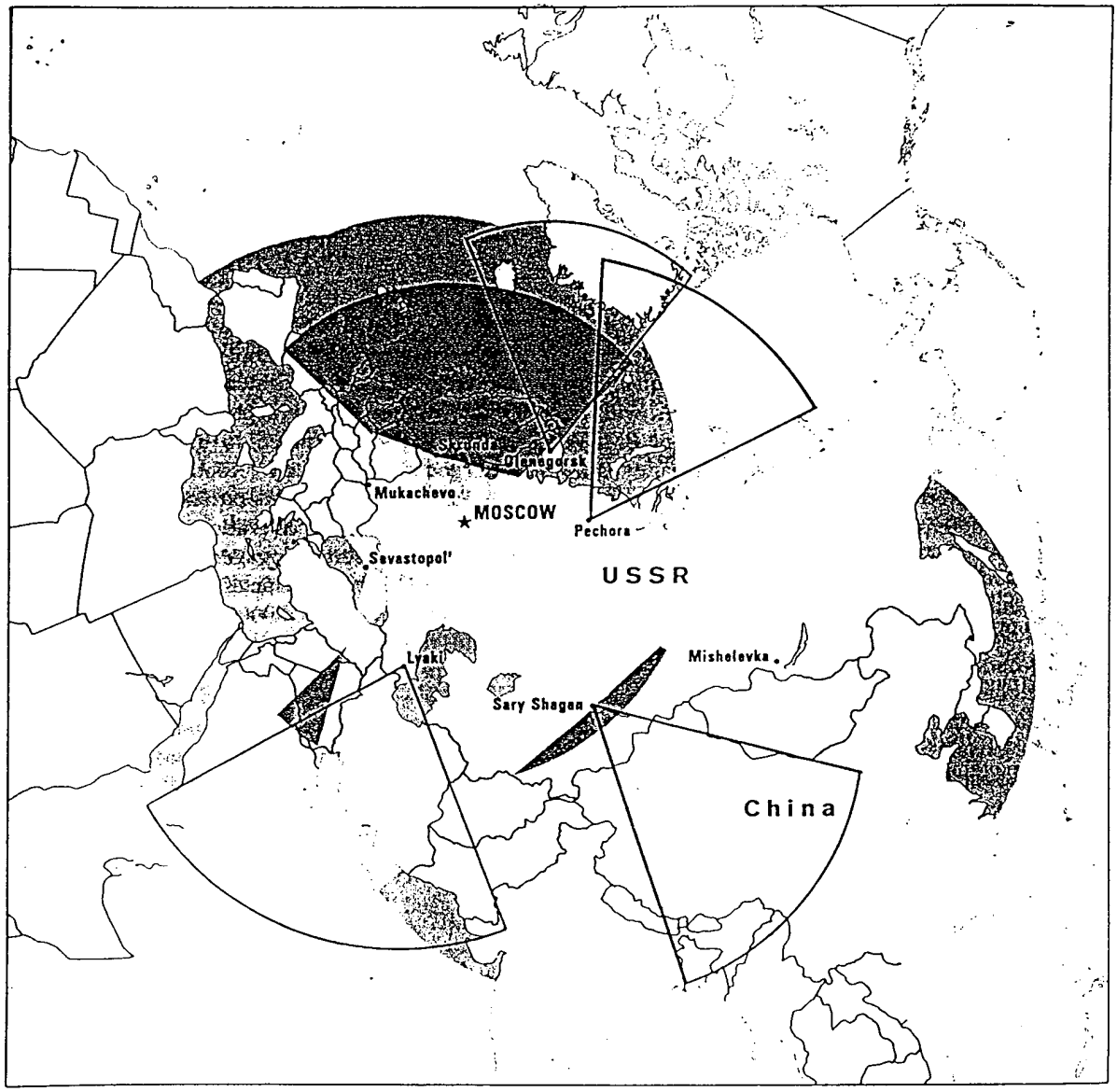
[2] *The holders of this view are the Director, Defense Intelligence Agency; the Senior Intelligence Officer, Department of Energy; the Assistant Chief of Staff for Intelligence, Department of the Army; and the Assistant Chief of Staff, Intelligence, Department of the Air Force.*

[3] *The holder of this additional view is the Assistant Chief of Staff, Intelligence, Department of the Air Force.*

[4] For purposes of this discussion, long range means in excess of 600 kilometers (320 nautical miles)—a distinguishing range limitation used in SALT.

Figure 8

Coverage of Soviet Ballistic Missile Detection and Tracking Radars



Present early warning radar coverage

Moscow battle management radar coverage

Estimated coverage of new phased-array radars under construction

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43. The orientations and locations of all of the four new phased-array radar facilities are consistent with previous Soviet deployment of BMEW radars. They are located on the periphery of the USSR and are directed outward. We are concerned, however, that in addition to the BMEW role, the new radars could be given the capability for ABM battle management—that is, the capability to provide tracking and prediction data to support the operation of an antiballistic-missile system. We believe that at least two of the facilities could be given this technical capability. The other two are colocated with existing BMEW radars, which are vulnerable to blackout by nuclear explosions, and apparently will operate in conjunction with them. For this reason, there is considerable question whether these other two new facilities could have a viable ABM battle management capability. A divergent view is that all four of the new facilities have been designed to acquire data of sufficient quality to use for battle management purposes and will be capable of operating independently of existing BMEW radars. In this view, all four could provide battle management information for future, widespread ballistic missile defenses.[5]

44. We expect more radars of one or both types to be constructed. With the kinds of data we can acquire, we are not likely to learn positively whether such radars are designed specifically to perform ABM battle management functions. If they are, they could constitute long leadtime preparations to support a future option to deploy an ABM system that requires battle management data.

45. **ABM Research and Development.** Research and development activity at the Sary Shagan missile test center includes an ABM system (ABM-X-3) which offers the possibility of much more rapid deployment than the present Moscow ABM system (that is, a site could be fielded in months rather than years). Its present interceptor does not have sufficient acceleration to await atmospheric filtering of penetration aids before its launch. The interceptor may be capable of loitering to allow extra time for discriminating penetration aids[

]

46. Despite the limitations of the ABM-X-3 system, all agencies agree that, with the present interceptor, it would have a capability against reentry vehicles with large radar cross sections (such as those carried on current Western SLBMs, IRBMs, Titan ICBMs, and Chinese ICBMs), provided that battle management data were supplied to it. There is disagreement over whether it would have any capability against US Minuteman ICBMs.[

]

47. The Soviets may intend to employ a high-acceleration missile with the ABM-X-3 system.[

] flight tests of such a missile have occurred since mid-1976. If the Soviets incorporate the high-acceleration missile into the ABM-X-3 system and modify the engagement radar, they would probably need about five years for development and testing. An alternate view is that such development and testing could require as few as three years.[6] The system would have an improved capability against current ballistic missile reentry vehicles, including those accompanied by chaff. The capability of the improved system against ICBMs using advanced penetration aids cannot be judged on the basis of present evidence and analysis.

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[5] *The holders of this view are the Director, Defense Intelligence Agency, and the Senior Intelligence Chiefs of each of the three Services.*

[6] *The holder of this view is the Director, Defense Intelligence Agency.*

48. There is evidence at Sary Shagan of renewed interest in silos which appear to be intended for the protection and launching of ABM interceptors—possibly the high-acceleration missile. The silos may be integrated into the ABM-X-3 system, in which case they would considerably increase the time required to deploy an individual site. However, these silos may also foreshadow a new ABM system.

49. Other developments at the Sary Shagan missile test center include [ ] These developments may or may not be ABM related. One interpretation is that each of the above activities probably is part of a major Soviet ABM research and development effort. [ ] According to this view, [ ] provide clear evidence that the USSR has a vigorous, diverse, and high-priority ABM program.[9] Another interpretation [ ] holds that [ ] the best indicator of the status and vigor of the Soviet ABM program is the ABM-X-3 effort, which has been slow and uneven for the past three years.[10]

50. The size and number of the activities at Sary Shagan represent a major Soviet investment in defense-related R&D. If all or even most of these activities are ABM related, the Soviet ABM effort is much greater than otherwise indicated. Other than the ABM-X-3, however, the major activities now under way at Sary Shagan do not appear to represent the development of rapidly deployable equipment.

[9] *The holders of this view are the Director, Defense Intelligence Agency, and the Senior Intelligence Chiefs of each of the Services.*

[10] *The holder of this view is the Central Intelligence Agency.*

Antisatellite Systems

51. The Soviets have continued to improve the performance of their nonnuclear orbital antisatellite (ASAT) system. We believe that this system has been capable of use against US satellites in low- and medium-altitude orbits since the early 1970s. A new phase of testing which began in 1976 has demonstrated increased operational flexibility. During the coming decade, we expect the Soviets to undertake other efforts to improve the capabilities of their orbital interceptor, which could include nonnuclear intercepts of satellites in semisynchronous and synchronous orbits. The Soviets are believed now to have a laser at Sary Shagan which could damage some US reconnaissance satellites. They are expected to continue work on both ground-based and space-based lasers for antisatellite applications. Finally, existing and future Soviet electronic warfare facilities could be used against certain US satellites with some degree of success.

Strategic Air Defense

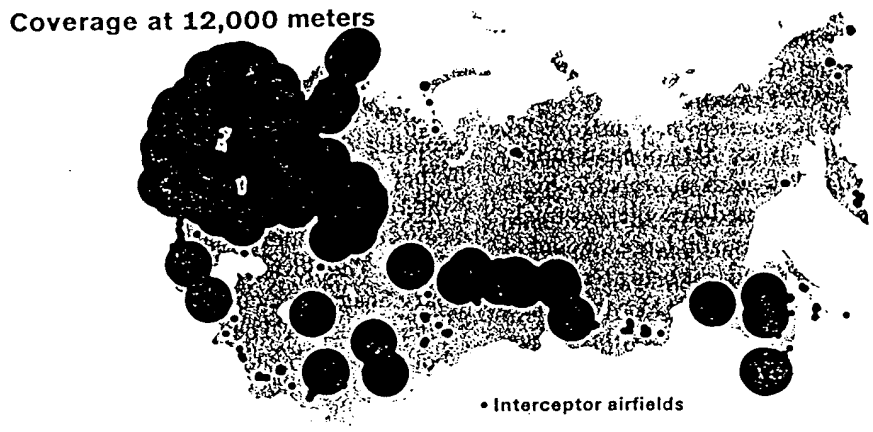
52. The Soviet strategic air defense force currently has more than 7,000 early warning and ground-controlled intercept (GCI) radars located at some 1,200 radar sites, slightly more than 2,600 interceptor aircraft stationed at about 80 airfields, almost 10,000 surface-to-air missile launchers deployed at fixed launch sites, and about 375 ground-based jammers. (Figure 9 shows current SAM coverage and interceptor bases in the USSR.) We believe that, during a crisis, the Soviets would assign available tactical forces to strategic air defense tasks, but they probably would not rely heavily on such forces because they have a competing primary mission. Tactical air defense assets within the USSR include about 800 mobile SAM launchers, 1,300 fighter interceptors, and about 375 ground-based jammers.

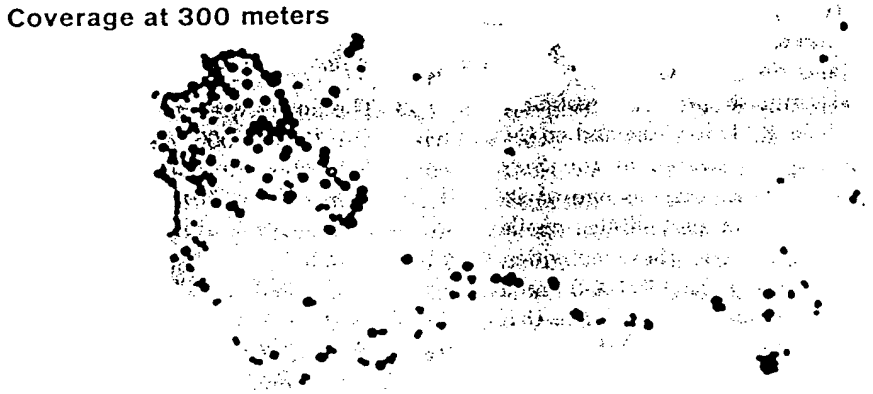
53. The Soviets have not yet devised an effective defense against the US low-altitude bomber threat, even though it has existed for more than a decade. Soviet writings and exercises of recent years show that the Soviets, facing not only US but third-country threats, have been expecting aerodynamic attackers at all altitudes. Moreover, the development of an effective, large-area, low-altitude air defense is technologically very difficult.

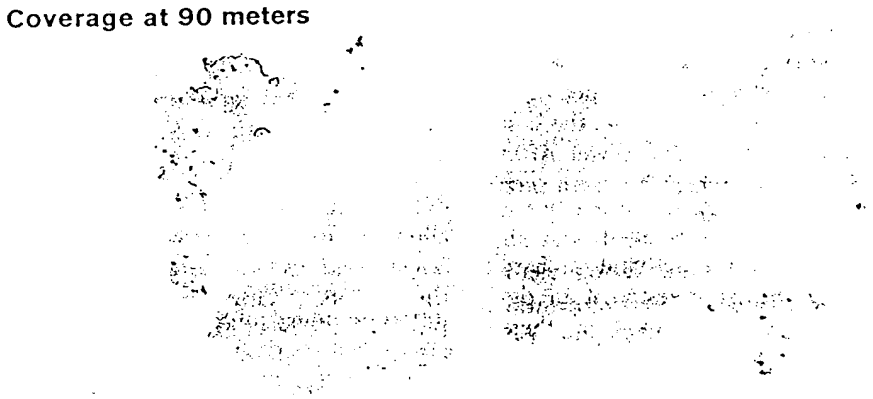
54. We judge that present Soviet defenses have a good capability against attacks by aircraft at medium and high altitudes. Against low-altitude threats, the defenses have a number of deficiencies, including gaps in radar coverage, deficiencies in GCI equipment and

Figure 9

Soviet Strategic SAM Coverage and Interceptor Bases







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an insufficient number of GCI sites, lack of a lookdown AWACS (airborne warning and control system), lack of a lookdown/shootdown interceptor, and poor low-altitude SAM coverage and performance. The new US cruise missile programs will probably cause the USSR to intensify its efforts to combat the low-altitude threat. Nevertheless, the Soviets foresee a mix of US strategic bombers and cruise missiles, forward-based systems, and third-country forces which will not let them concentrate exclusively on one aspect of the threat, however critical.

