Central Intelligence Agency

Washington, D.C. 20505

24 June 2022

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Reference: EOM-2019-01004

Dear Requester:

This letter is a final response to your 8 August 2019 Mandatory Declassification Review request referenced above and submitted under Executive Order 13526 (hereafter, "the Order") for:

"Soviet Forces for Intercontinental Attack"

We completed a thorough search for records responsive to your request and located the enclosed document which we can release in segregable form with deletions as marked on the basis of Sections 3.3(h)(2) and 6.2(d) of the Order.

As the CIA Information and Privacy Coordinator, I am the CIA official responsible for this determination. You have the right to appeal this response to the Agency Release Panel within 90 days from the date of this letter. Please explain the basis for your appeal. You may address appellate correspondence to:

Information and Privacy Coordinator
Central Intelligence Agency
Washington, DC 20505

If you have any questions regarding this response, you may seek assistance by calling this office at 703-613-1287.

Sincerely,

Anthony J. Capitos
Information and Privacy Coordinator

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USSC 3202

Soviet Forces for Intercontinental Attack

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NIE 11-8-72

SOVIET FORCES FOR INTERCONTINENTAL ATTACK

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CONTENTS

SOVIET FORCES FOR INTERCONTINENTAL ATTACK

SCOPE NOTE

This NIE assesses the strengths and capabilities of Soviet forces for intercontinental attack, discusses questions of policy with respect to those forces, and estimates their size and composition over the next several years.

SUMMARY AND CONCLUSIONS

I. PRESENT STATUS OF SOVIET FORCES FOR INTERCONTINENTAL ATTACK

General

A. An estimate on Soviet forces for intercontinental attack is subject to some special difficulties this year. For one thing, the strategic arms limitation (SAL) agreements concluded in May have profound implications both political and military. They create a new milieu, and affect both the choices open to the Soviets and the way in which they will be exercised. In addition, the Soviet forces for intercontinental attack are in a kind of interim phase technically, and there is much uncertainty about the characteristics of new systems being developed. The issues involved are taken up in depth in the body of the paper,

but only some can be resolved on present evidence. This summary sets forth (1) essential facts about present Soviet forces for intercontinental attack (2) considerations bearing on Soviet policy choices and (3) some likely changes in the characteristics of these forces. It concludes with a brief description of the illustrative future forces contained in the body of the paper and brief comments on the likely future shape of Soviet forces.

B. In the course of the past decade, the Soviets have engaged in a vigorous and costly buildup of the various elements of their forces for intercontinental attack. As a result of this effort, the Soviets had operational on 1 October 1972 an estimated 1,527 ICBM launchers, including 120 SS-11 launchers at Derazhnya and Pervomaysk which, though possibly intended for use against European targets, are nevertheless capable of reaching the US, 516 submarine-launched ballistic missile (SLBM) launchers, and 195 heavy bombers and tankers.

C. The large-scale deployment programs for ICBMs which began in the 1960s have now run their course, but the construction of new types of silos and certain activity at the test ranges indicate that Soviet ICBM programs are entering a new phase characterized by emphasis on qualitative improvements. The new silos are found at the Tyuratam missile test center and at several missile complexes. Two basic sizes are involved—one large and one small. The new silos probably will be harder to disable than existing silos. There is evidence which suggests that silos at operational ICBM complexes will be converted to the new configurations.

D. It appears that two new liquid-propellant missile systems are under development at Tyuratam which are to be used both in new silos and in reconstructed silos. Launch phase tests of these missiles have already taken place; down range flight testing of the smaller of the two probably has begun as well. The smaller missile is in the SS-11 class, and we think it will be deployed in reconstructed SS-11 silos. It may also be deployed in 60 new small silos at Derazhnya and Pervomaysk, but there is evidence that these silos will house the SS-11 Mod 3, at least initially. The larger missile is in the SS-9 class; the available evidence suggests that it could be either the size of the SS-9 or somewhat larger. We expect this missile to be de-

ployed in the 25 new large silos located at SS-9 complexes and in reconstructed SS-9 silos. In addition, flight tests have begun at the Plesetsk missile test center on a solid-propellant missile which could be entirely new or a highly modified SS-13.

E. Twenty-seven Y-class submarines, each equipped with 16 launch tubes, are currently operational, and an additional 4 are fitting out or conducting sea trials prior to entering service. The Soviets have launched a modified Y-class submarine which differs from all previous units of that class. This submarine, which has been designated the D-class, is longer than the Y-class and has 12 launch tubes rather than 16. We believe that it will carry the SS-NX-8 missile, which has a much greater range than the SS-N-6 missile carried by Y-class submarines.

F. The Soviet force of intercontinental bombers and tankers consists of 110 Bears, 70 of which carry air-to-surface missiles, and 85 Bisons, including 50 tankers. The first units of a new strategic bomber—the Backfire—could become operational by late 1973. All but the Air Force continue to believe that it is best suited for use against Europe and Asia. The Air Force believes that it is suitable for a variety of missions including intercontinental attack.

The Principal Types of Intercontinental Ballistic Missiles

G. The SS-11 Mod 1, by far the most numerous of Soviet ICBMs, is estimated to have a circular error probable (CEP) at intercontinental range of about 1 nm. There is disagreement about its yield,[1] but whichever view is correct, the missile is still suitable only for attacking soft targets. In 1969, testing began on two new versions of the SS-11, both apparently developed to help penetrate antiballistic missile defenses. Testing on one version ceased in December 1970 and the program has almost certainly been terminated. The other version, now called the Mod 3, has three re-entry vehicles (RVs) which are not independently targetable. There is disagreement about the yield of this weapon as well,[2] but again it is clearly suitable only for attacking soft

[1] See paragraph 24.
[2] See paragraph 27.

targets. Testing of the Mod 3 continues, and deployment is likely to begin later this year.

H. The SS-9 exists in four variants: Mod 1, which carries an RV weighing about 9,500 pounds; Mod 2, whose RV weighs about 13,500 pounds; Mod 3, which has been tested both as a depressed trajectory ICBM (DICBM) and as a fractional orbit bombardment system (FOBS); and Mod 4, which carries 3 RVs.

I. There is general agreement that the SS-9 was developed to provide better accuracy and a larger payload than the older SS-7, presumably for use against hard targets—e.g., the US Minuteman system. The Mod 1, carrying a warhead estimated to have a yield [redacted] appears reasonably well adapted for this purpose. In 1965, however, the Soviets began to test the Mod 2, which, with its heavier payload, is estimated to have a yield [redacted] The Mod 2 actually reached operational status before the Mod 1, and we estimate that three quarters or more of all operationally deployed SS-9s are Mod 2s. But the Mod 2 has never actually demonstrated enough range to reach any Minuteman complex. We believe that its demonstrated range could be increased sufficiently to cover all of them by using up more of the available propellant, removing telemetry packages, etc. It remains curious, however, that the Mod 2, alone among the ICBMs except the SS-13, has never been tested to what we would presume to be its intended operational range.

3.3(h)(2) 6.2(d)

3.3(h)(2) 6.2(d)

3.3(h)(2) 6.2(d)

J. The accuracy of the SS-9 must be deduced from evidence on certain aspects of the guidance system, and from estimates and assumptions about other factors. Depending upon the assumptions used and the statistical techniques employed, various results may be obtained. In the Intelligence Community, opinions as to the CEP of the SS-9 Mod 1 and Mod 2 under flight test conditions range from a low of 0.4 nm to a high of 0.7 nm; all are agreed that under operational conditions the CEP would be degrated somewhat. The significance of these differences is considerable, but the Soviets would in any event have to deploy several times the present number of SS-9 Mod 1s and Mod 2s, with their present capabilities, before achieving a force that would pose a serious threat to the Minuteman force as a whole.[3]

[3] See paragraph 13 for a discussion of the differing views on accuracy and paragraph 14 for a discussion of the effect of differences in accuracy and yield.

K. As to the SS-9 Mod 3, it would not have sufficient accuracy in either the DICBM or FOBS mode to attack hard targets effectively; its apparent function is to attack soft strategic targets, negating or delaying detection by the US Ballistic Missile Early Warning System. (New US warning systems give promise of reducing or eliminating this advantage.) The Mod 3 appears to have limited capability as a FOBS. It may be deployed in very small numbers; future deployment, if any, will probably also be limited.

L. The Soviets have also developed the SS-9 Mod 4, which carries three RVs. No firings clearly identifiable as troop-training firings have ever been detected. For several years, there has been controversy within the Intelligence Community about whether the three RVs could be targeted independently and there is still some disagreement on this point. Some agencies believe that the Mod 4 is and will remain a multiple re-entry vehicle (MRV) for use against soft targets; others believe that the Mod 4 could have represented either an MRV or a multiple-independently targetable re-entry vehicle (MIRV) with limited targeting flexibility but that the development program has been terminated; still others think it was intended to be a MIRV and also believe that the development program has been terminated.[4] There is also disagreement about the probability that the Mod 4 has been deployed, but all agree that if now deployed, it is as an MRV and in small numbers.

II. SOVIET POLICY AND FUTURE PROGRAMS

M. The broader reasons for the USSR's energetic buildup of its forces for intercontinental attack are neither complex nor obscure. In the early 1960s the Soviet leaders, politically and ideologically hostile to the US, and thinking and behaving as rulers of a great power, recognized that in this particular respect their military forces were conspicuously inferior to those of their most dangerous rival, the US. Consequently, they set themselves to rectify the imbalance—to achieve at a minimum a relation of rough parity. Parity in this sense cannot be objectively measured; it is essentially a state of mind. The evidence available, including Soviet statements at the SAL talks, indicates that the Soviet leaders think that they have now generally achieved this position.

[4] See paragraph 19.

N. Many aspects of the present force structure are also susceptible to simple and probably correct explanation. The Soviets built a large number of ICBMs in order to match—and then to surpass—the number of US ICBMs, and also to increase the probability that many would survive an initial US attack. They built missile-launching submarines which are highly survivable when deployed, and they retained a manned bomber force as yet another option. The intercontinental attack force is obviously capable of being used in war, but there is no reason to believe that the Soviet leaders intend deliberately to make nuclear war. The force is an attribute of power, an instrument to support policy, and a deterrent to the US.

O. Decisions about military policy and programs are probably centered on two key elements—the military and military-industrial authorities who formulate new programs, and the top political leaders. The latter have the final say, but they must operate in a context of other forces and take them into account. Decision-making appears to involve clusters of advisory and executive bodies which are likely, at times, to be in competition with one another. Bureaucratic pressures, conflicts, and constraints may be heavy on occasion. We think it unlikely that observed Soviet programs are the product of a carefully thought out strategic plan or rationale which is undeviatingly executed. It is probably fair to say that the Soviet system gives considerable weight to military claims and interests, and that it is characterized by an inertia which favors large established bureaucratic interests in general and tends to work against sharp changes in direction.