55. Known and possible future Soviet developments include the following:

- New ground-based air surveillance radars have been under development since 1972, but we have no indication that any of them are in production. These radars probably will provide better tracking data more effectively than existing air defense radars. New GCI and command and control equipment will continue to be deployed.
- An alternative or a supplement to widespread GCI improvement would be the introduction of an AWACS that could detect, track, and direct interceptors against targets at all altitudes over both land and sea. There is evidence of Soviet development of a large, airborne surveillance radar which could indicate an AWACS development effort. We believe that the Soviets might be able to deploy an AWACS capable of detecting targets over water in the early 1980s. A more advanced, overland AWACS could probably not be deployed until the mid-1980s.
- A modified version of the Foxbat high-altitude interceptor is under development. Its demonstrated weapon system performance against targets flying below it is superior to that of the Flogger interceptor, but the system still falls short of the lookdown/shootdown capability of modern US interceptors. We anticipate that the modified Foxbat will first become operational in about 1980. Future versions of the Flogger may be fitted with the same or a similar radar system.
- The Soviet technology base should be adequate to support the development and deployment of a new long-range fighter with a lookdown/shootdown capability comparable to that of current US equipment in the mid-1980s.
- The Soviets are developing a new strategic SAM system, the SA-X-10, with low-altitude capabilities. Previously, we projected the initial deployment of this system in 1980; we now estimate that deployment could begin as early as 1979. The SA-X-10 as currently configured will have capabilities against low-altitude bombers and could have some capability to engage cruise missiles. It probably will have no capability against SRAMs.

Defense Against Ballistic Missile Submarines

56. The development of an effective defense against the US SSBN force is a major Soviet objective. In recent years the USSR has been increasing the size and improving the quality of its antisubmarine warfare forces. Nevertheless, these forces still do not have a long-range submarine detection capability, they lack sufficient short-range reconnaissance systems to search rapidly the potential US SSBN patrol areas, and they are unable to track a US SSBN over a long period even if it is detected.

57. To help overcome these deficiencies, the Soviet Navy has been developing a number of nonacoustic techniques for detecting and tracking submarines by their wakes. [redacted] The Soviet Navy is also testing a passive acoustic linear array. We believe that this testing could lead to the initial deployment of towed-array sonar systems by the early 1980s. There appears to be little Soviet effort to develop a fixed acoustic system, similar to the US SOSUS system, to monitor submarine movements continuously throughout likely areas of US SSBN operations. Soviet ocean surveillance efforts will probably focus on the use of many platforms and sensors with relatively short-range detection capabilities, rather than on the use of fewer systems with a broad ocean surveillance capability.

Civil Defense

58. Soviet civil defense is an ongoing, nationwide program under military control. It is focused primarily on protection of people—the leadership, essential personnel, and the general population, in that order—continuity of economic activity in wartime, and recovery from the effects of a US nuclear attack. (See figure 10 for a listing of Soviet civil defense objectives and priorities.) While it is not a crash effort, the pace of the program, as indicated most clearly by shelter construction starts in urban areas, increased beginning in the late 1960s, and improvements have been made

Objectives and Priorities of Soviet Civil Defense

Figure 10

Program Objectives	Priority Tasks
Protection of Human Resources	Sheltering and Relocation of the Leadership
	Sheltering and Dispersal of Essential Workers
	Sheltering and Evacuation of Urban Population
	Stockpiling Food and Medical Supplies
Continuity of Economic Activity In Wartime	Integration of Civil Defense and Economic Mobilization Plans
	Rapid Shutdown of Industrial Facilities
	Permanent and Hasty Hardening of Installations and Equipment
	Crisis Relocation of Economic Enterprises
	Stockpiling Reserves of Materials
	Geographic Dispersal of Industry
"Liquidation of Consequences of Enemy Attack"	Preparation of Military and Civil Defense Formations
	Training in Rescue and Recovery
	Preparations for Distribution of Food and Essential Supplies

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in virtually all facets of the program. However, the program has been marked by wide variations from area to area and year to year, in both the rate of shelter construction and the total number of shelters, by bureaucratic difficulties, and by apathy toward civil defense by a large segment of the population. Most progress has been made in providing shelters for the leadership and essential personnel.

59. While total civil defense costs are unknown, cost estimates have been made of three major elements of the Soviet program: about 117,000 full-time civil defense personnel, operation of specialized civil defense military units, and shelter construction. The cost of these elements in 1976 amounted to about 400 million rubles, less than 1 percent of the estimated Soviet defense budget. If the Soviet program were to be duplicated in the United States, it would have cost about $2 billion in 1976, with about three-fourths of this representing manpower costs. These cost estimates are at best very rough.

60. Programs for protection of the leadership appear to be well advanced. At the present time most, if not all, of what we estimate to be an essential core of leadership elements at all levels (about 110,000) could be accommodated in command post shelters. Counting all shelters, including those found at economic installations to protect the work force and in residential areas, we estimate that a minimum of 10 to 20 percent of the total urban population could be sheltered at present. Despite the scope and pace of shelter construction, large-scale evacuation away from target areas remains the key to any marked reduction in the number of casualties.

61. We estimate that Soviet measures to protect the economy could not prevent massive damage from a US attack designed to destroy Soviet economic facilities. The Soviets have made little progress in protecting industry by hardening and geographic dispersal. The program for dispersal of industry appears to be offset by a contrary tendency for investments in new facilities to be inside or near previously existing installations. The Soviets appear to have given greater emphasis to sheltering and dispersal of essential personnel and equipment, and to rapid shutdown of facilities. These and other measures could contribute to maintaining and restoring production after an attack. We have not, however, analyzed the Soviet potential for recovery.

62. The effectiveness of civil defense in reducing casualties and in coping with the postattack period would depend primarily on the time available to make final preparations before an attack. Using the results of

analysis postulating a single-wave attack in which some 2,200 US weapons were used to destroy selected economic targets, we estimate that:

- Under the most favorable circumstances, including about a week to evacuate cities and to protect the evacuated population, Soviet civil defenses would reduce casualties from prompt effects and early fallout to about 20 million and would assure survival of a large percentage of the leadership elements. With only a few days' preparation, prompt casualties could be about 50 million.
- Under worst conditions, with only a few hours or less to make final preparations, prompt casualties would exceed 120 million. Many leaders would probably be able to reach shelter.
- The critical time for preparation appears to be about two or three days, during which the Soviets would have to evacuate their urban population to have any hope of averting massive losses.
- While a large percentage of essential personnel sheltered at economic facilities would probably survive a US attack, the Soviets could not prevent massive industrial and economic damage.

The casualty levels noted above could rise if the United States attacked while an evacuation was in progress, increased the number of targets, stretched out the attack over a longer period, structured the attack to produce more fallout, or if an evacuation was less expeditious than planned or was impeded by adverse weather or transporation deficiencies. In assessing the protection provided by their civil defenses, the Soviets would take account of these uncertainties.

Advanced Technology

63. There are several fields of advanced technology which hold promise for solving deficiencies in current Soviet air, missile, and space defense systems. Of particular note are the fields of lasers and particle-beam weapons (PBW). High-energy lasers are probably the closest to being available for weapons. One Soviet laser facility may now possess the capability to inflict damage to some low-orbiting satellites. Orbital antisatellite laser capabilities are possible in the mid- to late 1980s. We estimate that the development of a Soviet laser with sufficient capability to destroy ballistic missile RVs is at least 10 years away, if feasible at all. While the Soviets could deploy ground-based or airborne laser weapon systems for air defense during the period of this Estimate, we do not believe that such systems would markedly improve their overall defenses.

64. In last year's Estimate, we stated that we had no convincing evidence that the Soviets were embarked on a PBW program. Although we still believe the Soviets are far from developing a weapon, there is now evidence of a research effort for which the most likely explanation is particle-beam weapon research. Judging by US PBW investigations to date, we are uncertain whether such weapons are feasible. We believe that, if a Soviet PBW concept showed technical feasibility, the earliest that a short-range system prototype could be available for testing would be the late 1980s. A divergent view is that a prototype of a short-range system would be possible a few years sooner, if technical feasibility were proved by 1980.[11]

E. Operational Factors

Warning and Readiness

65. We have evidence that the Soviets can monitor and interpret enemy force postures, alterations of the political situation, and [redacted] sufficiently well to recognize the changes that Soviet doctrine anticipates would likely precede an enemy attack. They probably would not be able, however, to differentiate confidently between US preparations for a limited and those for a large-scale nuclear attack, because preparations for both would be virtually identical.

66. Despite these capabilities, Soviet force developments [redacted] suggest that the Soviets are not confident that strategic warning would be timely enough in all cases to allow for necessary preparations before the start of a nuclear war. This possibility underwrites the continuing development of the Soviet tactical warning system. Present ballistic missile early warning radars can provide Moscow up to 13 minutes' warning of ICBM reentry vehicles and from 10 to 15 minutes' warning of SLBM RVs targeted against Moscow. Existing radar coverage can provide about 30 minutes' warning of attack against the Soviet landmass by US bombers. The USSR's new launch detection systems are designed to increase warning of an ICBM attack to about 30 minutes and possibly could add about two hours to the warning time of bomber attacks along some penetration routes.

67. Although most Soviet strategic forces are routinely maintained at readiness levels below those of US

[11] *The holder of this view is the Assistant Chief of Staff, Intelligence, Department of the Air Force.*

forces, newly available evidence and further analysis indicate that significant portions of the Soviet ICBM force are capable of quick reaction. Within the time provided by current Soviet tactical warning systems, ICBMs with that capability could be launched before the impact of enemy weapons. With the continued deployment of newer weapon systems, the time required to move forces from day-to-day readiness to full combat readiness is expected to decrease. Thus, a Soviet capability for launch on tactical warning is becoming feasible for larger portions of the strategic nuclear forces.

Command and Control

68. To make effective use of their large military forces, the Soviets have developed a complex command and control system. Fundamental to the structure and operations of this system is an emphasis on the centralized control of all forces. The hardening and dispersal of fixed command posts and communications centers, and the introduction of airborne and other mobile command and communications systems, are designed to provide flexible control of forces under a variety of conflict scenarios.

69. Our analysis indicates that the Soviet command and control system has a high degree of survivability. The system's capabilities for controlling strategic nuclear forces would be degraded in a nuclear war, but if not directly attacked its battle management capabilities would remain largely intact. We believe that, even if subjected to a direct surprise attack, it would remain capable of supporting Soviet efforts to launch a retaliatory strike. Destruction of several of the 30 most important national-level command and communications facilities would complicate and probably delay the process of issuing initial combat instructions to the forces (assuming such instructions had not yet been issued). Destruction of these 30 centers would seriously disrupt the Soviets' capability for battle management and reconstitution of command.

Targeting and Retargeting

70. Evidence from Soviet [ ] military writings indicates that the primary targets of Soviet nuclear strikes in peripheral areas would be enemy nuclear delivery systems and storage sites, troop concentrations (especially armored forces), and major command and control facilities. In an intercontinental attack, Soviet targeting objectives evidently would be: (a) the weakening of the US capability to attack the Soviet homeland and military forces by striking nuclear weapon systems, command and control facilities, and supporting elements; (b) the destruction of those industrial capabilities which could contribute to the US war effort, as well as major economic and control centers; and (c) the isolation of the United States by attacks on conventional forces, arsenals, and depots useful in the resupply of US forces overseas. We believe the Soviets can retarget many of their strategic weapons within a set of preselected targets before, during, and after an initial intercontinental strike.

71. There is no evidence that Soviet targeting priorities would differ whether strikes were preemptive or retaliatory. [ ] intercontinental nuclear operations probably would be massive. Were the Soviets to consider attacks on the United States that were more limited in scope, we believe they would not reduce the size of those attacks below that necessary to strike a wide range of US nuclear capabilities and command and control. Soviet military planners probably would consider a "decapitation" attack (that is, an attack directed solely against US command and control facilities) to be inadequate in terms of their established war-fighting objectives.

Degradation of US Intelligence and Warning Capabilities

72. Concealment and deception techniques are an integral part of Soviet military doctrine. Although many of the techniques which we detect appear to be experimental and are often crude, some have been fairly successful. [ ] The selectivity and sophistication of concealment and deception measures applied to Soviet strategic forces have increased during the 1970s and are likely to increase in the future.

73. During a European crisis, we believe the Soviets would use concealment, deception, and misinformation to obscure their intentions and mask the size and character of any preparations they were making for the possibility of war. Selective electronic interference with Western reconnaissance systems would probably be employed. The Soviets would continue to use concealment and deception measures if a European crisis were to evolve into conventional war between NATO and Warsaw Pact forces. Once a European conflict appeared imminent or had actually begun, there is a high likelihood that the Soviets would actively interfere with US and NATO intelligence and satellite reconnaissance systems.

PART III

FUTURE FORCES AND THEIR IMPLICATIONS

A. Soviet Policy for Future Forces

74. The Soviet leaders will continue to regard strategic nuclear power as central to their security and national aspirations. In general, they will continue to seek to improve the capabilities of their forces to fight and survive a nuclear war so that the USSR could emerge from such a war in a better position than the United States. They will seek forces and supporting elements which will give them the options to execute preemptive strikes if they become convinced that intercontinental conflict is inevitable, to launch their forces on tactical warning if an attack is under way, and, if necessary, to retaliate after being struck first. They will also seek to be able to prosecute a protracted war in which they would expect residual forces to play an important role.

75. Aspects of Soviet programs for strategic nuclear forces will continue to threaten elements of US deterrent capabilities. At the same time, the Soviets will tend to assess US developments, including certain features of programed US forces, as threatening to their own strategic position. Some present Soviet programs—for example, hardening of ICBM sites and deployment of more survivable SLBMs—reflect this concern. Others, like the mobile ballistic missile and ABM R&D programs, probably constitute Soviet hedges against possible future US threats as well as deterrents to US withdrawal from SALT agreements. They could also represent efforts to give the Soviet leaders the future option to break out of such agreements if they conclude that the situation warrants it.

76. The Soviets see the strategic competition as long term. They probably view the main US strengths in this competition as: (a) a demonstrated ability to translate economic and technical superiority into rapid development and deployment of advanced weapons, and (b) an industrial base that could support more and larger strategic arms programs than it does today. The Soviets probably see themselves as enjoying relative advantages such as: (a) the ability through their command economy readily to channel resources and efforts into militarily significant areas, and (b) the latitude to pursue state goals without the difficulty that derives from the play of plural interests in free societies.

77. To the Soviets, the greatest concern in the strategic competition is likely to be the prospect that the United States will move with dispatch in directions which pose challenges that are difficult for them to cope with. Their greatest hope is that, in accordance with Soviet ideology, the United States will prove inferior in staying power over the long haul. Under these circumstances, the cautious Soviet leaders are likely to continue to seek to slow the United States by some accommodation in SALT while pressing ahead with long-term force improvement programs.

B. Projections of Future Soviet Strategic Forces [12]

78. In estimating future Soviet strategic forces, we face two general types of uncertainties, especially for the period five to 10 years from now. One is the qualitative improvements that the Soviets will make in weapon systems and supporting elements; the other is the quantities they will deploy under circumstances in which they are constrained or not constrained by SALT agreements.

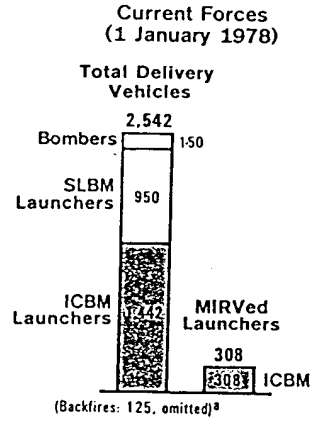
79. In light of these uncertainties, we project four alternative Soviet forces for intercontinental attack, based on differing assumptions about technological effort and success and about levels of deployment in the presence or absence of a hypothetical SALT II agreement. Two of these forces, called Moderate SAL and Moderate No-SAL, reflect our best estimates of deployment rates, of technical characteristics, and of IOC dates for new systems. The other two, called High SAL and High No-SAL, postulate the earliest IOC dates we consider possible, high rates of deployment, and technical characteristics at the more threatening end of our ranges of uncertainty. For a summary of these four alternative projections, see figures 11a and 11b.

80. For strategic air defense, we project two forces illustrating moderate and high levels of effort. Both reflect greater deployment of air defense systems

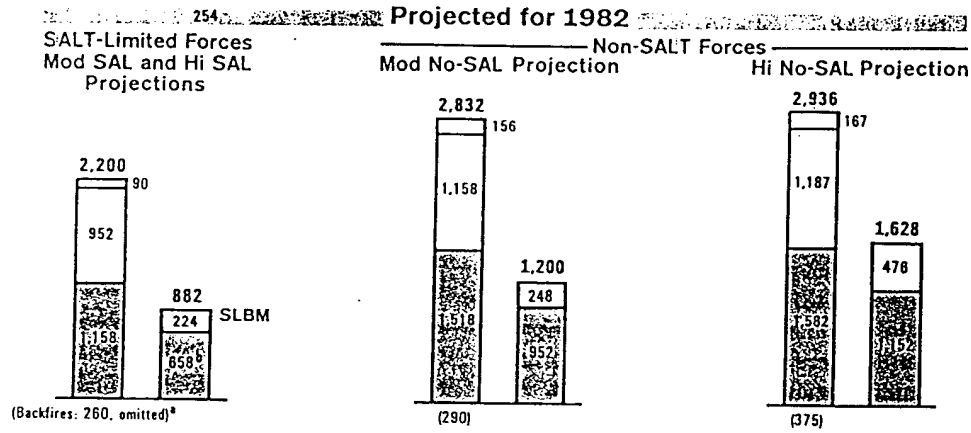
[12] See volume II for further details on these projections and for their relationship to projections published in the Defense Intelligence Projections for Planning (DIPP).

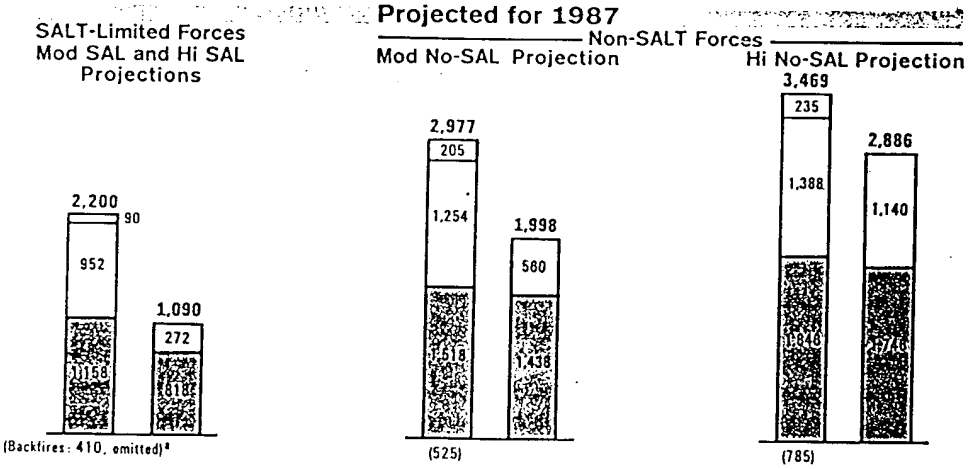
Figure 11a

Alternative Projections of Levels of Soviet Forces for Intercontinental Attack



- The columns for MIRVed launchers represent only those launchers actually fitted with MIRVed ICBMs and SLBMs. In the SALT-limited forces, the number of launchers accountable as MIRVed would be somewhat greater than shown if US-proposed counting rules are incorporated in an agreement.
- Some portion of the Soviet intercontinental bomber force may be ALCM carriers.
- In the projections for 1982 and 1987, the Moderate SAL and High SAL forces are shown as one because the SALT-constrained force levels would be the same with the single minor exception as stated in footnote b. The capabilities of the forces would be different, however, because of the different technical characterisitics projected for individual weapon systems.
- Backfire bombers are not included in the bomber totals in the bar charts. They are shown in parentheses below the bars.





a Includes total Backfire production.

b MIRVed ICBM launchers in the Hi SAL force total 718 in 1982.

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Alternative Projections of IOC Dates of Soviet Systems for Intercontinental Attack

Figure 11b

	Mod SAL	Mod No-SAL	Hi SAL	Hi No-SAL
Near-term follow-on ICBMs	1981-82	1981-82	1980-81	1980-81
Midterm follow-on ICBMs	1983-84	1983-84	1982-83	1982-83
Mobile ICBM system	*	1978	*	1978
ICBM with MaRVs	*	*	1984	1984
MIRVed SLBMs	1978	1978	1978	1978
New SSBN/SLBM system	1982	1982	1981	1981
New intercontinental bomber	1982	1982	1981	1981

* Not deployed in this alternative force.

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designed to counter low-altitude aerodynamic vehicles than we projected last year, due largely to our expectation that the Soviets will react to US cruise missile programs.

81. Considering the high offensive and defensive forces as packages, we believe them to be upper boundary cases and thus highly unlikely. The Soviets probably would have difficulty sustaining such high levels of deployment and almost certainly could not achieve such high technological success on all fronts simultaneously through the entire 10-year period. Individual elements of each high force are plausible, however.

Hypothetical SALT II Agreement

We assume for purposes of our SALT-limited projections that a SALT II agreement enters into force in 1978. Aggregate strategic nuclear delivery vehicles are assumed to be reduced to 2,400 by mid-1979. A further reduction to 2,200 is implemented by mid-1981. Launchers for MIRVed missiles and ALCM carriers are limited to a total of 1,320, with a sublimit on MIRVed missile launchers of 1,200 and a further sublimit of 820 on launchers for MIRVed ICBMs. Three-year bans on the testing of MIRVs on new ICBMs and on testing and deployment of ICBMs on mobile launchers are also assumed. These bans are assumed to lapse in 1981, but the other aspects of the hypothetical agreement remain in force to 1987. Backfire production is assumed to be limited to the current rate.

Alternative Soviet Offensive Force Projections

In all four projections, we assume that the Soviets continue to emphasize their land-based ballistic missile force because it is the primary contributor to the countermilitary capability they seek. In the SALT-constrained forces we project the deployment of MIRVed ICBM launchers up to agreed limits and the introduction of follow-on ICBM systems. We postulate that to comply with SALT limits the number of ICBM launchers will decrease somewhat, resulting in the retirement of some modern ICBMs. Without SALT limits, we project that the Soviets would not retire any modern ICBMs, that they would deploy mobile ICBMs, and, in the High No-SAL force, that they would build some additional fixed launchers for heavy ICBMs. In all the forces, we anticipate a continuing Soviet deployment of ICBMs and SLBMs with nonMIRV as well as MIRV warheads; in the SALT-constrained forces, the flight-testing of MIRV warheads on new ICBMs does not begin until the three-year ban lapses. We also project a few more SSBNs of the current generation and a program to construct new large SSBNs, with compensatory retirement of older systems in the SALT-constrained cases. Finally, in all alternatives we assume the deployment of a new intercontinental bomber, although there is considerable uncertainty as to whether the Soviets would actually deploy such a bomber.

Alternative Soviet Defensive Force Projections

The Moderate force is intended to represent steady improvement and is our best estimate of Soviet levels of achievement. In the High force we assume high rates of deployment, the earliest IOC dates for new systems that we believe possible, and technical characteristics at the more threatening ends of our ranges of uncertainty. We also assume in this force a greater effort against low-altitude attackers than we do in the other: larger numbers of new surface-to-air missiles are deployed, lookdown/shootdown and long-range interceptors are fielded in larger numbers, and greater AWACS capabilities are introduced by the end of the period. For alternative projections of Soviet low-altitude air defense systems, see table 2.

In both defensive force projections we assume that the Soviets adhere to the ABM Treaty. We project that they will construct additional ballistic missile detection and tracking radars and, in the High force, that they will deploy additional ABM launchers around Moscow up to the treaty limit. We also anticipate steady but modest improvement in Soviet ASW forces along the lines of recent years; no projection is made of ASW forces intended for use against SSBNs because we are unable to separate them from general purpose forces.

82. Soviet uncertainties about the future strategic situation—and to some extent our uncertainties as estimators—are affected by the present highly tentative nature of US planning for the mid- to late 1980s, particularly concerning the size and pace of cruise missile deployments and the development and deployment of the M-X or a comparable system. In our analysis of future Soviet intercontinental attack forces and strategic defenses, we assume a single future US force. (See figure 12.) This force is based on the Department of Defense Five-Year Defense Program (FYDP). We have arbitrarily assumed certain modifications to this program to comply with the hypothetical SALT II agreement, and we have not included the M-X ICBM or a comparable system because a decision for full-scale program development has not been made. The actual US program will undoubtedly differ somewhat from that assumed here. A reduction or slowdown in the US cruise missile program could significantly alter some of our findings, as would the future deployment of the M-X. We believe that, out of prudence, Soviet planners at this time would make generous assumptions about what the United States can and will do with respect to these systems in the future. They would at least be considering the implications of the possible deployment of the M-X for the capabilities and survivability of their own forces.

C. Significance of Future Soviet Intercontinental Offensive Forces

83. This section is intended to illuminate some of the implications of the projected Soviet intercontinental forces over the next decade. Of primary con-

Table 2

Alternative Projections of Soviet Strategic Low-Altitude Air Defense Weapon Systems

	1 Jan 1978	Mid-1982		Mid-1987	
Force Levels*		Moderate	High	Moderate	High
SA-3 SAM sites	340	350	375	350	375
(Launchers)	(1,354)	(1,400)	(1,500)	(1,400)	(1,500)
SA-X-10 SAM sites	—	75	100	325	475
(Launchers)	—	(225)	(300)	(975)	(1,425)
Overwater AWACS	—	2	6	36	36
Overland AWACS	—	—	—	2	12
Improved Flogger interceptor	—	35	250	250	550
Modified Foxbat interceptor	—	110	260	700	600
Long-range interceptor	—	—	—	90	280
IOC Dates for New Systems		Moderate	High		
SA-X-10 SAM system		1979	1979		
Overwater AWACS		1982	1981		
Overland AWACS		1987	1985		
Improved Flogger interceptor		1982	1980		
Modified Foxbat interceptor		1981	1980		
Long-range interceptor		1986	1984		

*Does not include existing strategic air defensive systems with more limited low-altitude capabilities, or systems assigned to tactical air defense forces.

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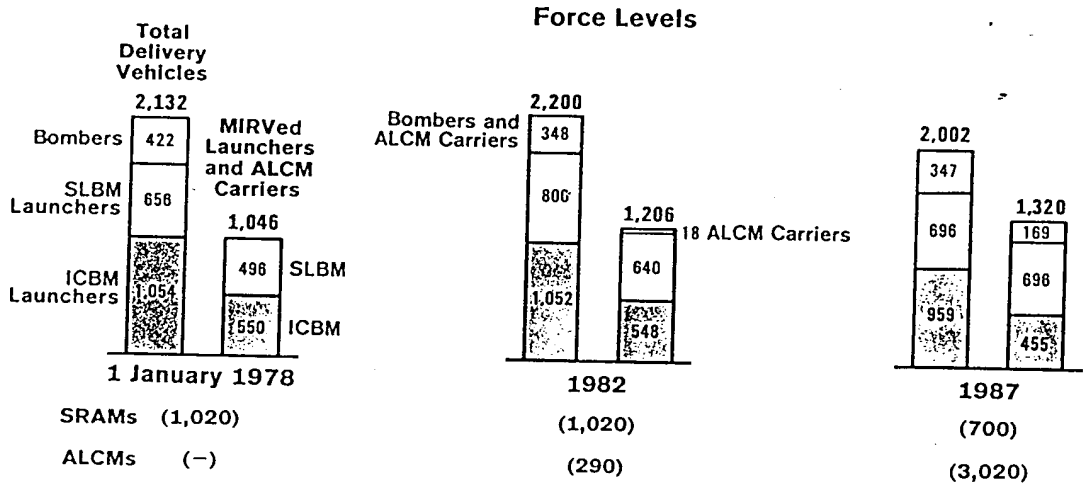
Figure 12

Assumed US Forces for Intercontinental Attack



IOC Dates for New Systems

Minuteman III with improved guidance	1978
Minuteman III with new warhead	1980
Trident SSBN/SLBM system (8 MIRVs)	1980
ALCM	1980

Note: US force projections are based on the Department of Defense Five-Year Defense Program. We have assumed certain modifications to this program to accommodate a hypothetical SALT II agreement. It should be noted, however, that US planning for the mid- to late 1980s is highly tentative.