P. Looking to the future, we have little basis in evidence for estimating the content of specific decisions on strategic policy or on particular weapon programs. Soviet strategic policy will of course be affected by the specific provisions of the SAL agreements, and by the manner in which these agreements alter or appear to alter the strategic, political, and economic conditions and opportunities confronting the USSR. Decisions about future forces will also be influenced by Soviet perceptions of the US strategic threat, and by what weapons they are able to develop and the feasibility of procuring and deploying them.

Q. It seems clear that the Soviet leaders intend to maintain at a minimum such forces as will continue to give them a sense of equal security with the US. The general attitudes and policies of the USSR

being what they are, it might seem obvious to infer that they will strive to exceed that minimum and to achieve marked superiority over the US in strategic weaponry. We do not doubt that they would like to attain such a position, but the question is whether they consider it a feasible objective, particularly in the light of the arms limitation agreements. They might think it feasible to seek a strategic posture that, while falling short of marked superiority, makes clear that the Soviets have advantages over the US in certain specific areas. Whether or not such advantages are significant militarily, they would help to dramatize the strategic power of the Soviet Union.

R. But even if the Soviet intention is to go no further than maintenance of "equal security", their arms programs are bound to be vigorous and demanding. This is in part because Soviet leaders must have an eye not only to what forces the US has at present, but also to what it can have, or may have, in future years even within the framework of arms control agreements. In this respect, they are likely to be cautious—to overestimate rather than underestimate the US threat. Moreover, the weapons competition nowadays is largely a technological race; the USSR is impelled to press forward its research and development (R&D) lest it be left behind. Soviet weapon programs also tend to attain a momentum of their own; the immense apparatus of organizations, installations, personnel, vested interests, and so on, tends to proceed in its endeavors unless checked by some decisive political authority.

S. In some respects, these tendencies will be reinforced now that the SAL agreements have been concluded. For military and political reasons, the Soviet leaders will wish at least to keep pace with the US. Also the leadership has a personal and political stake in insuring that the USSR suffers no real or apparent erosion of its relative position. It will want to maintain a strong bargaining position for the follow-on negotiations, and to develop new options in the event that future talks break down.

T. On the other hand, there are constraints upon Soviet arms programs beyond those imposed by the terms of the SAL agreements. The most obvious is economic: resources are not unbounded; the civilian economy demands its share; one weapon competes with another for allocations; and intercontinental attack forces compete with strategic

defense and general purpose forces. The various bureaucracies with interests in one or another area compete partly with rational argument and partly in sheer political infighting. Soviet leaders must also consider how far they may wish to press their own programs lest they provoke countervailing programs in the US. And they must assess not only the present and future US threat, but also that from China, and elsewhere.

U. In the context of arms control, other pressures for moderation will be at work. The SAL agreements have been hailed in the USSR as a successful manifestation of the current Soviet policy of détente; consequently there will be incentives to avoid actions which, though not actually violating the agreements, might jeopardize them. Many of the top political leaders, and most notably Brezhnev, have identified themselves personally with the accords, and would have much to lose politically if they came unstuck. Similarly, various groups in the USSR now have a stake in the agreements, as a consequence of a long and difficult process of negotiation which undoubtedly required a delicate balancing of individual interests. Any step which might constitute a threat to the agreements would probably disturb this balance.

V. While the foregoing considerations probably govern the nature of Soviet decisions as to future weapon programs, they provide us with little or no basis on which to estimate what these programs will be and, in particular, their features in detail. We have never had solid evidence on these matters, and there is no reason to expect that we shall have such evidence in the future. Moreover, as the past 10 years have shown, technological advance can produce vigorous action and reaction between military programs of the USSR and the US.

W. Yet the possibilities are not unlimited, certainly in the next five years or so. For one thing, intercontinental weapon systems are of such complexity that their development, testing, and deployment take a long time. We can therefore estimate with much confidence that the kinds of weapon systems deployed by the Soviets during the next two years or so will be those already in operation or in the late stages of development. Even in the period from two to five years from now the force will be composed largely of existing kinds of delivery vehicles, but it could change substantially by the end of the period of this Estimate.

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X. As a result of the SAL accords, the main questions about the future of Soviet forces for intercontinental attack center more than ever on the pace and scope of technological change. Also as a consequence of the accords, and of the opportunities and risks they present, future strategic programming decisions will probably be even more directly influenced than in the past by the Soviet leadership's sense of stability or change in its strategic relationship with the US. To be sure, as China moves closer to establishing a credible nuclear force, the need to counter Chinese capabilities will also affect Soviet plans. For many years to come, however, Soviet planning of strategic offensive weapons is likely to be concerned primarily with the US arsenal, in terms both of the strategic threat it poses and the diplomatic and political leverage it affords.

Y. The next few years should see significant qualitative improvements in Soviet forces for intercontinental attack, as the USSR pushes ahead with its R&D and exercises options open to it under the SAL accords. The most important of these improvements are likely to be in accuracy of missiles, in MIRVs for them, and in survivability.

1. *Accuracy.*[5] We have for some time thought that the Soviets would incorporate greater accuracy in follow-on missile systems, and we now have some positive indications of this intent. The Soviets appear to be moving toward less blunt RVs for their missiles. Such RVs pass through the atmosphere more quickly, and are thus less subject to deflection while in the atmosphere. Improvements in the components of present Soviet guidance systems and a continuation of the recent trend to less blunt RVs could result in CEPs as low as about 0.25 nm for ICBMs. The Soviets could achieve significantly smaller CEPs but this would require, in addition, wholly new techniques of guidance. It is too early to tell what methods of guidance are being employed in the new ICBMs described earlier, but it appears that two of them utilize on-board digital computers [redacted] 3.3(h)(2) 6.2(d)

[5] Lt. Gen. Samuel C. Phillips, the Director, National Security Agency, and Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, believes this Estimate overstates the improvements in ICBM accuracies the Soviets might achieve during the period of this Estimate. For their views, see footnotes to paragraphs 54, 57, and 58 in Section I.

2. *MIRVs.* We continue to believe that the Soviets will develop MIRVs, including some with the yields and accuracies necessary to attack hard targets. We estimate that it would take at least two years of flight testing to develop a MIRV system, and at least an additional year if wholly new techniques of guidance, designed to achieve very high accuracies, were also involved.

3. *Survivability.* The USSR's concern about the survivability of its forces will surely continue strong as the US deploys increasingly large numbers of independently targetable RVs. In addition to the employment of active defenses, survivability can be achieved through hardness and mobility. The new silos under construction promise to be considerably harder than present types, and so do reconstructed SS-9 and SS-11 silos. The Soviets could also deploy mobile ICBMs, an option not actually barred by the SAL accords; we continue to think this unlikely, the more so because of the unilateral US statement opposing this development.[6] We do expect the Soviets to replace their older ICBMs with SLBMs as permitted by the agreements, in part to achieve greater survivability.

Z. We have little evidence concerning the qualitative improvements to be incorporated in the three new ICBMs. We are fairly confident that the new large missile will carry a heavier payload than the SS-9, and the new small liquid-propellant missile a heavier payload than the SS-11. Although there is as yet no evidence on the point, we believe that one or more of these missiles will carry MIRVs, in due course if not at first, and that all will incorporate at least some improvements in accuracy. More definitive judgments on these missiles cannot be made until more data become available.

AA. As to ballistic missile submarines, in two years or so the Soviets will have as many launchers on their Y- and D-class submarines as the US has in the Polaris force, and these launchers will constitute a substantial portion of Soviet forces for intercontinental attack. We expect the current SSBN production program to continue for some time, with most if not all future units consisting of the 12-tube D-class carrying the SS-NX-8. There is no direct evidence of another new class of ballistic missile submarines, but we believe that one will appear in the next five

[6] Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, does not agree with this judgment. For his views, see his footnote to paragraph 49 in Section I.

years or so. A new construction hall is being built at the Severodvinsk shipyard, which may be for a new class. A new submarine with more launch tubes than the D-class would permit the Soviets to come closer to the combination of 62 modern ballistic missile submarines and 950 launchers allowed by the SAL agreements.

BB. We have judged for the past several years that as their ICBM and SLBM forces grew, the Soviets would come to rely less and less on their intercontinental bombers. Those missile forces have now reached significant proportions, but there has been no phase-out or appreciable attrition of the heavy bombers and tankers in Long Range Aviation for several years, or any significant reduction in their training activity. Thus, it appears that current Soviet leaders believe that the advantages afforded by an intercontinental bomber force, for the present at least, are worth the cost of retaining one. If they persist in this view, they must decide whether to put their rapidly aging aircraft through more difficult and costly rehabilitation programs than in the past, or, alternatively, to go for a new heavy bomber which would give them greater capabilities for intercontinental attack than their present force does.

CC. It is evident that there are many uncertainties regarding the future makeup of Soviet forces for intercontinental attack. In order to depict a range of possible developments, we present in Section V of this Estimate five illustrative forces representing different levels of effort by the Soviets and different degrees or rates of technological advance within the constraints of the interim agreement on strategic offensive weapons.[7] Three of them postulate that the Soviets do *not* introduce new and highly accurate guidance systems for their missiles within the period of this Estimate. Force 3 represents about the most the Soviets could achieve under this postulate; it assumes that new missile systems reach initial operational capability in the minimum possible time. Force 2 illustrates what could happen if some difficulties and delays were encountered during development. Force 1 postulates, in addition, less ambitious technological goals than those of Forces 3 and 2. Two other forces postulate that the Soviets *do* introduce new and highly

[7] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, and Maj. Gen. William E. Potts, the Assistant Chief of Staff for Intelligence, Department of the Army, are in fundamental disagreement with several aspects of Section V. For their views see their footnotes throughout that Section.

accurate guidance systems for their missiles, providing accuracies of the order of 0.15 nm CEP. Force 4 postulates the introduction of such accuracies and other improvements later in the decade. Force 5 constitutes a limiting case, and, in a sense, an artificial one, illustrating what the Soviets could theoretically achieve under the interim agreement if they have highly ambitious programs already well under way and encounter no significant setbacks or delays.[8]

DD. On the whole, we think the Soviets will probably head into the next round of SAL talks with something like the goals of Force 3. They probably will be forced to settle for some slippages and delays of the sort illustrated on an across-the-board basis in Force 2. The outcome would then be something between Force 3 and Force 2. We wish to emphasize, however, that these and the other models are strictly illustrative, and not to be regarded as confident estimates. As one moves beyond the next two years or so, all projections become increasingly uncertain; beyond five years they are highly speculative.

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[8]Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, believes that Forces 2-5 overstate the missile accuracies the Soviets could achieve in the time periods reflected in those models. For his reasons, see his footnote to paragraph 54 in Section I.

DISCUSSION

1. With the signing of the strategic arms limitation (SAL) agreements in Moscow on 26 May 1972, the Soviets achieved one of the main objectives of their postwar foreign policy: world-wide recognition of a position of strategic parity with the US. This goal was reached largely as the result of the massive buildup of intercontinental and submarine-launched ballistic missile forces which began in 1963-1964 in the wake of the Cuban missile crisis.