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cern is how the prospective trends regarding such forces may affect:

- The viability and stability of the US deterrent.
- The USSR's evaluation of its comparative strategic capabilities and vulnerabilities.
- Perceptions of relative power in the United States, the USSR, and elsewhere.

To shed light on these issues, this analysis examines the striking power and vulnerability of Soviet intercontinental offensive forces, and compares them with the assumed US forces in the following ways:

- Quantity, quality, and destructive potential of total forces.
- ICBM countersilo capability and the prelaunch vulnerability of ICBMs and other forces.
- Residual capabilities of the forces after a hypothetical surprise or preemptive counterforce attack by ICBMs.

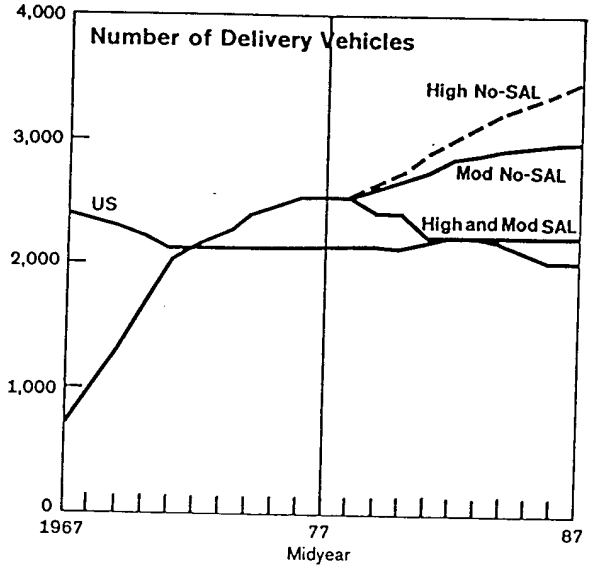
Quantity, Quality, and Destructive Potential of Forces

84. The first comparison deals with the size and striking power of total Soviet and US intercontinental offensive forces before any attack. Many characteristics of the forces are relevant to such a comparison. Figures 13a and 13b display six which seem to provide the most useful indexes. Two are the simplest and most often used:

- Numbers of delivery vehicles.
- Numbers of missile reentry vehicles and bomber weapons.

Quantity and Quality of US and Soviet Forces for Intercontinental Attack, 1967-87

Figure 13a



The figures for total delivery vehicles include ICBM launchers operational, in conversion, or under construction; SLBM launchers operational, under conversion, in shipyard overhaul, or on sea trials; and operational long-range bombers. The figures do not include SLBM launchers on SSBNs which have not yet begun sea trials or land-mobile ICBM launchers produced but not in units. Also excluded from the Soviet figures are Backfire aircraft, ICBM launchers believed to be operational at Tyuratam, Bear aircraft in naval aviation and reconnaissance units, Bison tankers, and the launchers aboard G-class submarines.

The figures for the on-line measures exclude ICBM silo launchers under construction or conversion and SLBM launchers on SSBNs undergoing sea trials, conversion, or shipyard overhaul.

Missile payloads composed of MRVs (which are not independently targetable) are counted as one RV.

The comparisons of hard-target potential show the number of targets of a nominal hardness expected to be destroyed in a one-on-one attack by on-line ballistic missiles and bombers in each force. The targets are assumed to be hardened.

The assumed US force is based on the US Department of Defense Five-Year Defense Program (FYDP), except that we assume certain modifications to this program to accommodate a hypothetical SALT II agreement.

These notes also apply in general to the analyses and charts appearing elsewhere in Part III.

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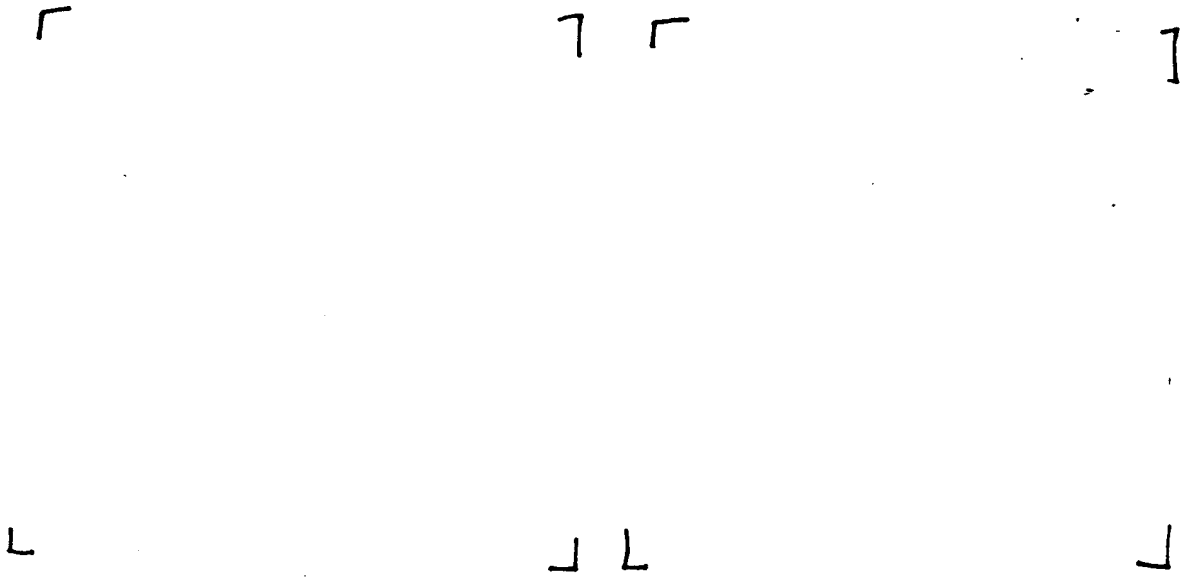
Figure 13b



While providing a rough quantitative index, these measures are not fully indicative of destructive potential because they fail to take account of qualitative factors which are critical in determining how much area or how many hard targets can be destroyed. Two additional measures introduce these qualitative factors into the comparison:

— **Equivalent megatons (EMT),** which provides a rough assessment of the theoretical capabilities that yield and number of weapons provide against soft area targets.

— **Average force accuracy,** which provides a rough indicator of technological level and is a key contributor to the theoretical capabilities of a force against hard point targets.

The indicators of quantity and quality can then be combined, along with weapon system reliability, to give some measure of the destructive potential of forces against broad categories of targets. EMT and reliability can be converted by a simple formula into the destructive capability of a force against soft area targets, if all weapons in the force were used exclusively for that purpose. Accuracy, yield, reliability, and number of weapons in a force can be combined to measure the total number of hard point targets it could destroy, if all weapons in the force were used exclusively for that purpose. Such calculations represent prelaunch potentials against purely notional targets of nominal hardness; no provision is made for specific target complexes, force employment plans, attrition by defenses, or other operational considerations. The measures used are:

— **Lethal area potential,** which provides a rough assessment of the theoretical area within which the nuclear effects of missile RVs and bomber weapons inflict severe damage on reinforced concrete buildings.

— **Hard-target potential,** which provides a rough assessment of the theoretical capabilities of missile RVs and bomber weapons against hardened point targets.

There are other measures which could be used—for example, numbers of MIRVed launchers, missile throw weight, and missile throw weight plus bomber payload equivalent—but we believe that those employed above best reflect the total striking power of deployed forces.

85. In figures 13a and 13b, we compare the four alternative Soviet forces with the single, assumed US force. The trends are generally similar to those reported last year.[13] The figures show that:

— In total delivery vehicles, the two Soviet No-SAL forces exceed the US force throughout the period of the Estimate, while a SALT II agreement reduces the Soviet advantage in the 1980s.

— In on-line missile reentry vehicles and bomber weapons, the US force exceeds the Soviet Moderate SAL force over the period. The High No-SAL force overtakes the US force in the early 1980s, and the High SAL and Moderate No-SAL forces come to match the US force by the late 1980s.

— In equivalent megatons, all Soviet forces come to exceed the US force by even wider margins than today.

— In average force accuracy, the High SAL force exceeds the US force in the 1980s, while the other Soviet forces are equal or about equal to the US force by the end of the period.

— In lethal area potential, as in on-line equivalent megatons, all Soviet forces increase their lead over the US force throughout the period of the Estimate.

— In hard-target potential, the two Soviet Moderate forces are about equal to the US force in the 1980s, while the High SAL and High No-SAL forces exceed the US force by substantial margins.

It should be noted that if missile RVs alone were considered in these comparisons, Soviet gains would be much more marked because of the USSR's greater emphasis on ICBMs. For example, in the mid-1980s, the hard-target potential of Soviet missile RVs in the SALT-constrained forces would be two to four times that of US missile RVs.

86. When the trends in the SALT-limited forces of both sides are compared in terms of numbers of missile RVs and bomber weapons, lethal area potential, and hard-target potential, it can be seen that the USSR will gain relative to the United States until the early 1980s. Throughout the period, however, advantages will probably remain mixed. In terms of bomber weapons and missile RVs, the SALT-limited US force remains ahead of the Moderate Soviet force over the next 10 years; the lethal area potential of both Soviet SALT-limited forces comes to exceed that of the US force by even wider margins than today; and the hard-target potential of the US force falls between the High and Moderate Soviet forces until the late 1980s, when the Moderate Soviet force comes to be about equal to the US force.

Note: Recent evidence and analysis, described in the notes following paragraphs 16 and 27 above, suggest that future Soviet ICBM forces may be different from those forecast in our projections in the following respects:

— The Soviets are likely to accommodate to a SALT II limit of 820 MIRVed ICBMs by deploying about 100 fewer SS-19s and 100 more SS-17s than projected in the Moderate SAL force.

— A new PBV, overcoming certain mechanical limitations on the accuracy of SS-18 MIRVs, may be installed on SS-18s beginning in 1979, rather than awaiting deployment on a follow-on heavy ICBM in 1982 as projected in the Moderate SAL and No-SAL forces.

—[ ]

The calculations which we summarize in this section were performed prior to these recent indications and do not take them into account. We have tested the sensitivity of our findings to an altered SS-17/19 mix and to the possible installation of a new PBV on SS-18s beginning in 1979. We find that these changes would only slightly affect the results of our calculations of Soviet missile RVs and bomber weapons, EMT, average force accuracy, lethal area potential, and

[13] It should be recognized that a failure of SALT II or the emergence of Soviet programs along the lines of our High projections could lead the United States to undertake new weapon programs or to adjust deployment programs in ways which would change these relationships.

hard-target potential summarized in the preceding paragraphs. The combined changes would also slightly affect our residual calculations detailed later in this section. They would, however, significantly improve Soviet countersilo capabilities in the early 1980s, as illustrated in figure 15.

[ ] Preliminary analysis of the potential for accuracy improvement [ ] suggests that the accuracy of SS-18s and SS-19s could be still further enhanced, resulting in further increases in Soviet countersilo capabilities and hard-target potential in the early 1980s and beyond.

Countersilo Capability and Prelaunch Vulnerability of Soviet Fixed ICBM Forces

87. With respect to deterrence, the vulnerability of intercontinental offensive forces to a first strike can be critical. The weapons most relevant to assessing Soviet first-strike capability and the vulnerability of Soviet forces to attack are ICBMs. The significant hard-target potential and relatively short flight times of ICBMs make them particularly well-suited to a first strike against fast-reaction opposing forces. Bomber weapons generally have good hard-target potential, but take hours to reach their targets. SLBMs, though timely, have poor hard-target potential. Moreover, because silo-based ICBMs make up a large portion of projected Soviet forces throughout the next 10 years, the Soviets would have to be especially mindful of their potential vulnerability.

88. The calculations which follow do not reflect operational considerations. In particular, no provision is made for launching ICBMs while under attack rather than "riding out" an attack; this is a worst case assumption from the point of view of ICBM vulnerability. We accompany the calculations with an illustration of how the many uncertainties which surround our estimates of those key parameters—for example, accuracy, yield, and reliability—affect the countersilo capability of Soviet ICBMs.

89. Countersilo Capabilities of Soviet ICBMs. Figure 14 illustrates the results of our calculations of the hypothetical countersilo capabilities of the ICBMs in the four alternative Soviet forces, in terms of the number of Minuteman silos surviving and the number of RVs on the missiles in those silos.[14] Figure 15 shows the degree to which uncertainties about the performance of Soviet ICBMs affect our estimates. Our calculations indicate that over the next 10 years Soviet ICBMs will pose an increasing threat to US ICBM silos. As shown in the figures, the time when this threat reaches major proportions depends on a number of variables.[15] Specifically:

- The ICBMs in the Moderate SAL and Moderate No-SAL forces would pose a major threat to US missile silos in the mid-1980s assuming one-on-one attacks, or in 1979 assuming two-on-one attacks.
- The ICBMs in the High forces would already pose a major threat to US missile silos, but this is considered highly unlikely because the High projections assume that all Soviet ICBM characteristics are at the most threatening ends of our ranges of uncertainty.

90. Because we have revised our estimates of Soviet ICBM accuracies, these major threats are projected to occur about one year earlier than we estimated last year.[16] Given the large numbers of RVs in all alternative future Soviet ICBM forces—whether SALT-limited or not—the calculation of the threat to US ICBM silos is primarily a function of the quality of Soviet ICBMs and of our uncertainty about it. We

[14] In these calculations we treat as a variable to reflect uncertainty the question of whether two MIRVs can be targeted with sufficiently precise timing (that is, about five to 20 seconds apart) so as to avoid mutual interference between the warheads and to increase the probability of the destruction of a silo prior to the launch of its ICBM. We have no evidence that the Soviets intend to employ this two-on-one tactic, but we believe that at least two of their new MIRVed ICBM systems have the technical capability to be so used. These systems could be used for two-on-one targeting either from the same booster (in line) or from different boosters (cross targeting). In our calculations we use the cross-targeting technique, which is operationally more difficult but gives slightly better results and thus illustrates an upper bound. [ ]

[ ] There is a divergent view that Soviet planners would consider two-on-one cross targeting with near-simultaneous impacts to be operationally infeasible. *This divergent view is held by the Assistant Chief of Staff, Intelligence, Department of the Air Force.*

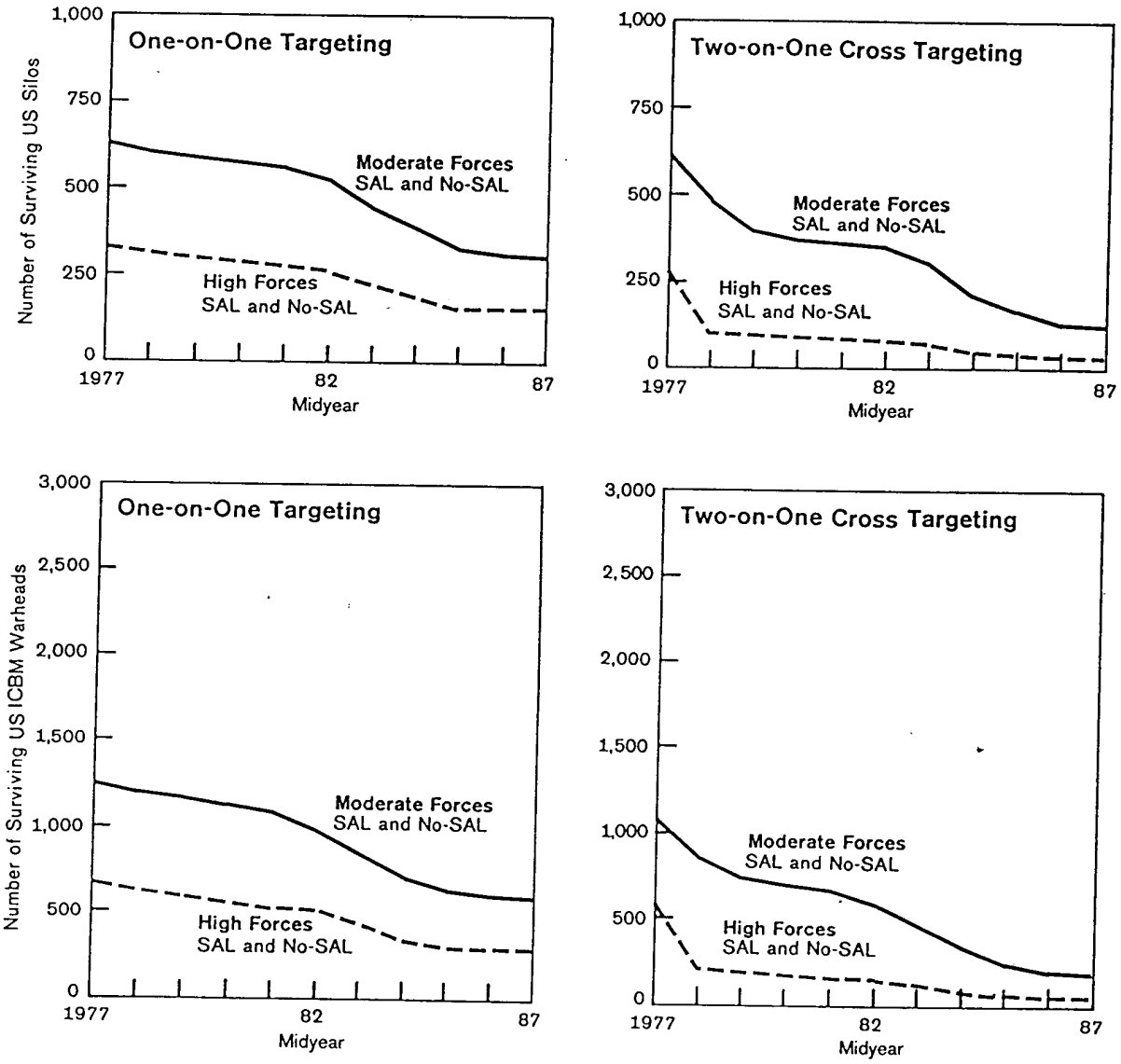
[15] For purposes of this Estimate, a major threat is arbitrarily defined as the prospective destruction of all but 400 Minuteman silos.

[ ]

Figure 14

Countersilo Capabilities of Soviet ICBMs

Comparison of Force Projections Against 1,000 Minuteman Silos



We have no evidence that the Soviets plan to employ two-on-one cross targeting, but at least two of their new MIRVed ICBMs have the technical capability to be so used. *The Assistant Chief of Staff, Intelligence, Department of the Air Force, believes that the possible damage the Soviets could expect to achieve against US missile silos lies between the one-RV and the two-RV cases.*

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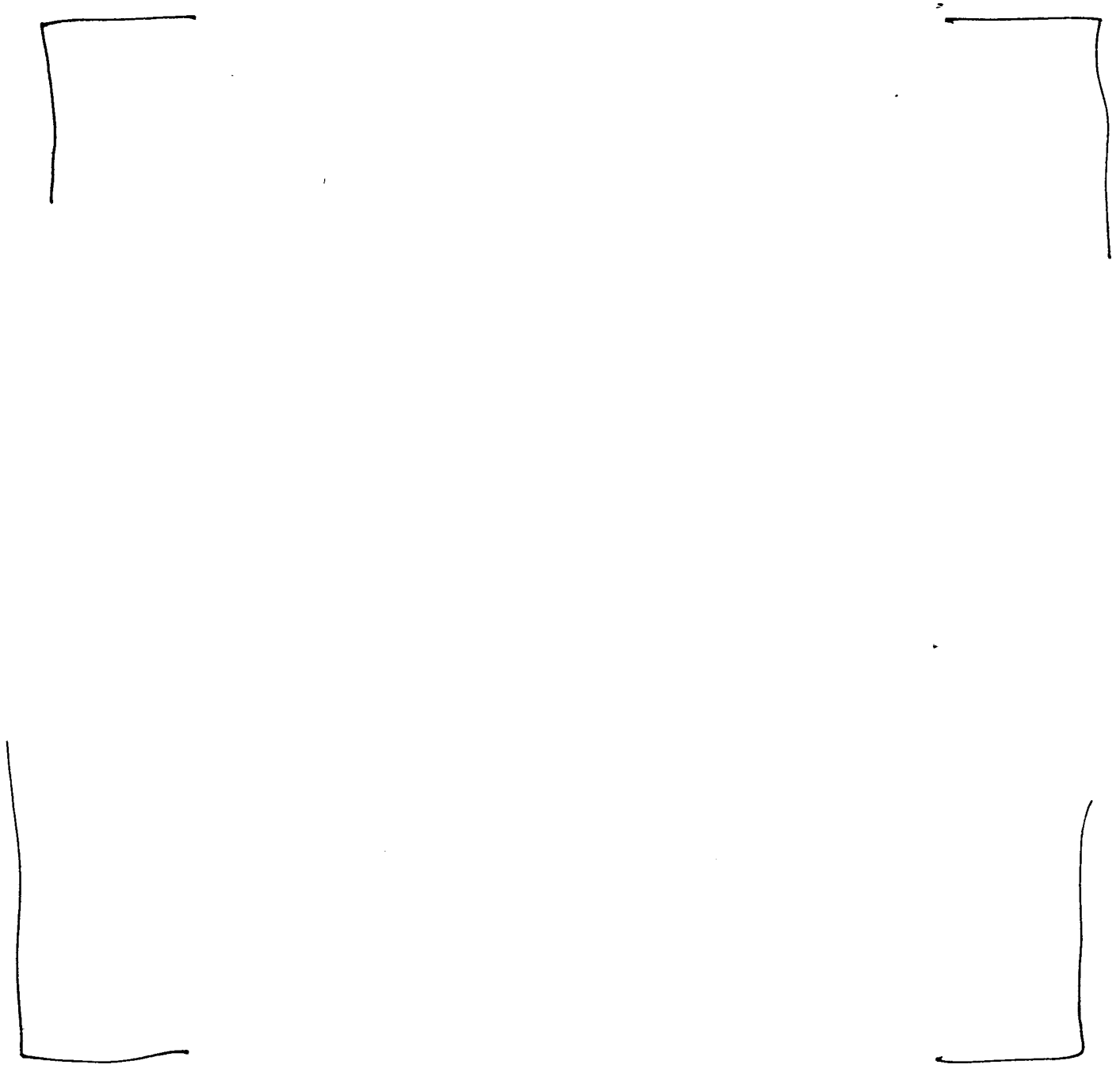
Figure 15



believe that the Soviets themselves would be uncertain about the results of attacks on US silos. We expect uncertainty to influence both US and Soviet views of ICBM survivability throughout the period of this Estimate.

91. **Prelaunch Vulnerability of Soviet ICBMs.** Using the Moderate SALT-constrained force as an example, the calculations illustrated in figure 16 indicate that the vulnerability of Soviet ICBM silos to attack by US ICBMs will remain relatively constant over the next 10 years unless the M-X ICBM or a comparable system is deployed. It also shows that, in the absence of M-X deployment, the number of Soviet ICBM warheads in the Moderate SAL force surviving a hypothetical attack by US ICBMs will double during this period. This is because the near-term effects of Minuteman III improvements tend to be offset by continued Soviet conversion to harder silos and to ICBMs with MIRVs. But from the USSR's point of view, a very unfavorable trend in Soviet ICBM vulnerability would begin in 1986 if the United States were to start deploying the M-X ICBM or a system with comparable accuracy, yield, and number of warheads. It should be noted that US cruise missiles will also have the potential capability to inflict significant damage to Soviet ICBM silos. Because of their relatively slow speed, they probably would not be viewed by the Soviets as a first-strike threat, but the Soviets might see cruise missiles as a threat to any ICBMs in fixed silos they planned to withhold as part of a reserve force. As the Soviets contemplate the possibility of unfavorable trends late in the period, they may perceive a need to shift away from vulnerable fixed ICBMs to more survivable systems. Their options would include deploying mobile ICBMs, increasing their SSBN force, and placing more SSBNs on patrol. They might increase their reliance on launching their forces upon receipt of tactical warning.

Prelaunch Vulnerability of SLBMs and Bombers

92. Since both the United States and the USSR maintain triads of intercontinental attack forces with widely differing attributes, we also assess the prelaunch vulnerability of bombers and SLBMs. The potential of the USSR to reduce these elements of the US triad, and the vulnerability of the comparable Soviet elements to a first strike, depend in considerable measure on whether or not the bombers and SSBNs are on day-to-day alert or on increased alert.

93. The Soviets maintain no bombers on alert and keep the bulk of their SSBNs in port, making these elements of their strategic nuclear forces vulnerable to surprise attack. They are, however, building tunnels which could afford some SSBNs a measure of in-port survivability. If strategic warning were available, they could disperse most of their bombers and send about 70 percent of their SSBN force to sea.

94. If launched from close to US coastlines, Soviet SLBMs and perhaps some SLCMs (submarine-launched cruise missiles) could present a more serious threat to the US alert bomber force. In contemplating deployment of submarines for such a purpose, the Soviets would have to consider US ASW and missile detection capabilities and the dispersal and other measures the United States could employ to make an attack on bombers more difficult. Thus, we believe that the Soviets would conclude that US alert bombers could survive throughout the period of this Estimate. Moreover, because of the different flight times of Soviet ICBMs and SLBMs, Soviet planners could not rely on maximizing the prelaunch destruction of both US bombers and ICBMs.

Residual Capabilities of Forces

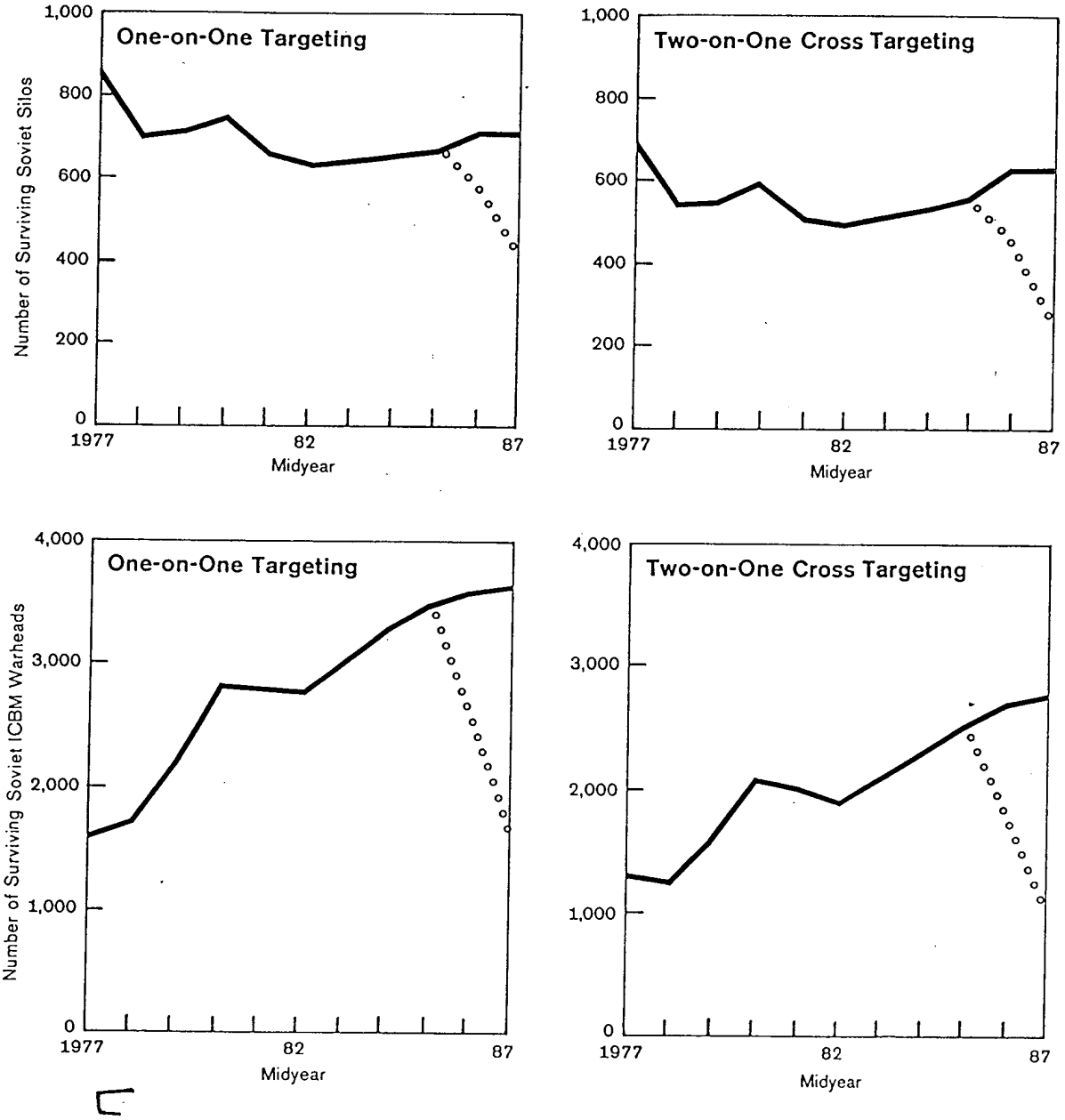
95. The assessments of Soviet ICBM countersilo capability and ICBM prelaunch vulnerability depicted in figures 14 and 16 do not illustrate the degree to which the ICBM forces of an attacking side would be depleted by employing them in a counterforce attack; they do not indicate the destructive potential of those ICBMs on the other side that would survive the attack; nor do they illustrate the additional contribution that SLBM RVs and bomber weapons would make to the remaining capabilities of each side. The trends in total remaining forces and destructive potential, however, are highly relevant to deterrence, strategic capabilities, and perceptions.