2. The interim offensive agreement is not comprehensive, and it leaves various options open to both sides. The way in which the signatories will apply it is not known. Thus, the effect it will have on specific Soviet programs or on the size and shape of Soviet forces for intercontinental attack is far from clear. The major effect of the agreement is to place limits on the aggregate total of Soviet strategic offensive missiles. New construction of ICBM launchers is prohibited, and new construction of SLBM launchers (beyond 740 launchers, and up to a total of 950) is allowed only on the basis of one-for-one dismantling of older ICBM or SLBM launchers. The agreement leaves considerable latitude, however, for changing the existing mix of weapons, especially on the Soviet side where the terms create an incentive for a partial shift from land-based to sea-based missiles. Qualitative improvements in missiles are allowed, but silo enlargement in excess of 15 percent is prohibited. The agreement does not cover mobile ICBMs, but the Soviets have been informed in a unilateral statement that the US would regard the deployment of land-mobile ICBMs as inconsistent with the objectives of that agreement. Moreover, the agreement places no limits—quantitative or qualitative—on bombers, the third major element of forces for intercontinental attack.

3. Since the publication of NIE 11-8-71, three new Soviet ICBM test programs have been identified. Also now identified are the missiles intended for initial deployment in the new small silos and the platform for deployment of the SS-NX-8 naval missile. Many

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questions which were outstanding remain unanswered, however. We still do not know the characteristics of the new ICBMs, or whether the Soviets plan to develop another class of ballistic missile submarines, a new intercontinental bomber, or a mobile ICBM. And all but the Air Force remain uncertain about the role of the new Backfire strategic bomber.

4. The next three sections review these and related questions and provide what we believe to be the most likely answers. The fourth section discusses Soviet decision-making in the military field. A final section discusses the factors which might influence the future course of Soviet forces for intercontinental attack, and sets forth several different ways in which these forces might develop over the next several years.

I. INTERCONTINENTAL BALLISTIC MISSILES

Status of Operational Systems

5. As of 1 October 1972, the Soviets had 1,527 ICBM launchers in service at their deployed missile complexes. (See Figure 1.) These include 120 SS-11 launchers at the Derazhnya and Pervomaysk complexes which, although possibly intended for use against European targets, are nevertheless capable of reaching the US. There is still disagreement within the Intelligence Community as to which of these two missions is the primary one.

6. In addition to their operational launchers at deployed complexes, the Soviets have about 85 launchers which are used for research and development (R&D) firings or for troop-training firings. Another 20 or so launchers are used for training at operational complexes. At any given time, something over half of these launchers would be available for use against the US, but we do not believe that they are on constant alert and we do not know how long it would take to prepare them for operational use.

7. The total number of ICBMs which could be targeted against the US is summarized in Table I. It should be noted that these totals represent gross capabilities rather than an estimate of the numbers which are in fact likely to be targeted against the US at any given time. As indicated above, there is a difference of opinion about the primary mission of the SS-11s deployed at Derazhnya and Pervomaysk. In any case, all of the missiles nominally available almost certainly would not be used in an initial salvo against the US.

8. No additional launchers of the types now in service are under construction, and no additional deployment of these types is expected. A total of 91 launchers of two new types is under construction; 25 are at five of the SS-9 complexes and 66 are at Derazhnya and Pervomaysk. All 91 of these launchers may be completed under the terms of the interim agreement. There is no evidence of deployment of these or other types of launchers elsewhere. There is evidence, however, that the Soviets plan to convert existing SS-9 and SS-11 silos into launchers of the new type. There is also some evidence that the Soviets may be deactivating SS-7s deployed at soft sites.

Characteristics and Capabilities of the Intercontinental Ballistic Missile Force [9]

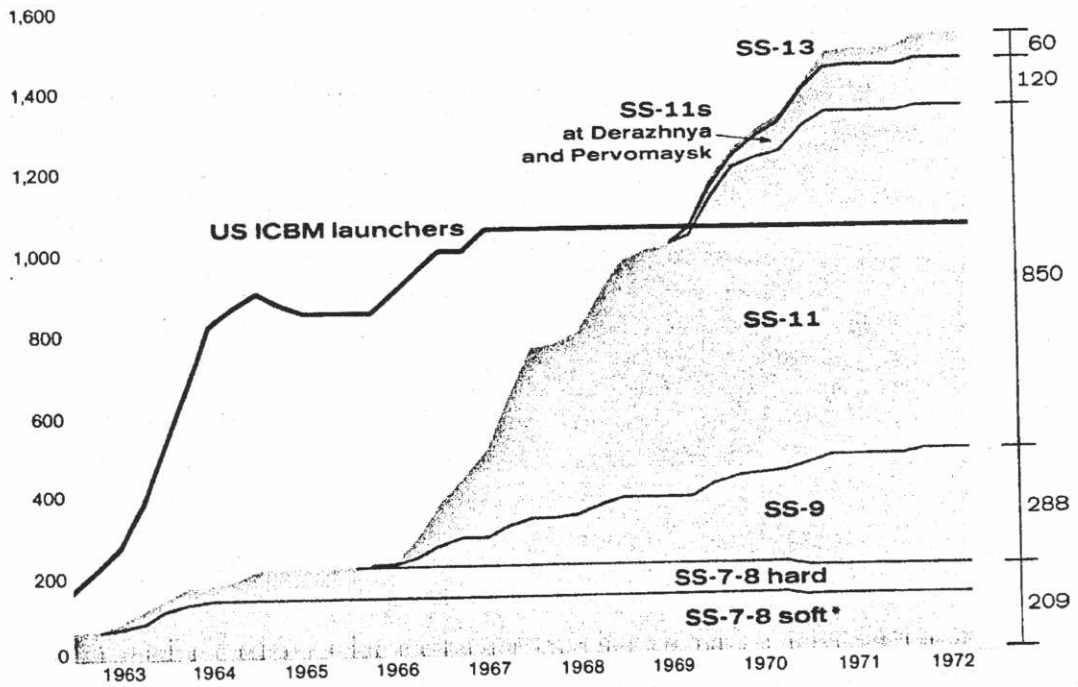
9. There has been little evidence or analysis over the past year which would lead us to change our basic judgments about the SS-9, the SS-11, and the SS-13, although we have refined some of our judgments. Recent evi-

[9] See Figure 2 for a comparison of Soviet ICBMs.

6.2(d)

Figure 1

Soviet Operational ICBM Launchers



*There is evidence that deactivation of some SS-7 soft sites has begun. See paragraph 33.

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This chart reflects estimates of operational ICBM launchers as of 1 October 1972. Assuming that all the 209 SS-7 and SS-8 launchers are still in the active force and including the 120 SS-11 launchers at Pervomaysk and Derazhnya, the Soviets have 1,527 operational ICBM launchers deployed in the field. The chart does not include 6 SS-9 Mod 3's which may be operationally deployed at the Tyuratam Missile Test Center.

dence has not helped much to resolve continuing uncertainties about the characteristics and performance of these systems, and the payload weight and yield of the SS-11 have become matters of disagreement. The discussion which follows is limited to the high points of past material on the SS-9, SS-11, and SS-13, and to new evidence or analysis.

10. *The* SS-9. The SS-9 has been discussed extensively in the Estimates in this series for the past three years. It is the only ICBM now in the Soviet inventory which could have the necessary combination of yield and accuracy to threaten US land-based ICBMs and other critical hard targets. Consequently, estimates of its characteristics and capabilities have as-

TABLE I

STATUS OF SOVIET INTERCONTINENTAL BALLISTIC MISSILE LAUNCHERS AS OF 1 OCTOBER 1972

System	Deployed forces: Operational	Deployed forces: Projected total when all groups complete	Other [a]	
ICBM Soft				
SS-7 [b] [c]	124	124	Training Launchers at Complexes	
SS-8 [b]	10	10	About	20
SS-11	0	0		
Subtotal	134	134		
ICBM Hard			Test Range R&D and Training Launchers	
SS-7	66	66	About	85 [d]
SS-8	9	9	TOTAL ABOUT	100
SS-9	288	288		
SS-11	850	850		
SS-13	60	60		
Subtotal	1,273	1,273		
New Large	0	31		
New Small	0	60		
SS-11s at Derazhnya and Pervomaysk	120 [e]	120 [e]		
GRAND TOTAL	1,527	1,618		

[a] Most of these launchers probably could be readied to fire at the US, but we are unable to make any reliable estimate of the time required to do so or of the availability of missiles for them.

[b] Each of the soft SS-7 and SS-8 launchers has a capability to launch a second missile, probably in 2 to 4 hours after initial launch.

[c] Deactivation may have begun at some SS-7 soft sites.

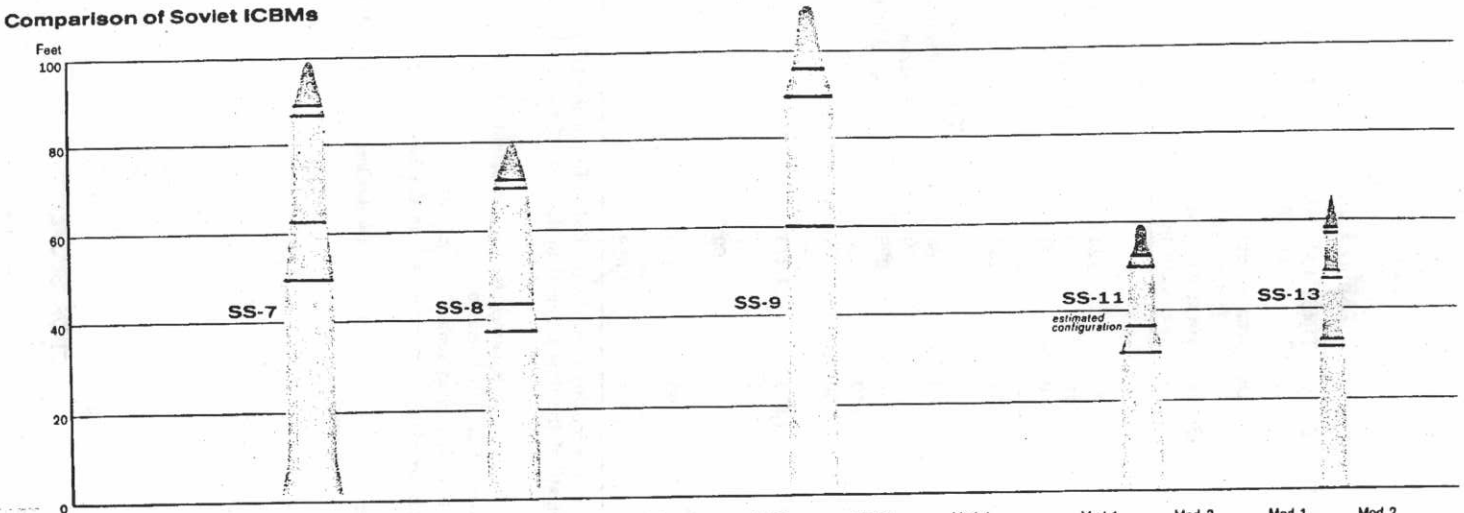
[d] This figure includes six silos at Tyuratam where the SS-9 Mod 3 may be operationally deployed.