96. Therefore, we next provide calculations of the destructive potential that would remain available to each side after hypothetical ICBM counterforce attacks. To illustrate the trends, we measure the Soviet Moderate SAL force and the assumed US SALT-

Figure 16

Prelaunch Vulnerability of Soviet ICBMs

Soviet Moderate SAL Force
Hypothetical Attack by ICBMs of Assumed US Force



[ ] indicate the result if the trench-based M-X ICBM or a comparable system is deployed beginning in 1986.

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TOP SECRET

limited force. For both the United States and the USSR, we examine alternative first-strike conditions: a surprise attack, that is, catching the other side on day-to-day alert; and a preemptive attack, that is, assuming the other side is in an alerted posture after a brief period of tension. The calculations are made in terms of what we call residual forces. For the attacking side, residual forces are assumed to be those ICBMs not used in the attack and those SLBMs and bomber weapons which can be generated; thus, the residual forces are those available for other missions, either at the time of the first strike or later. For the side attacked, residual forces are those intercontinental attack forces available for retaliation after the first strike is absorbed. They include those ICBMs calculated to survive hypothetical countersilo attacks, as well as the proportions of bombers on alert and SLBMs at sea noted above. In our calculations we assume that alerted bombers and SSBNs at sea are not vulnerable to first-strike attacks.

97. It should be recognized that the calculations are limited to analysis of hypothetical ICBM attacks by one side on the ICBM silos, bomber bases, and SSBN bases of the other side. There are analytical advantages to limiting the calculations in this way. In particular, it permits us to avoid speculation about the discretionary aspects of force employment, such as an attacker's perception of his requirements to strike other military and economic targets as well as the scale and nature of retaliation by the side attacked. But the artificialities should also be recognized. For example, Soviet plans evidently call for using more than just ICBMs and for more than just a counterforce attack; no major US attack option uses only ICBMs against Soviet strategic forces; and a real conflict probably would involve a retaliatory attack. Further, the calculations ignore the possibility that either side might launch its ICBMs on tactical warning. Finally, we make no attempt to factor in the degree to which defensive forces might be able to degrade the residual capabilities of either side.

98. Our assessment of residual forces provides another rough measure of the potential for destruction and survival of intercontinental striking forces. It illustrates important future trends and the key factors driving the trends. It sheds light on the implications of the size, quality, and composition of the forces of each side and, more importantly, on how these forces may be viewed by an opponent. It is not, however, a simulation of the tactics and targeting which would actually be employed by either side, nor is it a prediction of the outcome of a nuclear exchange. The results are not definitive or comprehensive enough to be used as a basis for detailed US planning. A definitive assessment of comparative US and Soviet warfighting capabilities would involve both initial and retaliatory strikes. It would require the use of all force elements against a broad range of targets, would employ actual US targeting doctrine along with a range of Soviet attack options, and would consider operational factors and the interactions between opposing forces to the maximum extent possible. It can be argued that simplified assessments based on calculations of only initial ICBM counterforce strikes, with no reflection of retaliation, could give an erroneous picture of future capabilities and trends, especially if firm conclusions about the strategic balance and the value of first strikes should be drawn from such assessments alone. Accordingly, one view in the Intelligence Community is that incomplete assessments falling short of the comprehensive approach discussed above probably do not provide any insights into Soviet perceptions and should not be included in this document.[17] A comprehensive net assessment, however, is beyond the scope of a National Intelligence Estimate.

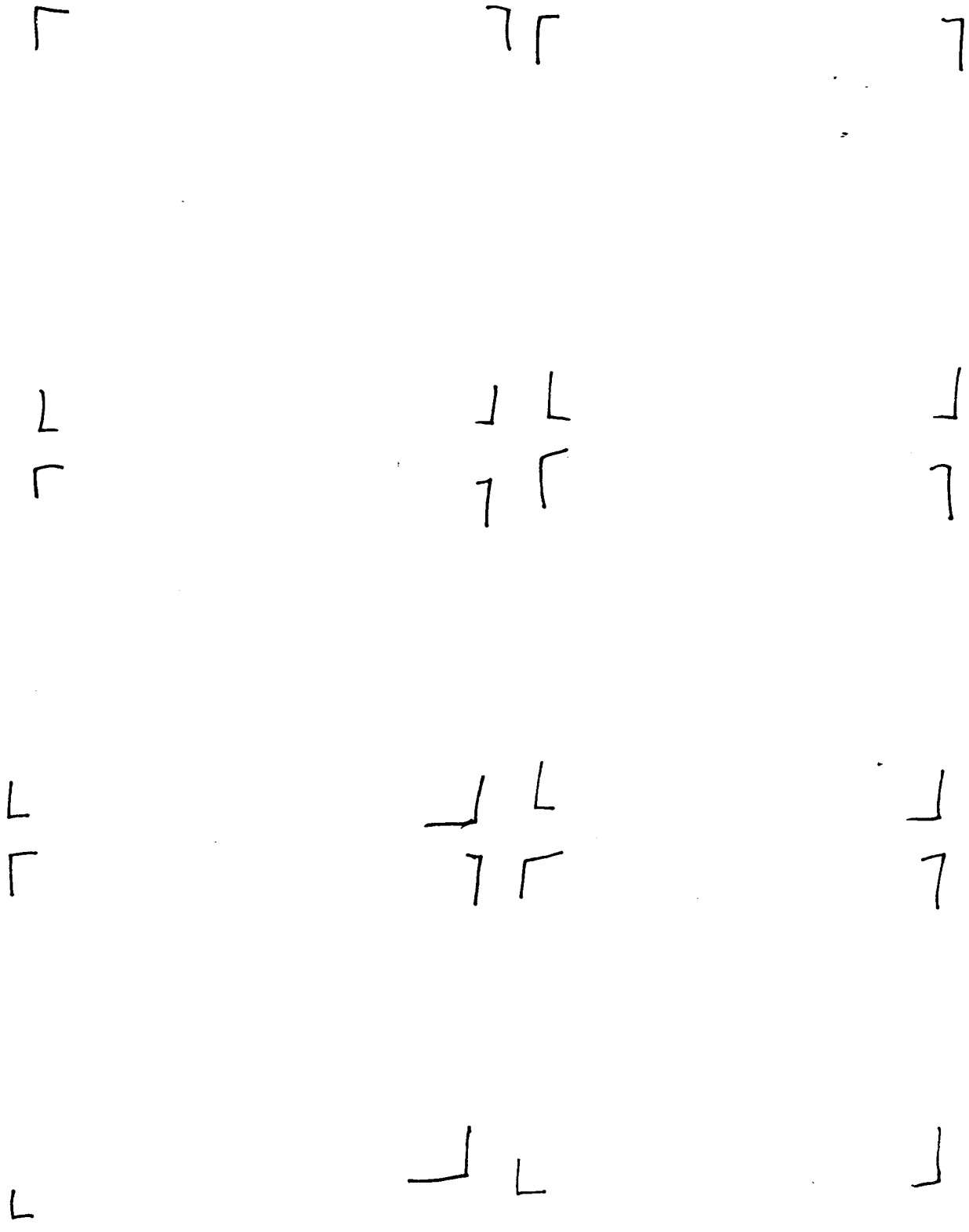
99. The results of our analysis of residual forces are summarized and illustrated in figures 17a, 17b, and 17c. We calculate the residual capabilities of both sides in terms of number of missile RVs and bomber weapons and in terms of lethal area potential and hard-target potential, assuming that the residuals are used exclusively for one or the other of these purposes. The figures show that, for the SALT-limited forces:

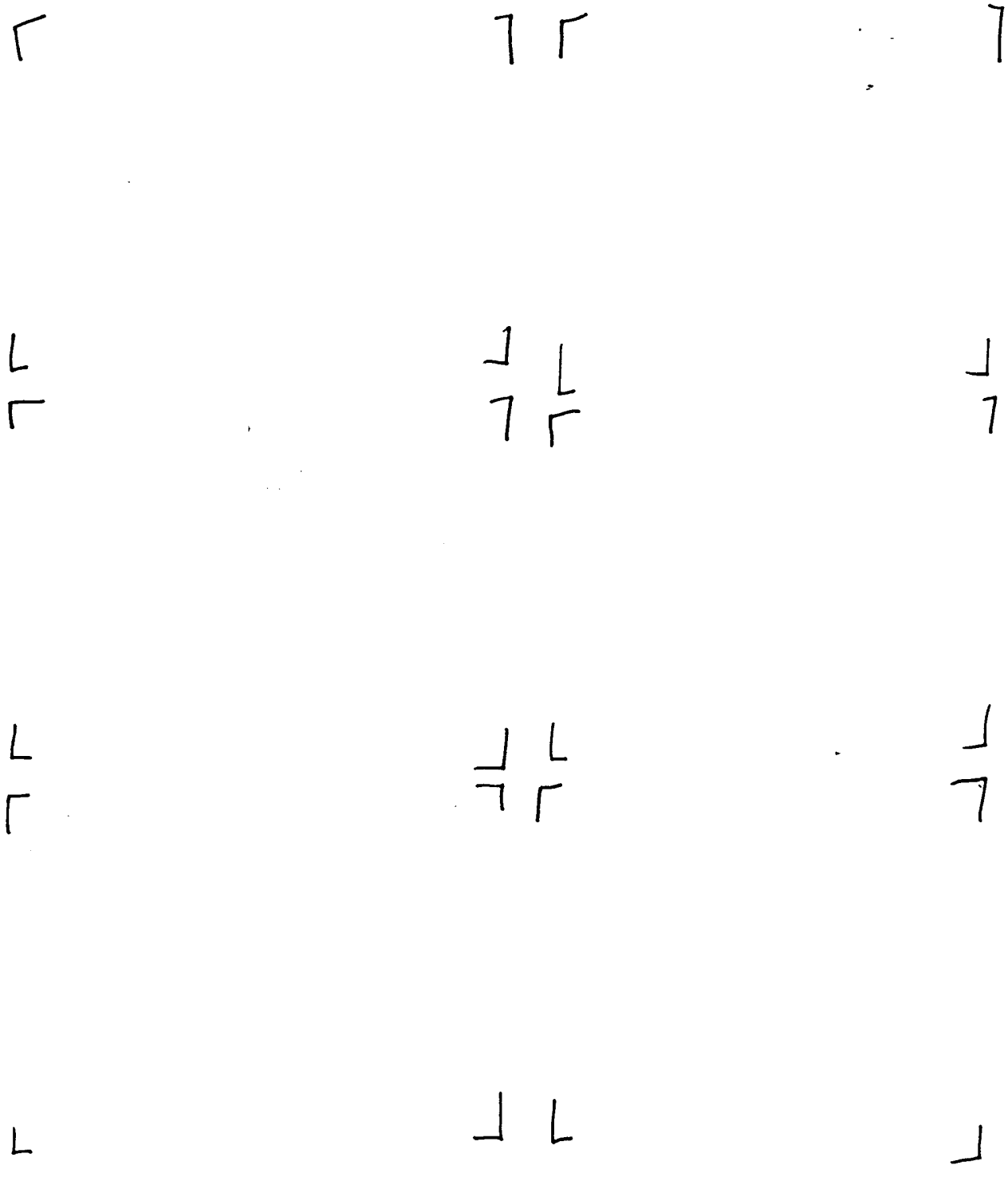
— The general trends in relative residual forces in most cases will favor the Soviets over the next few years, largely because of their continuing program of conversions to improved ICBMs, especially those carrying MIRVs. The relationship between Soviet and US residual forces will tend to stabilize or become more favorable to the United States in some cases beginning in the early 1980s, primarily because of US ALCM deployment.

— Except in the case of a surprise Soviet attack, the United States will have a greater number of residual missile RVs and bomber weapons, due primarily to the many US SLBM RVs and, after the early 1980s, cruise missiles.

— Except in the case of a surprise US counterforce attack, the Soviets will have much greater re-

[17] *The holders of this view are the Director, Defense Intelligence Agency, and the Senior Intelligence Chiefs of each of the three Services.*





sidual lethal area potential than the United States. This is due to their concentration on ICBMs with relatively large MIRV warheads.

— Except in the case of a surprise Soviet attack, the United States will have greater residual hard-target potential. This is largely because of the accuracy of US systems, including bomber weapons—especially cruise missiles in the 1980s.