[e] There are differing views concerning the primary mission of these SS-11s. All are agreed, however, that they could be used against the US.

6.2(d)

Figure 2

Comparison of Soviet ICBMs



	SS-7		SS-8	SS-9				SS-11		SS-13	
	Mods 1,2	Mod 3		Mod 1	Mod 2	Mod 3	Mod 4	Mod 1	Mod 3	Mod 1	Mod 2
Year Operational	1962-63	1963	1963	1967	1966	1969	see text	1966	see text	1969	see text
Maximum Operational Range (NRE)	6,500 nm	5,500 nm	6,000 nm	7,000 nm	see text	see text	5,500 nm	at least 5,700 nm	5,500 nm	5,100 nm	see text
Accuracy (CEP)	1.0-1.25 nm	1.0-1.25 nm	1.0 nm	see text	see text	1-2 nm (DICBM) 1.5-3 nm (FOBS)	see text	about 1.0 nm	0.6-0.7	about 1.0-1.5 nm	about 1.0-1.5 nm
Deployment Mode	soft pads or triple silos	soft pads or triple silos	soft pads or triple silos	single silos (6 per group)	single silos (6 per group)	single silos (6 per group)	single silos (6 per group)	single silos (10 per group)	single silos (10 per group)	single silos (10 per group)	single silos (10 per group)

TOP SECRET RESTRICTED DATA
561120 (LEFT) 9-72 CIA

TOP SECRET RESTRICTED DATA
561120 (RIGHT) 9-72 CIA

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sumed a unique importance in our overall assessment of the Soviet ICBM force. Deployment of the SS-9 ceased in 1970, however, at a level well below that required to threaten the survival of the Minuteman force.

11. With the 9,500 pound re-entry vehicle (RV) of the Mod 1 variant, the SS-9 has been flown to a non-rotating earth (NRE), range of 6,600 nautical miles (nm), enough to reach targets anywhere in the US from any of the SS-9 complexes.[10] With the 13,500 pound payload of the more widely deployed Mod 2, however, the SS-9 has never been flown more than 4,400 nm NRE. This is only enough to reach the extreme northwestern part of the US from the closest SS-9 complex. We have, therefore, searched for ways to explain this apparent limitation in the capability of the Mod 2. Considerable analysis has been done with the result that, by making certain logical assumptions and extrapolating from the available evidence, we have concluded that the SS-9 Mod 2, using a minimum energy trajectory, has a maximum operational range of 5,300 nm. This would permit coverage of all six Minuteman complexes, one Titan complex, and NORAD and Strategic Air Command (SAC) Headquarters from at least one SS-9 complex. DIA believes, further, that a maximum operational range of 5,500 nm, providing full coverage of Minuteman fields from most SS-9 complexes, should not be ruled out.

[10] The actual range of these firings was 7,100 nm, but this figure included effects of the earth's rotation, which in this case added about 500 nm. Missile ranges quoted in this Estimate are expressed in terms of NRE distances. Ranges achievable in operational firings northward to the US from the USSR are less affected by the earth's rotation than are Soviet test firings to Kamchatka or to the Pacific. As a result of the earth's rotation, the ranges in some operational firings would be increased, and in some decreased, depending on launch point and target direction.

12. Estimates of the yield of the various SS-9 warheads are based almost entirely on the estimated weight of the RV and on the assessed yield-to-weight ratio of Soviet nuclear devices as derived from the analysis of debris from atmospheric tests conducted in the USSR during 1961 and 1962.

3.3(h)(2)
6.2(d)

13. The most important element in determining the capability of a missile system against hard targets is the accuracy, or circular error probable (CEP),[11] of the system. System CEP has been calculated by measuring or estimating various factors that reduce accuracy, and subsequently combining these error contributions statistically. The primary factors involved are inaccuracies in missile guidance and control, deflections of the RV due to atmospheric conditions, and geodetic and gravimetric (G&G) errors. Taking into consideration these and other factors, CIA, NSA, State, and Air Force believe that the CEP of the Mods 1 and 2 at a range of 5,300 nm and under flight test conditions is 0.6±0.1 nm; DIA, Army, and Navy believe that the CEP of these two variants lies between 0.4 and 0.6 nm but they favor the lower value. All the Agencies believe that handling and maintenance of deployed missiles by operational personnel would degrade accuracy *somewhat*.

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14. The significance of these differences can be seen from the fact that, with a 0.4 nm CEP, a *single* SS-9 would have chance of disabling a *single* Minuteman silo. With a CEP of 0.6 nm, the same weapon would have

[11] See Glossary for de...

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3.3(h)(2)
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6.2(d)

chance of disabling a Minuteman silo, Allowing for an estimated force reliability factor of 75 percent (that portion of the force which is expected to reach the target area and detonate), it could be expected that some 70 percent of the SS-9 Mod 2s that the Soviets were able to target against Minuteman silos would disable their targets in the first case, and that less than 60 percent would do so in the second case. For Minuteman launch control centers (LCCs) two SS-9 Mod 2 missiles would be required to achieve similar probabilities, and the probabilities fall off more sharply as estimated accuracy declines.[12]

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15. Turning to the Mod 3, this variant of the SS-9 has been flight tested in two modes—as a fractional orbit bombardment system (FOBS) and as a depressed trajectory ICBM (DICBM). A large amount of data is available on this system from the firings conducted to date. On the basis of RV weight, we estimate that the Mod 3 warhead has a yield We also estimate that the system has a CEP of about 1.0 to 2.0 nm when fired as a DICBM in a northerly direction to the US; when launched in a southerly direction in the FOBS mode, the CEP would increase to 1.5 to 3.0 nm. These levels of accuracy make the Mod 3 incapable of attacking hard targets with any reasonable probability of success. The shape of the trajectory connotes a desire to deliver an attack with less time for the enemy to react. These factors suggest that the Mod 3 was designed to attack strategic, time-urgent soft targets, such as SAC bomber bases and soft command and control facilities.

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16. The Mod 3 has been flown to a range of 6,300 nm in the DICBM mode, and can unquestionably provide full coverage of the US on northerly trajectories from any SS-9 site. The vehicle as tested in the FOBS mode is not capable of inserting the payload into an orbit that would permit an attack against any target in the US on the initial orbit, on either northerly or southerly launches. The removal of 500 pounds of instrumentation would provide coverage of the eastern one-third of the US if the Mod 3 is fired south from the most favorably located complex (Dombarovskiy). It appears questionable, however, that the Soviets would have developed a FOBS system with such a limited capability. Considerable attention has been devoted to insuring that our assessment of the Mod 3's capabilities as a FOBS is not caused by incorrectly interpreted data or faulty methodology. Consequently, we are left with the following possible explanations of why

[12] Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, believes this paragraph could be misleading. With respect to the probabilities of disabling Minuteman, he would note that the calculations do not represent the disablement probabilities of the entire SS-9 Mod 2 force against the entire Minuteman force. By using the number of deployed SS-9 Mod 2s cited for 1972 in all the tables in Section V of this Estimate (222) and the CEPs, yields, and reliability factor from paragraph 14 above, calculations would show that the probability of disabling all Minuteman silos would be only 13-16 percent even if all SS-9 Mod 2s were targeted against them. He would further note that these probabilities have no bearing on Minuteman missiles already launched.

As to the probabilities of disabling LCCs, he would note that assessing the impact of disabling one is more complicated than assessing that of launch silos because of the redundancy among the five LCCs within each Minuteman squadron and because of the existence of the airborne launch control system (ALCS). Any one of the LCCs in a squadron can launch any one of the 50 Minuteman missiles in the squadron. Moreover, the ALCS, which is continuously airborne, can launch any of the Minuteman missiles. Thus, to prevent the launching of Minuteman by attacking the Minuteman command and control system, the LCCs and the ALCS would all have to be neutralized simultaneously. He believes the probability of this occurring is essentially zero.

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the Soviets have tested the Mod 3 in the FOBS mode:

(a) The Mod 3 may be intended only for use as a DICBM and might have been tested in the FOBS mode merely because it was desirable to test fully the capability of the launch vehicle while at the same time monitoring the re-entry phase at fully-instrumented land impact areas in the USSR.

(b) Alternatively, the Soviets may have taken advantage of the limited FOBS capability of the Mod 3 and deployed it as both a DICBM and a FOBS.

17. Last year we noted a third possibility—that the Mod 3 might eventually be modified to provide the additional range required to attack targets throughout the US in the FOBS mode. The lack of any evidence of this, after as long as three years of deployment, virtually eliminates this possibility.

18. The SS-9 Mod 4 has three RVs. Each RV is estimated to carry a warhead with a yield [redacted] The Mod 4 has been flight tested to a range of 4,700 nm, but it is believed to have a maximum operational range of 5,500 to 6,000 nm—sufficient to cover most of the likely targets in the US. The single shot kill probability against hardened targets would be much less than that of the Mod 1 or 2, because the individual warheads have a much lower yield and the Mod 4 is less accurate than either the Mod 1 or the Mod 2.

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19. There has been considerable controversy within the Intelligence Community about whether the Mod 4 is or was intended to be a multiple independently-targetable re-entry vehicle (MIRV). After analyzing the evidence, CIA and State conclude that the Mod 4 is a multiple re-entry vehicle (MRV) for use against soft targets and that it probably will not be developed into a MIRV capable of attacking hard targets. DIA and the Air Force conclude that the Mod 4 could have represented either a MRV or a MIRV system with limited targeting flexibility and that the development program has been terminated. NSA, Army, and Navy believe that the characteristics of the system are more applicable to the intended development of a MIRV with limited targeting flexibility than to a MRV, but that the lack of any firings since November 1970 indicates that the Mod 4 development program has been terminated.

20. There is some uncertainty about how many of the various Mods of the SS-9 are operationally deployed. The SS-9 force is made up of 48 groups. Probably about 9 of them (with 54 launchers) were originally equipped with the [redacted] Mod 1 vehicle, while the other 39 groups (with 234 launchers) were equipped with the [redacted] Mod 2 variant. There is evidence which suggests that the SS-9 Mod 4 has been retrofitted into 2 groups (12 launchers). If this is the case, it would be as an MRV and we do not know whether the missiles replaced were Mod 1s or Mod 2s. Firings of the Mod 3 fractional orbit or depressed trajectory version of the SS-9 indicate that this variant is operationally deployed at one group of six silos at Tyuratam. This group has been used for training firings in the past and may not be ready for operational use at all times. We have in the past concluded that this Mod was deployed at three groups in the field. We have acquired no additional evidence of such deployment, and there have been no further troop-training firings. It remains possible, however, that 2 or 3 groups in the field are equipped with this Mod rather than with the Mod 1 or Mod 2.