100. With respect to the surprise attack cases examined, figures 17a, 17b, and 17c show that for the SALT-limited forces:

— The Soviets could expect that, if the United States struck first with surprise, their residual hard-target potential would continue to increase over the next 10 years but in the mid- and late 1980s would be much less than that remaining to the United States. Their residual lethal area potential would also increase and would come to exceed the US residual by a small margin by the late 1980s. In general, substantial Soviet forces would survive throughout the period. For example, the number of surviving Soviet missile RVs and bomber weapons would grow to between 3,000 and 4,000, and substantial lethal area potential would survive.

— The Soviets could expect that, if they struck first with surprise, their residual lethal area potential would greatly exceed the US surviving potential. They could also expect their residual missile RVs and bomber weapons and hard-target potential to become about equal to that of the United States in the early 1980s and to surpass that of the United States later in the period.

— Any Soviet temptation to initiate nuclear war in a crisis before the United States alerted its forces, however, would be countered by the size and destructive potential of the prospective surviving US forces. For example, in the case of a Soviet surprise attack, the number of US missile RVs and bomber weapons surviving for retaliation would be no fewer than [ ] throughout the period, and substantial US lethal area potential would survive.

101. Figure 18 illustrates in more detail the destructive potential and composition of the US forces which the Soviets would have to expect to survive a surprise Soviet ICBM counterforce attack. For the assumed SALT-limited force it shows that:

— Until the early 1980s, US residual capabilities will remain fairly constant despite the growing threat to US ICBM silos posed by the Soviet buildup in improved ICBMs with MIRVs. The effects of increasing US silo vulnerability tend to be offset by the following factors: (a) improvements in accuracy and yield will increase the hard-target and lethal area potentials of most surviving Minuteman III warheads; and (b) Trident SLBM RVs with increased lethal area potential will start to be deployed.

— Beginning in the early 1980s, US residual hard-target potential will begin to climb sharply, followed in the mid-1980s by an increase in residual missile RVs and bomber weapons. These changes are due largely to US deployment of ALCMs.

— The percentage of US residual capability in ICBMs will decrease throughout the next 10 years.

— Aerodynamic vehicles will account for about one-third to one-half of the US residual lethal area potential. For hard-target potential, about one-half of the residual capability resides today in aerodynamic vehicles, and the introduction of cruise missiles will cause this fraction to increase substantially in the mid- and late 1980s. Aerodynamic vehicles would be subject to attrition by Soviet air defenses.

102. Figure 19 illustrates in more detail the destructive potential and composition of the forces which the Soviets might expect to survive a surprise US ICBM counterforce attack. For the Moderate SAL force it shows that:

— The Soviet ICBM force will continue to make by far the largest contribution to surviving Soviet weapons, lethal area potential, and hard-target potential throughout the next 10 years. The changes apparent in figure 19 result from: (a) Minuteman III accuracy improvements in 1977-78, offset by continuing Soviet conversion to harder silos and new, MIRVed ICBMs; and (b) Minuteman III yield increases in 1980-82, offset by follow-on Soviet ICBMs with additional MIRV warheads.

— The contribution of Soviet SLBMs to lethal area potential, while never more than a small percentage of the total, will about double during the period, largely because of the deployment of MIRVs and the new, large SLBM expected in the early 1980s. The contribution of SLBMs to the hard-target potential will be negligible through-

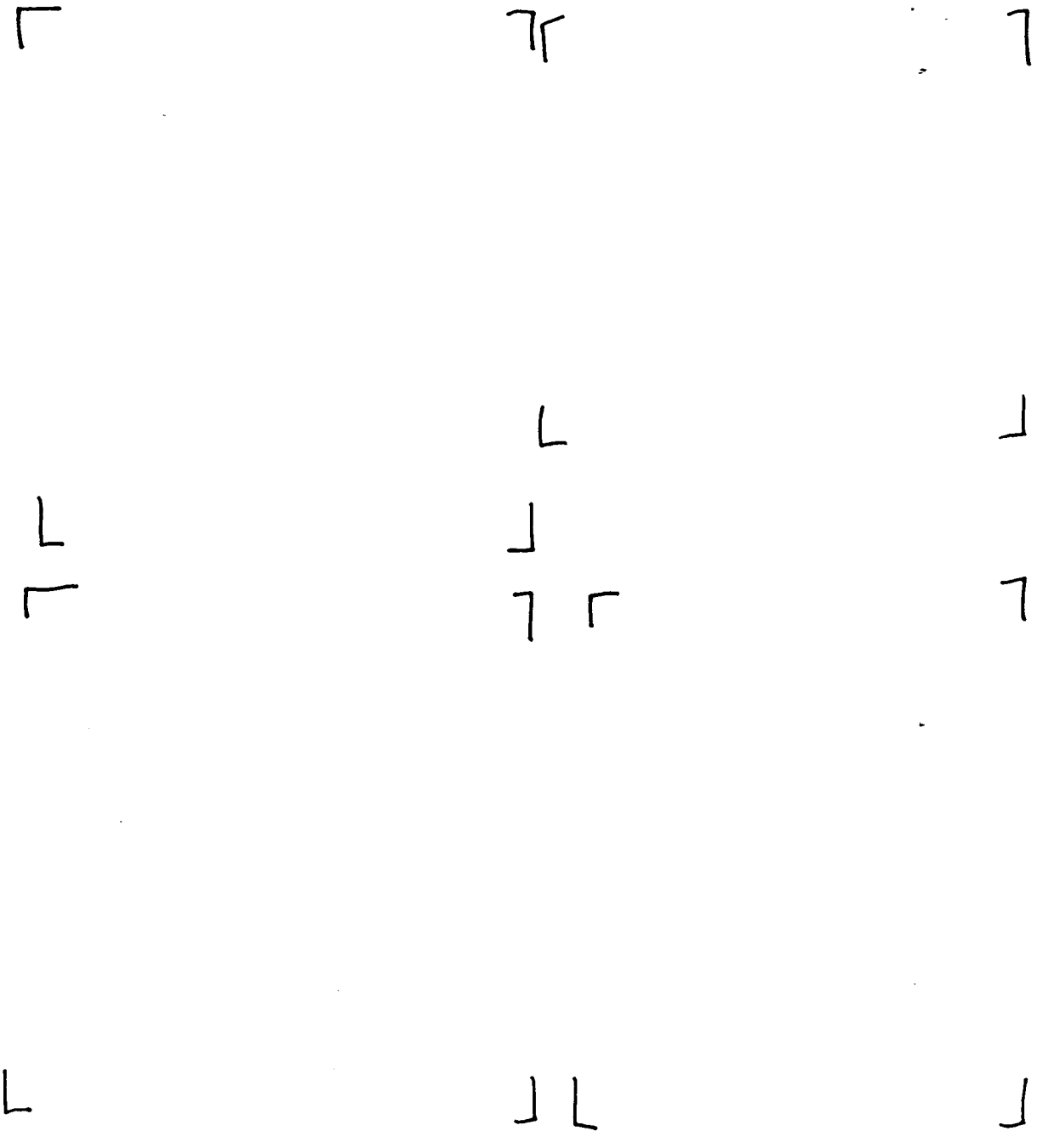
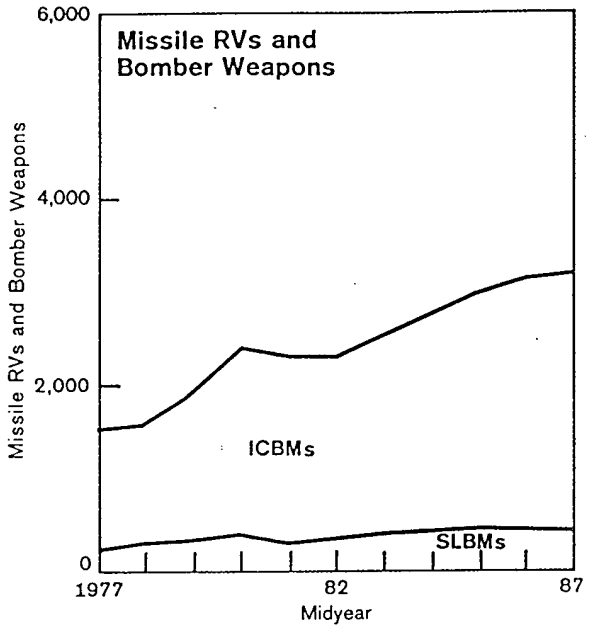


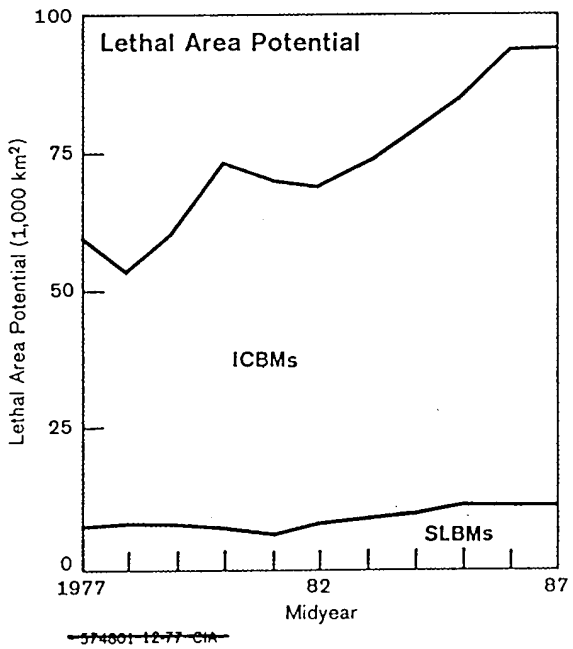
Figure 19

Residual Capabilities of Soviet Forces Following a US Surprise Attack

By ICBMs of Assumed US Force
Against Soviet Moderate SAL Force
for Intercontinental Attack

- The Soviets do not maintain bombers on alert. Hence, we assume none would survive a US surprise attack.
- Two-on-one cross targeting of US ICBMs against Soviet ICBM silos is assumed.





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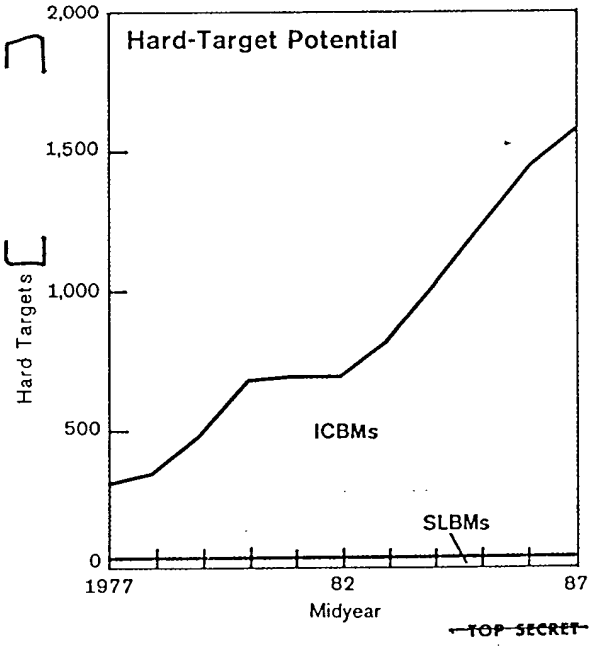

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out the period because of their accuracy limitations.

— In this calculation, Soviet bombers make no contribution to surviving Soviet capabilities because the Soviets keep no bombers on alert and, hence, we assume that none would survive a US surprise attack.

103. There are important limitations in this analysis of residual forces:

— It examines only hypothetical ICBM counterforce attacks.

— It considers neither the employment of other weapons nor strikes against other targets.

— It measures destructive potential in terms of nominal soft and hard targets rather than specific target sets.

— It does not take into account the possibility that a side under attack would launch its ICBMs upon receipt of tactical warning.

— It does not consider the possible effects of Soviet defenses.

104. Any such analysis is also affected by the great uncertainties in intelligence projections of Soviet forces for a period as long as 10 years in the future and by the present state of flux in US force planning for the mid-1980s and beyond. In particular, US deployment of the M-X ICBM or a comparable system, if it occurred, would significantly affect the analysis beginning in 1986. It could cause Soviet residual ICBM capability to drop off markedly and could begin to restore the ICBM component of the US residuals. Uncertainty about both the operational capabilities of one's own current forces and the future programs of the opponent is likely to affect the calculations of both sides throughout the period of this Estimate.

D. Soviet Peripheral Attack Forces

105. The Soviets' efforts to enhance their peripheral forces have included assignment of some ICBMs to peripheral attack missions, relocation of older ballistic missile submarines to bases closer to potential target areas, deployment of the Backfire bomber, and the initial deployment of the MIRVed SS-20 mobile IRBM. Extensive deployment of the SS-20 will allow the Soviets to reassign any ICBMs currently targeted against peripheral areas to intercontinental missions. The total number of bombers and missile launchers in the peripheral forces probably will decline. However, Soviet capabilities to conduct strategic nuclear strikes in Europe, China, and other parts of the Eurasian periphery will be greatly enhanced because of the increased capabilities of the newer weapons and, in the case of the SS-20, the availability to each launcher of multiple missiles for refire. As compared with existing Soviet systems, the Backfire will be better able to penetrate European defenses and the SS-20 will be more survivable because of its mobility.

E. Capabilities and Limitations of Soviet Strategic Defenses

106. We do not compare strategic defensive forces in the same manner as intercontinental offensive forces. For one thing, partly because US and Soviet strategic doctrines differ, the USSR has developed and deployed massive forces for the defense of the homeland, whereas the United States has not. In addition, we have not thus far been able to devise useful measures of defensive force effectiveness. Rather, we make general judgments about the ability of Soviet strategic defenses to defend the USSR against a US strategic nuclear strike.

107. In most of our analyses of Soviet strategic defenses, we begin by assessing the capabilities of individual defensive weapon systems. If a system shows promise of at least some technical capability to defend against a threat, we estimate the number the Soviets might deploy and then judge the quality of the defense these weapons could provide for the areas they would be likely to defend. Relevant to these analyses is the fact that today, and in the foreseeable future, the large numbers of offensive weapons available to the United States and the US ability to determine the location and tactics of attack make the task of Soviet defense very difficult.