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3.3(h)(2)
6.2(d)

21. There are also questions about how the Soviets intend to target their force of SS-9s. Although the high yield and relatively high

accuracy of the SS-9 Mods 1 and 2 make them the most effective missiles in the Soviet inventory for attacking hard targets, the extent to which the SS-9 force is, in fact, intended for use against such targets remains unclear, for the available evidence is scanty and inconclusive.

22. Such evidence as we do have suggests that, at least initially, most SS-9s had US ICBM complexes as their primary targets. There is some evidence that a shift in targeting concept may have taken place after 1966. On balance, we believe that at least some, and perhaps the bulk, of the SS-9 Mods 1 and 2 are aimed at US ICBM installations, even though the Soviets have not deployed SS-9s in sufficient numbers to provide assurance of putting more than a small portion of US launch facilities out of action.

23. *The SS-11.* The SS-11 currently makes up some 60 percent of the ICBM force. All SS-11s currently deployed are believed to consist of the initial version, the Mod 1. While the maximum demonstrated range of the Mod 1 is about 5,200 nm, all Agencies agree that it can be flown at least 5,700 nm, sufficient to reach targets in almost all the US from SS-11 complexes.

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24. Determining the size and payload capability of the SS-11 has always been more difficult than for any other Soviet ICBM. Until recently, all Agencies agreed that the Mod 1 payload weight was about 1,500 pounds and that it carried a warhead [redacted] All except CIA believe that this Estimate is still valid. CIA now believes that the SS-11 Mod 1 is bigger than previously estimated and that its payload is about 2,200 pounds. While the increase in weight over previous estimates is significant in absolute terms—a 2,200 pound RV could carry a warhead [redacted] it is not sufficient to change the judgment that the SS-11 Mod 1 is suitable only for attacking soft targets. To attain a hard target capability at intercontinental ranges, its accuracy, currently estimated at about 1 nm, would have to be improved considerably.

25. In the summer of 1969, the Soviets began testing two new versions of the SS-11, both of which were apparently intended to enhance the capability of the SS-11 to penetrate antiballistic missile (ABM) defenses. One version, originally designated the Mod 2A but now called the Mod 2, carries what probably are exoatmospheric penetration aids along with a new RV. The other version, originally designated the Mod 2B but now called the Mod 3, carries three RVs which are separated in flight so that they will land either in sequence on or near the same target or about 5 miles apart laterally. The three RVs are separated simultaneously by a single mechanism and they are not independently targetable. If sufficiently hardened, however, these RVs would present three separate aiming points to a defending ABM system. Testing of the Mod 2 ceased in December 1970. Development of this system may have been completed but the lack of any recent firings and continued firing of the Mod 3 make it almost certain that the Mod 2 program has been terminated. Testing of the Mod 3 is continuing. Development of this system probably is nearing completion and deployment is likely to begin later this year, or early next, at the new silos at the Derazhnya and Pervomaysk complexes. Additional deployment of the Mod 3 is possible in standard SS-11 silos.

26. The range of the SS-11 Mod 3 is about 5,500 nm.[13] Like the Mod 1, it has also been fired to a reduced range of about 550 nm, possibly to test its capability to perform in

[13] This is a change from the 6,000 nm estimated last year.

a peripheral attack role. There have been no improvements in the guidance system, and the CEP is estimated to be 0.6 to 0.7 nm. This improvement in accuracy as compared with the Mod 1 is due to the higher ballistic coefficient (beta) of the three RVs, which reduces their susceptibility to atmospheric effects, i.e., wind and density. Like the Mod 1, the Mod 3 would be effective only against soft targets.

27. There is disagreement about the weight of the three RVs for the Mod 3. CIA, using the same type of analysis as it applied to the Mod 1, believes that each RV weighs about 900 pounds. DIA, Army, Navy, Air Force, and NSA believe that each RV weighs about 600 pounds.

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28. The SS-11 Mod 3 is not a MIRV as tested to date and apparently is not intended to be one. To give it an independent targeting capability, the Soviets would have to develop a new technique for dispersing the RVs. For it to have a hard target capability, a new guidance system would be required as well. The payload of the Mod 3 was evidently designed to facilitate the penetration of ABM defenses by multiplying the number of warheads to be dealt with by a defender. Under certain circumstances the Mod 3 also has a greater capability to destroy targets than the single warhead variants of the SS-11. In the case of area targets such as cities or industry, spacing between the RVs on the order of 4 to 5 nm or more provides up to a 30 percent increase in the size of the area destroyed. Impact patterns of this kind have been tested on several occasions, including one to the Pacific.

29. *The SS-13.* To date, the Soviets have deployed only one solid-propellant ICBM, the three-stage SS-13. It is found at only a single complex, in a total of 60 silos. One version of the system, the Mod 1, is deployed and a second version, the Mod 2, has been tested and may also be deployed. Less is known about the SS-13 than about any other operational Soviet ICBM. Detailed analysis of performance data now indicates that the RVs used on both versions weigh about 1,200 pounds, some 200 pounds more than previously estimated.[14]

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With an estimated CEP of 1.0 to 1.5 nm, the SS-13 is suitable for use only against soft targets.

30. The SS-13 has been tested to a range of 4,500 nm, sufficient to reach only the extreme northeastern portion of the US from the one complex where the system is deployed. In August 1971, a Mod 1 was flown to the 4,500 nm Pacific impact area. It appears that this test demonstrated the maximum energy potential of the Mod 1,

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would permit a maximum range of about 5,100 nm. This is sufficient to cover the northern half of the US from the complex where the SS-13 is deployed.

31. Flight testing of the Mod 2 began in early 1970, and development may have been completed in late 1971, in time for deployment in early 1972 in the last two groups of SS-13 silos to be completed.

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[14] The RVs are not identical, however. The one for the Mod 2 has a different shape than the one for the Mod 1. Because of this difference, the RV for the Mod 2 has a ballistic coefficient in the range of 600-850 pounds per square foot, compared to about 250 for the Mod 1 RV.

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The change in the shape of the RV gives the Mod 2 slightly better accuracy than the Mod 1, but the improvement is not significant in terms of the overall capability of the system.

32. There is uncertainty about the maximum range of the Mod 2, which, like the Mod 1, has been flown to a range of only 4,500 nm. If

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would give the Mod 2 a maximum range of about 5,500 nm. If, however

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the range would remain about 5,100 nm, the same as for the Mod 1.

Possible Deactivation of SS-7 Soft Sites

33. There is evidence which suggests that some of the SS-7 soft sites are at least in a reduced state of readiness and are possibly being deactivated. All Agencies but the Air Force believe that the start of deactivation is the most likely explanation, but they cannot rule out two other possibilities: modernization or overhaul of the ground support system or changes in missile handling procedures. The Air Force acknowledges that some SS-7 soft sites are at a state of reduced readiness but believes that the evidence is insufficient at this time to indicate that deactivation has begun.

The New Deployment Programs

34. Last year we judged that construction of two, possibly three new types of silos was underway at the test center at Tyuratam and at some complexes in the field. We said that

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the purpose of these new silos was not clear and that they might be intended to house wholly new missiles, variants of present missiles, or existing types in a program aimed at increased survivability. We said that some might not be intended for missiles at all.

35. We now believe that only two types of silos are involved, one for a system in the SS-9 class and one for a small ICBM in the SS-11 class. Most of the large silos are at SS-9 complexes while the small ones are at the Derazhnya and Pervomaysk complexes. We are confident that the new silos will be harder to destroy than earlier types of Soviet silos, but we do not know what degree of hardness will be achieved.

36. In the recently concluded talks on the limitation of strategic arms, one of the main Soviet concerns was to maintain the right to "modernize and replace" existing ICBM launchers. This concern, along with conversion of both SS-9 and SS-11 launchers at Tyuratam to the new silo configurations, indicates that the Soviets plan to modernize existing SS-9 and SS-11 launchers in the field. We do not know how extensive the conversion program will be, or how rapidly it will be accomplished.

37. We believe that the SS-11 Mod 3 is to be deployed in the 60 new small silos now under construction at Derazhnya and Pervomaysk, at least initially. If so, then the first of these silos probably will be operational late this year or early next. If the 25 new large silos presently under construction at the SS-9 complexes must await completion of testing on the new large missiles, as also seems likely, then they will not be operational before late 1974 at the earliest, even though the silos themselves may be completed well before that.

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Intercontinental Ballistic Missile Research and Development

38. The number of R&D flight tests of ICBMs declined sharply in 1971 and so far this year as compared with 1970. This decline in the pace of testing reflects the completion, or near completion, of the major ICBM development programs for the SS-9 Mod 4, the SS-11 Mods 2 and 3, and the SS-13 Mod 2 which have been under way in the USSR for the past three and a half years. But the Soviets are already embarked on other development programs—one involving a large missile for the new large silos; one involving a smaller missile for the new small silos; and one involving a new solid-propellant ICBM, or a highly modified SS-13.

39. *A New Missile for the Large Silos.* There is evidence that the Soviets are developing a new large ICBM in the SS-9 class which can be deployed in the new large silos. The tests that have taken place thus far have involved only the launch phase of the system; no tests to Kamchatka, which are most useful in evaluating a system, have yet been carried out.

40. Based on what little data are available, we believe that the new large missile is about the size of the SS-9 or somewhat larger. Considering the number of launch phase tests to date, we judge that a new launch technique is involved, possibly a pop-up technique wherein the missile is ejected from the silo prior to ignition of the first stage.

41. Whether the new ICBM is about the same size as the SS-9 or larger probably will not be apparent until the Soviets begin firing it to Kamchatka. Such firings—which will probably begin soon—will also yield data on other characteristics of the system.

42. *A New Missile for the Small Silos.* It was noted in the previous section that the SS-11 Mod 3 would probably be deployed in the new small silos at Derazhnya and Pervomaysk at least initially. There is also evidence, however, that the Soviets are developing yet another new small ICBM which can be deployed in modified SS-11 silos.

43. During the recently concluded SAL session in Helsinki, one of the Soviet officials asserted that the USSR had one, perhaps two, missiles of different dimensions under development as replacements for the SS-11. He intimated that at least one of these missiles is somewhat larger than the SS-11. His comments were made in the context of a conversation in which he expressed concern about US proposals to limit increases in missile and silo size. The Soviets subsequently agreed to limit increases in silo launcher dimensions to 10 to 15 percent, but beyond the general limitation in Article II of the interim agreement—which prohibits the substitution of "heavy" missiles for "light" ones—the Soviets have made no commitment to limit the size of the missiles themselves.

44. There has recently been one full scale test of a new ICBM. Preliminary analysis indicates that it is in the SS-11 class, that it uses liquid propellants, and that it has an on-board digital computer. The payload involved is only a single RV. Detailed analysis of the characteristics and capabilities of the new missile cannot be made until more data become available.

45. *A New Solid-Propellant ICBM?* Thus far, the Soviets have developed only two solid-propellant ballistic missiles—the SS-13 ICBM and the SS-14 medium-range ballistic missile, which is made up of the upper two stages of

the SS-13. The USSR has a large and varied solid-propellant production capability, however—ample to support a new generation of solid-propellant ballistic missiles. The magnitude of its solid-propellant R&D facilities, moreover, suggests that it is pursuing an active development program.

46. There were firings of a missile this year at Plesetsk which could have been of a new missile or of a highly modified SS-13. There were some similarities between it and the SS-13, including the use of solid propellants, but there were differences as well; the missile flew to a higher apogee than the SS-13, and its RV apparently had a considerably higher ballistic coefficient.

47. *A Mobile ICBM?* For some years, the Soviets have boasted of a mobile ICBM capability, but the now abandoned SS-X-15 was the only mobile missile system we detected which appeared to have a potential ICBM application. The Soviet refusal to ban mobile ICBM launchers in the interim agreement with the US limiting strategic offensive weapons indicates that the USSR remains interested in that mode of deployment, in which it may feel it has an edge on the US.

48. All in all, ultimate Soviet intentions with respect to both solid-propellant ICBMs and the mobile mode of deployment are unclear. The sum of the evidence suggests that the Soviets are committed to continue R&D on larger solid-propellant motors, and we believe that they will gradually bring new models to the flight test stage. The Soviets could have the solid-propellant missile now being tested ready for deployment by late 1974 or 1975. But they already have follow-on liquid-propellant programs for their two principal silo based ICBM systems. Although we believe that the Soviets will deploy additional solid-propellant missiles, we doubt that they will be quick to abandon some 25 years of proven liquid-propellant technology in favor of solid-propellant systems.

49. With respect to mobile ICBMs, the Soviets may see both military and bargaining advantage in developing one. But they cannot proceed too far in this direction unless they are willing to risk some sort of showdown with the US, which has asserted that deployment of land-mobile ICBMs would be inconsistent with the objectives of the interim agreement. In addition, there are practical difficulties in deploying and maintaining the large and complicated pieces of equipment which would be required, and increased survivability, which mobile systems could provide, is already being provided by the silo hardening program and the growth of the SLBM force.[16]

Goals of New Missile Programs

50. We will not have a clear-cut picture of what the Soviets are trying to accomplish with their new ICBM systems until further data are available. Nevertheless, we do have some indications of their probable goals.

51. *Survivability.* The survivability of their ICBM force against a first strike or preemptive attack has been a major concern of the Soviets and will unquestionably continue to be. The new silos are being constructed so as to make them considerably harder than previous Soviet types. Conversion of existing SS-9 and SS-11 silos to the new configuration, which the Soviets apparently contemplate, will represent a considerable financial invest-

[16] Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, believes that the Soviets would deploy mobile ICBMs if they considered it to their advantage. Noting the Soviet's refusal to include mobile ICBMs in the SAL Agreement, he believes it unlikely that the unilateral US statement on mobile ICBMs will deter the Soviets from deploying them.

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ment in increased survivability as well as in improved missiles.

52. Soviet concern for survivability is also reflected in the provision of the interim agreement on strategic offensive weapons which permits the USSR to construct additional SLBM launchers if equal numbers of older ICBMs or SLBMs are retired. Recognition of the vulnerability of SS-7s and SS-8s, which are deployed on soft pads or in clustered silos almost certainly contributed to Soviet interest in this provision.

53. *Accuracy.* We have long believed that the Soviets would incorporate greater accuracy in follow-on missile systems, if only through normal improvements in existing types of guidance components. We now have indications of an interest in improved accuracy in connection with two of the new missile systems under development. The use of RVs with higher betas, as in some of the more recent ICBM modification programs, could also facilitate development of higher accuracies. As noted in past Estimates, Soviet RVs have normally had considerably lower betas than US RVs, thus making them slower-moving once they reach the atmosphere and more subject to atmospheric disturbances.

54. How much improvement will actually be achieved in the new missile programs is hard to predict. Even detailed future analysis is not expected to provide a confident assessment. The improvement might be only marginal. Improvements in the components of present Soviet guidance systems and the use of higher betas (i.e., 950-1,250 PSF) could, however, result in CEPs as low as about 0.25 nm. This would require at least two years of testing. If the Soviets were willing to accept the necessary risks and commitments, they should be able to achieve CEPs approaching 0.15 nm. To do so, however, would require the guidance system to incorporate new concepts such as mid-course guidance or terminal RV corrections. In addition, they would have to accept the necessity for at least three years of testing—more if the program developed difficulties—before the system could be confidently deployed.[17]

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[17] Dr. Ray S. Cline, the Director, Bureau of Intelligence and Research, Department of State; Lt. Gen. Samuel C. Phillips, the Director, National Security Agency; and Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, believe that significantly longer flight test programs would be required by the Soviets to achieve very high accuracies on their new missiles. If the Soviets have decided to strive for such accuracies in their new ICBMs and are only now beginning initial testing of guidance systems capable of providing such accuracy, they face many problems and like the US will require a substantial number of flight tests and an extended learning period to solve those problems.

Dr. Cline and Gen. Phillips believe that a flight test program of at least 5 years would be required to achieve a CEP significantly better than 0.25 nm. Gen. Keegan believes that a longer period of flight testing would be necessary. He notes that as the requirement for ICBM accuracy approaches a CEP of 0.25 nm, many previously subtle effects begin to play an important part. For example, even the spring effect on the payload at separation due to relaxation of the missile airframe structure at thrust termination must be isolated and quantified through flight testing. Other examples of effects that become important include: residual correction velocities at thrust termination due to limit cycling, subjective separation transients (such as post guidance impulses imparted on the RV by release mechanisms), translational impulses on the RV imparted by control jets during RV spin-up or altitude change, and coning angle errors during re-entry. While recognizing that some of these effects might be anticipated by the Soviets, he believes that only an extended learning period and significant numbers of flight tests would permit satisfactory quantification. Based on US experience, Gen. Keegan believes that the Soviets would probably require five to seven years of flight testing and analysis to understand, quantify, and translate these problems and their theoretical solutions into an operational system with a CEP of 0.25 nm. Since the Soviets may now be entering the initial flight test phase of a new generation of guidance systems and techniques like those the US has been refining in flight testing for some 17 years (i.e., all inertial incorporating a digital computer and inertial platform), an additional learning period would be expected. Thus, he believes that under these circumstances the Soviets would require a total of seven to 10 years of flight testing and concurrent analysis to obtain CEPs better than 0.25 nm.

55. Preliminary analysis indicates that both the small liquid- and solid-propellant missiles now being tested carry digital computers. This could indicate that a new guidance system is involved.

56. It is too early to tell whether the Soviets are now seeking to achieve very high accuracies for their land-based ICBM force and have done the lengthy design and development work required before actual testing could begin. We do have evidence that they are experimenting with new and more sophisticated guidance techniques in other applications

3.3(h)(2)
6.2(d)

57.

3.3(h)(2)
6.2(d)

58

3.3(h)(2)
6.2(d)

3.3(h)(2)
6.2(d)

[redacted]

59. *Multiple Independently-Targetable Reentry Vehicles.* We continue to believe, as we have for some years, that the Soviets will develop MIRVs for their ICBMs, including some with accuracies providing a capability to attack hard targets. Increasing the number of available RVs by means of MIRVs would also be useful for enhancing the retaliatory capabilities of ICBMs surviving a preemptive attack and for penetrating ABM defenses. There have been various indications, some quite explicit, that the Soviets regard this as an important area of strategic weaponry in which they have need, for political as well as military reasons, to catch up with the US.

60. The first indication of present Soviet intentions with respect to MIRV development may emerge once the Soviets begin downrange tests of their new large missile from Tyuratam to Kamchatka. Our best present judgment is that this program will involve MIRVs with improved accuracy. The new small ICBM which the USSR is developing is less likely to have a hard target capability, but we would expect it to incorporate advances in guidance system technology, and it may be equipped with MIRVs as well. We would expect to determine the broad objectives of new ICBM development programs soon after the Soviets begin flight testing.

[redacted]

3.3(h)(2)
6.2(d)

61. *Penetrating Antiballistic Missile Defenses.* The Soviets have also been concerned by the problem of penetrating ABM defenses, although this concern has presumably abated now that an ABM Treaty has been concluded. In the past few years they have developed three missile systems which would complicate the problems of an ABM defense—the SS-9 Mod 4, the SS-11 Mod 2, and the SS-11 Mod 3. As indicated earlier, the SS-11 Mod 2 program appears to have been terminated.

62. The three RVs of the SS-11 Mod 3 and the SS-9 Mod 4 would have to be hardened to withstand the nuclear effects of defensive weapons (and possibly also to avoid "fratricide"[20]) if they were to be effective. Studies have shown that in order to escape destruction of all three RVs by a single 4 MT Spartan warhead, the SS-11 Mod 3 would have to be hardened to withstand about 50 to 150 calories per square centimeter respectively for the in-line and cross-range dispersal patterns, and the SS-9 Mod 4 as tested would have to be hardened to withstand up to about 200 calories. The Soviets are presumably well aware of the problem and have done research in the area. Hence we believe that at least some degree of hardening has been provided for these systems even though we have no evidence of it.

63. We do not know why the Soviets began testing these systems long before any US ABM

[20] Fratricide takes place when an incoming warhead is put out of action as the result of the detonation of an earlier incoming warhead.

6.2(d)

system could be operational. A possible explanation is that they may initially have expected US ABM deployment to begin well before it actually did. They may later have decided it would be desirable to complete development of appropriate hardware in advance of any strategic arms limitation agreement. As it has turned out, however, signature of the ABM Treaty lessens the pressure for developing penetration systems except possibly as a hedge.

II. SUBMARINE-LAUNCHED BALLISTIC MISSILES

64. In the mid-1950s, the Soviets acquired a limited ballistic missile submarine capability by converting six diesel-powered Z-class attack submarines to carry two missiles each. Soon thereafter, production began on two new classes of submarines—the diesel-powered G- and the nuclear-powered H-class—each of which carried three 300 nm ballistic missiles. Production of these two classes ended in 1962 with the completion of 23 G-class and 9 H-class units. The decision to halt construction probably was made in the late 1950s in connection with a decision, evident in classified Soviet writings, to divest the Soviet Navy of responsibility for carrying out strikes deep in enemy territory.

65. Shortly after the Cuban missile crisis, however—and probably in part as a reaction to that crisis—another reversal of course took place. Authorization was given to develop a strategic counterpart to the US Polaris force, based on the Y-class nuclear-powered ballistic missile submarine. Construction on the first of these 16-tube units began at Severodvinsk in 1964. This lead unit was launched in 1966 but did not enter service until nearly two years later. In 1969, the first Y-class submarine was launched at a second yard—Komsomol'sk in the Soviet Far East.