108. We find that even when we make optimistic assumptions for the defense, weaknesses often still appear when we examine the capabilities of individual systems and force elements. In such cases, it is perhaps less necessary to take on the much more difficult task of assessing the effectiveness of an integrated defense. Nevertheless, as mentioned previously in connection with offensive force calculations, a definitive assessment of such effectiveness probably could not be made short of performing a two-sided war game which would take into account the tactical interactions between US and Soviet forces.

Ballistic Missile Warning and Defense

109. Work now is in progress on new, large phased-array radar facilities which will expand, improve, and

fill a remaining gap in the Soviet ballistic missile early warning network. We are concerned, however, that these radars and others which may be built could be given the capability to perform ABM battle management functions. If they are, this could constitute long leadtime preparations to support a future option to deploy an ABM system that requires battle management data. The Soviets are also working on two new launch detection systems which together would provide reliable warning of a US ICBM attack shortly after launch and could thus contribute to a Soviet option to launch offensive forces upon receipt of tactical warning.

110. Compliance with the ABM Treaty would keep Soviet ABM defenses insignificant, but ABM research and development will continue. The ABM-X-3 system which has been under development could be deployed much more rapidly than the Moscow ABM system, but, like the Moscow system, it would have limited capabilities against a large ballistic missile threat incorporating penetration aids. A high-acceleration ABM interceptor, which began flight-testing in 1976, would substantially improve the capabilities of the ABM-X-3. The Soviets probably would need about five years to incorporate and test the new interceptor and to make necessary modifications to the engagement radar. An alternate view is that such development and testing could require as few as three years.[18] We have no reason to believe the Soviets are planning to abrogate the ABM Treaty or that they will do so under circumstances approximating that of the present US-Soviet political and strategic relationship. In our view, Soviet goals in ABM R&D are to deter the United States from abrogating the ABM Treaty, to put the USSR itself in a position to abrogate the treaty should it so desire, and to deploy quickly in the event of US abrogation.

Antisatellite Systems

111. We expect the Soviets to continue improving the capability of their nonnuclear orbital interceptor, and possibly to modify this system to permit intercepts of US satellites in synchronous and semisynchronous orbits. The Soviets also have some present capability for electronic interference with certain satellites and we expect them to continue to develop it. During the next decade the Soviets are expected to continue work on lasers for use in antisatellite applications, including space-based laser ASAT weapons, which would be more effective than current orbital interceptors. It is within their technical capabilities to have a prototype available in the mid- to late 1980s.

Strategic Air Defense

112. The recent US cruise missile program will probably cause the USSR to accelerate its efforts to combat the low-altitude threat. We believe, however, that there will be no significant improvement in the present very limited Soviet capability for defense against manned bombers at low altitudes before 1980. The improvements we foresee have the potential of making low-altitude penetration by today's bombers considerably more difficult by the mid-1980s, or perhaps somewhat earlier with a high level of effort. The Soviets probably would not have high confidence in their capabilities against bombers, however, because of such factors as penetration tactics, electronic countermeasures (ECM), and electronic counter-countermeasures (ECCM). The Soviets are unlikely to have the capability to defend against the short-range attack missile through the period of this Estimate.

113. With respect to defense against a large-scale, low-altitude cruise missile attack, the technical characteristics of the SAMs, AWACS, and interceptors which the Soviets are likely to have in the period to 1987 lead us to judge it unlikely that they can deploy sufficient defenses to cover all of the areas they would want to protect. AWACS aircraft could probably provide short-term coverage of major overwater approaches and penetration corridors. Technical and operational weaknesses, however, will lead to a poor quality of defense against cruise missiles for those corridors and target areas that are covered. Thus, while it is difficult to quantify the degree of protection the Soviets could achieve against a large-scale cruise missile threat in the mid- to late 1980s, we believe that overall defense effectiveness will be low. A divergent view is that Soviet defensive potential against cruise missiles is somewhat understated in the foregoing text. This view is based on preliminary estimates which indicate that a substantial number of targets could be provided with SA-X-10 low-altitude SAM coverage between now and the late 1980s. Given this deployment potential and the existing uncertainties about the performance of the SA-X-10 and other low-altitude systems the Soviets are now developing, this view holds that it is not yet possible to assess fully how effective their deployment might be against the first generation of US cruise missiles. While the degree of protection provided for the entire Soviet target base would probably be low, this view concludes that the Soviet defensive efforts

[18] *The holder of this view is the Director, Defense Intelligence Agency.*

against cruise missiles might prove significant enough in some target areas to complicate US force structuring and force application tactics.[19]

114. The combination of US air attack forces would be considerably more difficult to defend against than any one of its elements alone. US penetration tactics and ECM, as well as the degradation of defenses by ballistic missile strikes, would continue to weigh heavily against the overall effectiveness of Soviet air defenses. We cannot, however, assess the full effects of these and other operational factors.

[19] *The holder of this view is the Assistant Chief of Staff, Intelligence, Department of the Air Force.*

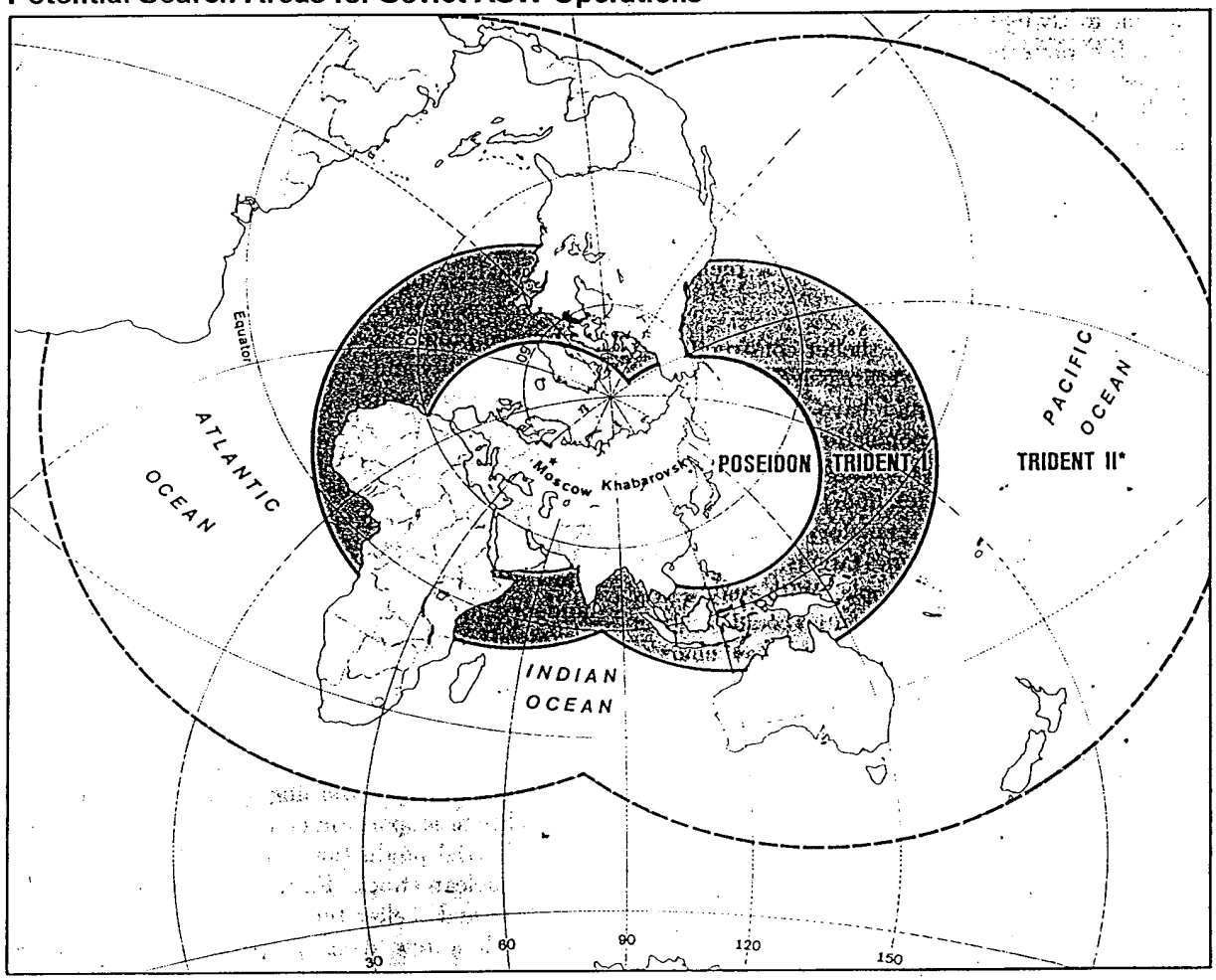
Defense Against Ballistic Missile Submarines

115. Soviet antisubmarine warfare forces are not now an effective counter to US SSBNs. We believe that Soviet ASW capabilities will improve over the next 10 years. Introduction of the Trident SSBN, with expanded operating range, will compound the Soviets' problem. (See figure 20.) From our understanding of the R&D programs in the United States and the USSR, we believe the Soviets have little prospect of developing new systems capable of effectively detecting and tracking US submarines in broad ocean areas during the period of this Estimate. [redacted]

[redacted] From present evi-

Figure 20

Potential Search Areas for Soviet ASW Operations



*The Trident II SSBN/SLBM weapon system is not a part of the current US programed force.

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dence, we conclude that Soviet ASW capabilities against US SSBNs in confined waters will improve during the period of this Estimate. Despite the likely Soviet ASW improvements, we expect that virtually all US SSBNs on patrol would be able to launch their missiles.

Civil Defense

116. To date, the Soviet program to construct personnel shelters for civil defense is estimated to have provided shelter space for most if not all leadership elements at national, regional, and local levels and for a large percentage of essential personnel at key industrial facilities. A minimum of 10 to 20 percent of the Soviet urban population could be protected in shelters; we are confident that more extensive analysis would result in an upward adjustment of this figure, but we are unable to say by how much. This concentration on shelters for protection of the leadership, essential personnel, and the general population—in that order—is consistent with stated Soviet civil defense priorities. Policies to protect industry by dispersal and hardening have not been effectively implemented, however, and it appears that in a nuclear war the Soviets could not prevent massive damage to their economy and the destruction of many of their most valued material accomplishments.

117. Despite their extensive shelter construction, if the Soviet leaders hoped to avert massive human losses in a nuclear war, they would have to evacuate the majority of their urban population. Our tentative estimate is that with about a week for evacuation and other preparations, casualties due to prompt effects and early fallout from a US retaliatory attack designed primarily to destroy economic targets could be reduced to about 20 million people. With only a few days for preparation, prompt casualties could be about 50 million, and with the time limited to a few hours or less, more than 120 million. Many circumstances could cause these estimated casualty levels to rise, such as a US attack while urban evacuation was under way, an attack stretched out over a longer period, or one designed to maximize fallout. In assessments of the effectiveness of their civil defense, the Soviets would probably take into account uncertainties about the nature and size of the US attack and other uncertainties about weather, the time for evacuation, and the availability of transportation. We have not analyzed the Soviet potential for postattack recovery.

118. The Soviet leaders almost certainly believe that their present civil defenses would improve their ability to conduct military operations and would enhance the USSR's chances of surviving a nuclear war. Given the many uncertainties attendant to a nuclear exchange, however, they cannot have confidence in the degree of protection that would actually be afforded. We therefore do not believe that their present civil defenses would embolden them deliberately to expose the USSR to a higher risk of nuclear war.

119. A continuation of present trends in the ongoing Soviet civil defense program would, by 1985, increase to about 15 to 30 percent the proportion of the urban population which could be sheltered and would further improve the protection available to the leadership and to essential personnel. Considering the projected growth in urban population, we foresee no reduction in the Soviets' dependence on evacuation for population protection. Improved transportation may somewhat reduce the time required. The prospects are that over the next 10 years the Soviet economy will remain about as vulnerable as at present to a large-scale US attack directed against it. We have no present reason to anticipate any significant change in the Soviet leaders' perception that civil defense contributes to the USSR's capabilities for nuclear conflict, or in their uncertainties about its actual effectiveness. Nevertheless, the Soviet civil defense program, in conjunction with other Soviet strategic offensive and defensive programs, could have a potential impact on both the reality and perception of the strategic balance in the coming years.

120. There is an additional view which goes beyond the foregoing and holds that available evidence clearly demonstrates that civil defense makes an important contribution to the Soviet strategic posture. In this view, the comprehensive Soviet planning, training, and organizing efforts devoted to civil defense programs afford the USSR a significant potential advantage over the United States in dealing with nuclear warfare conditions. In particular, the Soviet ability to protect a large infrastructure of leadership cadres at all levels in hardened command post shelters under conditions of short warning greatly enhances Soviet capability to support military operations, restore essential industrial production, and speed recovery following a nuclear attack. Further, the Soviets' ability to evacuate and shelter the bulk of their urban population with a few days' preparation, thus markedly reducing expected casualties, enhances Soviet strategic capabilities. Finally, the continuing Soviet investment of considerable resources and skilled manpower in the program clearly demonstrates the Soviet leaders' own

perception that civil defense enhances the overall strategic capabilities of the USSR.[20]

Advanced Technology

121. Soviet R&D programs are consistent with a desire both to avoid slipping behind the United States and to gain the lead in the technology of strategic offensive and defensive forces, particularly if US programs falter. During the next 10 years, the Soviets will have a growing potential for significant and perhaps novel developments in weapons and supporting systems. [

122. We continue to examine closely Soviet R&D programs and prospects for major advances that might seriously erode US deterrent capabilities. We give particular attention to R&D applicable to directed-energy weapons for use in air and missile defense, and to the detection and tracking of US ballistic missile submarines. The Soviets are working actively in both fields, and there are gaps in our knowledge of this work. The available evidence, together with our appreciation of the physical, engineering, and operational hurdles which must be overcome, leads us to rate as small the chances that the Soviets can sharply alter the strategic balance through such technological advances in the next 10 years. But Soviet efforts in advanced technology applicable to strategic defense merit very close watching.

[20] *The holders of this view are the Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Staff, Intelligence, Department of the Air Force.*

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