66. The Soviets have launched a modification of the Y-class submarine which differs significantly from all previous units of that class. Up until recently this submarine has been referred to as the modified Y-class. It has now been designated the D-class. (See Figure 3.) It is about 25 feet longer than the Y-class, has 12 rather than 16 launch tubes, and carries a larger missile, the SS-NX-8, with much greater range than the SS-N-6 carried by the Y-class. Because the extra length is aft of the missile bay, the Soviets could have utilized the extra space for such improvements as increased habitability and an improved and/or quieter power plant.[21] Subsequent to the launch of this unit, the Soviets launched five more Y-class submarines, three at Severodvinsk and two at Komsomol'sk, but it is believed that the Soviets are now concentrating on the D-class and that few if any more Y-class units will be produced.[22]

Current Production Rates and Force Levels

67. The present combined rate of D- and Y-class production from Severodvinsk and Komsomol'sk is 6 to 7 a year, down from the previous high of eight units in one year established in 1970. The switchover to production of D-class units is now complete at Severodvinsk, however, and the overall production rate probably will begin to increase somewhat.

68. Table II shows the estimated number and status of Soviet ballistic missile submarines as of 1 October 1972. The number of missile launch tubes is shown in parentheses. Of the 27 Y-class units operational, 20 are in the Northern Fleet and 7 in the

[21] There have been other modifications of the Y-class, but the earlier "variants" differed from the original in only minor ways, such as an improved sonar system.

[22] It is not known whether Komsomol'sk is producing the D-class.

6.2(d)

Figure 3

D-Class Submarine

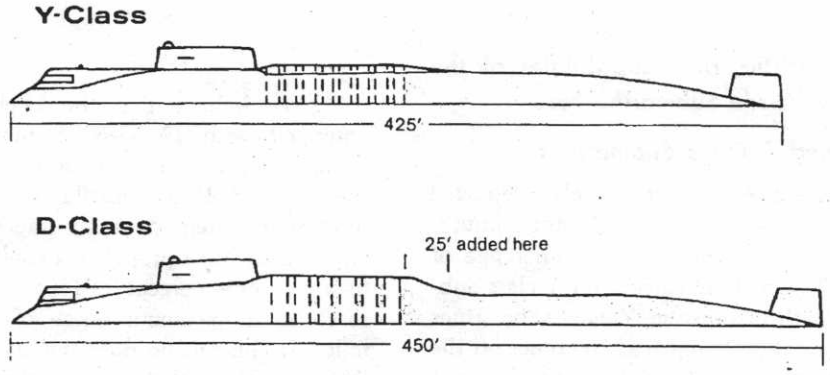

TABLE II

Class	Operational	In construction or conversion [a]	Outfitting or on sea trials	Total
G-I (3 Launchers)	7(21)	1(3)[b]	...	8(24)
G-II (3 Launchers)	11(33)	...	1(3)	12(36)
G-III (4 Launchers)[c]	...	...	1(4)	1(4)
G-IV (6 Launchers)	...	1(6)	...	1(6)
H-II (3 Launchers)	8(24)	...	...	8(24)
H-III (6 Launchers)	1(6)[d]	...	...	1(6)
Y (16 Launchers)	27(432)	0-4(0.64)[e]	4(64)	31-35(496-560)[e]
D (12 Launchers)	...	12-8(144-96)[e]	1(12)	13-9(156-108)[e]
	54(516)	14(153-169)[e]	7(83)	75(752-768)[e]

[a] All units currently in construction or conversion will be operational by late 1974 or early 1975.

[b] This unit probably is being converted to a G-II type.

[c] The missile intended for the G-III submarine has not yet been determined.

[d] The H-III is not, strictly speaking, operational because it is being used for R&D firings of the SS-NX-8. See paragraph 85.

[e] The range of figures reflects our uncertainty as to whether the Komsomol'sk shipyard is producing the D-class.

Pacific Fleet.[23] Of 12 units on the ways, 8 are in the main yard at Severodvinsk, and 4 are at Komsomol'sk. All 12 of these units and 5 more now fitting out or on sea trials probably will be operational by late 1974 or early 1975, bringing the operational force to a total of 44 units.

Characteristics and Capabilities of the Ballistic Missile Submarine Force

Y- and D-Class Submarines

69. The Soviets' most widely deployed SLBM—the SS-N-6—is a single-stage, liquid-propellant missile with a maximum range of about 1,300 nm. It is carried on Y-class submarines. With this missile, Y-class submarines could take station as much as 500 miles off the east and west coasts of the US and strike most major targets in the country; moving the submarines closer in or placing some in the Gulf of Mexico would permit virtually complete coverage of the US. Y-class submarines have never been detected operating closer than 800 nm from the US mainland and they normally stay about 1,000 nm out. (See Figure 4.) The SS-N-6 is estimated to have

3.3(h)(2)
6.2(d)

a CEP of about 0.4 nm. Submarine navigation inaccuracies probably would increase the overall *system* CEP to about 0.7 nm, making the Y-class/SS-N-6 combination useful primarily against soft targets.

3.3(h)(2)
6.2(d)

70. the Soviets have launched two SS-N-6 missiles in about eight seconds. Extrapolation would indicate a salvo time for all 16 missiles of less than two minutes. This rapid a salvo time could raise problems with respect to such things as targeting accuracy and system reliability, but there is no technical reason why these problems could not be solved. If they have not been solved, the actual salvo time might be greater—on the order of 3 to 5 minutes.

3.3(h)(2)
6.2(d)

71. We believe that the D-class will be equipped with 12 SS-NX-8 missiles. There is some doubt about the maximum range of the SS-NX-8. If the missile has a propellant utilization system on both stages, both first and second stage propellants could be burned to about one percent residuals. This would result in a maximum range of about 3,500 miles. If the missile does not have a propellant utilization system on both stages, the maximum operational range would be about 3,100 nm.

72. The first D-class submarine is now on sea trials and will probably not join the operational fleet until 1973, assuming that the SS-NX-8 is also ready by then. The missile development program was in its final stages earlier this year but was disrupted by a test failure in May when the missile exploded early in the flight. After a standdown in testing for nearly three months, launchings resumed from the White Sea area in August, indicating that the program is back on track.

73. Deployment of the SS-NX-8 will significantly improve the flexibility and survivability of the Soviet SLBM force. With this missile, submarines could take station some 1,500 miles off the coasts of the US and strike any target in the country. This would greatly increase the ocean area from which D-class submarines could strike the US, compared with the amount of ocean area associated with the 800 nm standoff range of the closest present Y-class patrols. (See Figure 5.) Much of

[23] Two of the Pacific Fleet units were built at Severodvinsk and transferred from the Northern Fleet—one in 1971, another in 1972; the rest were built at Komsomol'sk.

6.2(d)

Figure 4

Ballistic Missile Submarine Patrol Areas

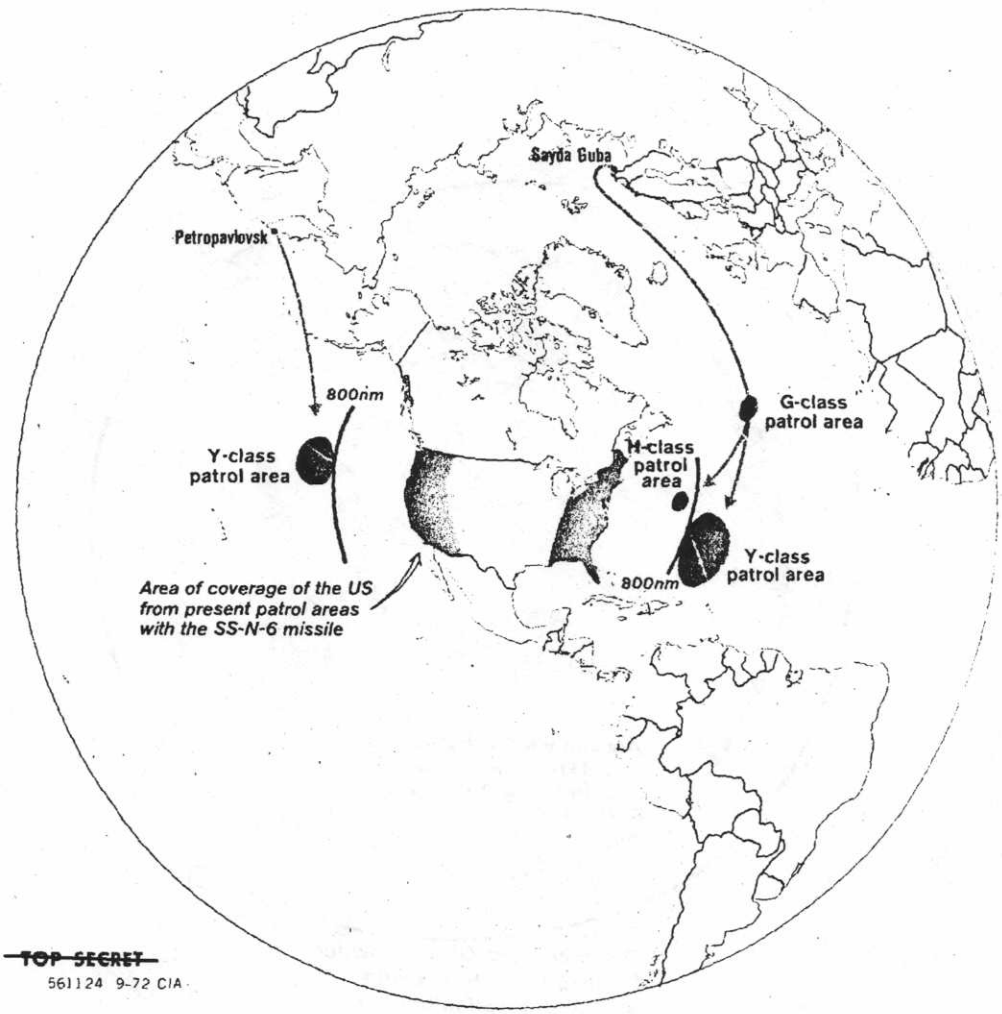

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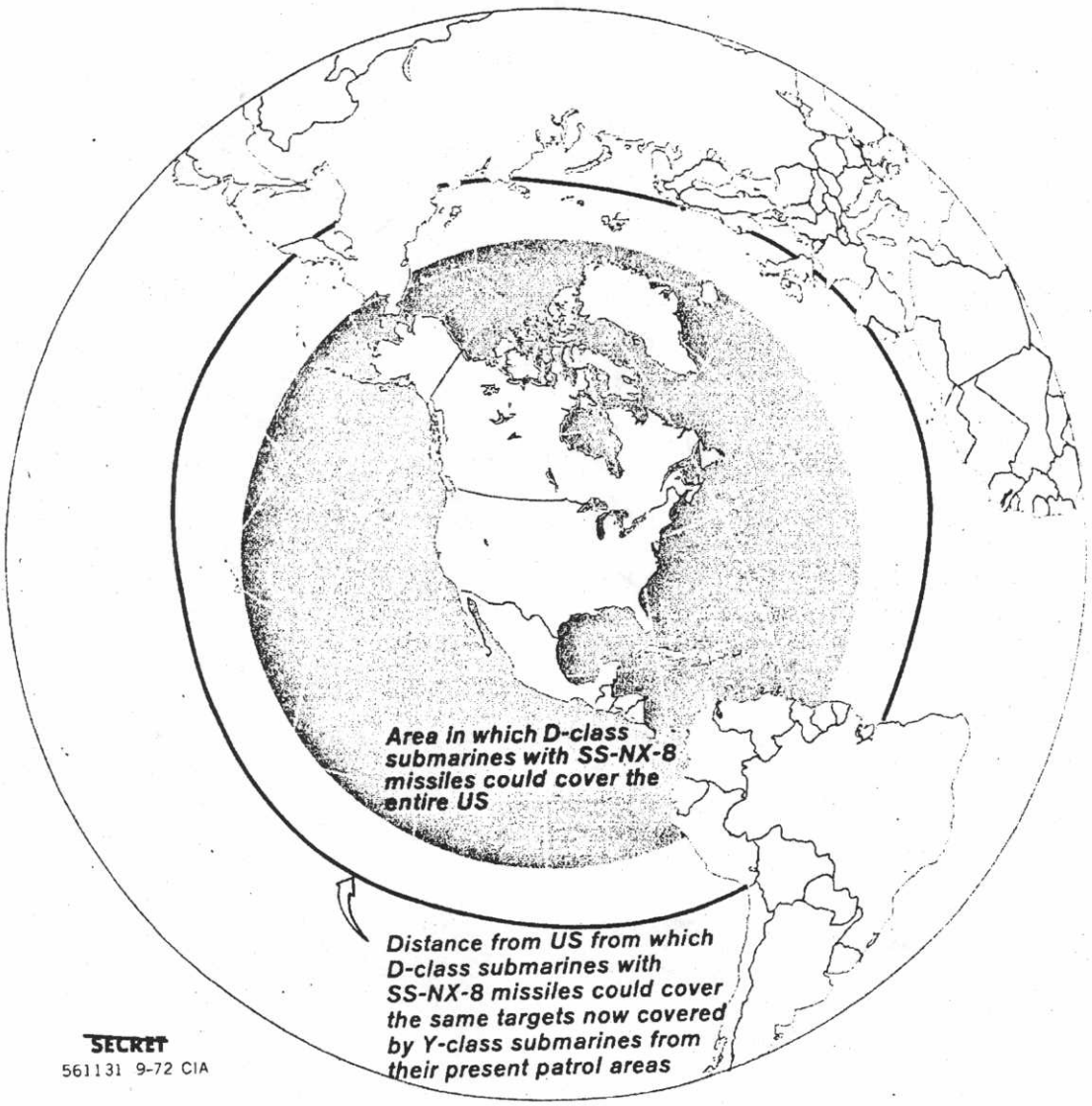
Figure 5

Potential Coverage of US by D-Class with SS-NX-8 Missile



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6.2(d)

this enlarged area would lie outside the range of the most effective US antisubmarine detection capabilities. If the Soviets were to target only the same installations that are now within range of the SS-N-6 missile from 800 nm offshore, the D-class submarines with the SS-NX-8 could stay out as far as 2,800 nm and further complicate the US antisubmarine problem.

74. Each D-class unit equipped with the SS-NX-8 will have fewer missiles than Y-class units. But such units would have shorter travel time to and from patrol stations, and could thus stay on station longer. Assuming that the same target areas were to be covered in both cases, the Soviets could then maintain as many launchers on station with units fitted with SS-NX-8 missiles as they could with a force of the same size consisting of units equipped with the SS-N-6. With all else equal, for every three Y-class units equipped with the SS-N-6 that the Soviets could maintain on station within range of the US, they could maintain four D-class units on station equipped with the SS-NX-8, because of the shorter transit times. The number of *missiles* on station would be the same in either case, but US antisubmarine forces would have to cope with the presence of more submarines at greater distances from the US coasts in the case of units equipped with the SS-NX-8.

75. In addition to its greater range, the SS-NX-8 is believed to be more accurate than the SS-N-6

3.3(h)(2)
6.2(d)

3.3(h)(2)
6.2(d)

76

77. The CEP of the SS-NX-8 has been calculated using the same error budget approach applied to other ballistic missile systems.

3.3(h)(2)
6.2(d)

78

3.3(h)(2)
6.2(d)

6.2(d)

3.3(h)(2)
6.2(d)

3.3(h)(2)
6.2(d)

80. During the past year, the number of submarines continuously on station within missile range of the US has remained the same—one in the Pacific and three in the Atlantic. Thus, the percentage of the force continuously on station has been declining—from nearly 20 percent last year to about 15 percent now. This compares with about 50 percent continuously on station for the US Polaris-Poseidon fleet.

81. We do not know the reasons for this continuing low level of patrol activity. It is consistent, however, with the long-standing Soviet belief that hostilities with the US and its allies would occur only in the course of a major political crisis which would provide an opportunity for bringing Soviet forces to peak readiness. In such a situation, some 80 percent of the force probably could put to sea and remain there for 60 to 90 days.

79

3.3(h)(2)
6.2(d)

82. In time, the Soviets might increase the percentage of the force normally on station, particularly as units equipped with the SS-NX-8 become available beginning late this year or early next. Even with a sizable SS-NX-8 force, however, operational factors, such as the lack of forward bases and crew availability (the Soviets probably have only one crew for each missile submarine), probably will prevent the Soviets from maintaining more than 40 percent of the force continuously on station within range of the US.[24]

[24] This figure also takes into consideration the requirements for overhaul of SSBNs. In the years to come, about 20 percent of the force normally will be in the overhaul process at any one time, and thus not available for patrol duty.

83. The Y- and D-class force appears intended for use against urban-industrial or soft military targets in the US, because its missiles lack the yield and accuracy to be effective against hard targets. Beyond this, we do not know how the Soviets intend to use the force. They may regard it as primarily useful for retaliatory or follow-up strikes. Some 70 percent of the force is always in port and vulnerable to a surprise attack from a potential enemy, however. This suggests that the Soviet plan would be to send more Y- and D-class units to sea in the event of a major political crisis in which a serious threat of nuclear war developed.

84. The use of depressed trajectories with SLBMs would make them potentially more effective against time-urgent targets because warning times would be reduced. At a range of 1,000 nm, for example, the SS-N-6 fired on a trajectory with an apogee of about 100 nm would have an estimated flight time of less than 11 minutes, as opposed to about 14 minutes with the trajectory normally used in flight tests. There has been no evidence to date that any Soviet SLBMs have been tested on depressed trajectories. Depressed trajectories produce higher temperatures and greater dynamic pressure on the missile which could cause structural failure. In addition, the shallower angle of the flight path degrades accuracy. Thus, some tests probably would be required to determine the effects of depressed trajectories on the missile involved. We would probably detect such a test program before its completion.

H-Class Submarines

85. Of the nine H-class nuclear-powered submarines built between 1958 and 1962, eight have been converted to carry three 700 nm SS-N-5 missiles. These submarines have been designated the H-II-class. The SS-N-5 can be launched while the submarine is submerged and has more than twice the range of the surface-launched SS-N-4 which it replaced. The ninth unit, designated the H-III, has been extensively remodeled to provide it with six launch tubes instead of the original three. It has completed sea trials and now is being used for the initial firings at sea of the SS-NX-8. There is no evidence that any other H-class units are being similarly converted, and, in view of the length of time since completion of the H-III unit in 1970, it appears unlikely that any additional units will be.

86. Although patrols by H-class submarines in the western Atlantic continue, no patrols by units of this class have been detected in the Pacific since January 1971, suggesting that the two units in the Pacific Ocean Fleet now are assigned to a peripheral attack role. No patrols indicative of such a role have yet been detected, however. The H-class units in the Northern Fleet, which are now conducting about three patrols per year, probably are still intended for use against targets in the US. These submarines may be relegated to a peripheral attack role when more Y- and D-class submarines are available.

G-Class Submarines

87. Of the 23 G-class diesel-powered submarines built between 1958 and 1962, 11 have been converted to carry three SS-N-5 missiles instead of the original SS-N-4s. Two more units are being similarly converted. The converted units have been designated G-IIs. Seven G-class units still carry three SS-N-4s.

88. The two remaining G-class units have been converted in two uniquely different ways. In one instance a G-class has had a raised superstructure added aft of the sail. Four missile tubes of a size suitable to house SS-N-6 missiles are fitted in the superstruc-

6.2(d)

ture. There are no tubes in the sail. Work on this conversion appears complete but sea trials and missile firings have not yet begun.

89. The other conversion program involves modifying a G-class submarine to carry the SS-NX-8 in six missile tubes in an enlarged sail—along the lines of the H-III. This conversion should be finished about the end of this year.

3.3(h)(2)
6.2(d)

90. We do not know why the Soviets would undertake to convert G-class submarines to carry either the SS-N-6 or the SS-NX-8, because both types of missiles are already being installed on Y-class and D-class units, respectively. The first conversion may carry [redacted] missile now being tested at Kapustin Yar, which is about the size of the SS-N-6. As to the second, involving the SS-NX-8, whatever the Soviets had in mind may have been overtaken by events at the SAL talks and in the SS-NX-8 program itself.

91. We continue to believe that some G-class submarines are assigned to a peripheral and some to an intercontinental attack role, but we do not know how many, or which ones, are assigned to which mission. No G-class patrols have been detected in the Pacific since the initiation of Y-class patrols there in late 1970, and three have been noted in the usual G-class patrol areas in the Atlantic since mid-1971. At present, it would appear that the six G-II class submarines in the Northern Fleet may still be assigned to an intercontinental attack role but that the nine G-class units in the Pacific, and probably the five G-I class units in the Northern Fleet, are intended primarily for use against peripheral targets. The undetected movement of a G-II class submarine from the North Atlantic to Cuba in April 1972 provided a dramatic reminder of the capability of these units to patrol within missile range of the US, even though the primary purpose of this particular cruise probably was political rather than military.

New Programs

92. There is no direct evidence of any new Soviet ballistic missile submarine program. But the SAL agreement allows the USSR to build up to 62 modern ballistic missile submarines and 950 SLBM launchers, not counting the launchers for older types of missiles now installed. The only way these totals can be approached or reached *in combination* from the current base of 12-tube D-class and 16-tube Y-class submarines operational and under construction is for the Soviets to revert to construction of the 16-tube Y-class units or to include units of a new class with more than 16 launchers each.[25] If the Soviets convert existing Y-class submarines to the new, 12-tube D-class configuration, this would further increase the requirement for a new class with more launchers per unit.

93. The Soviets are building a large new construction hall adjacent to the main submarine construction hall at Severodvinsk. This building was begun in late 1970 and probably will be ready for use in 1974, but we do not know how the Soviets plan to use it. One possibility is that a new ballistic missile submarine will be produced there. In this case, the Soviets could complete the present program in the existing construction hall in 1974, at about the time the new hall would be ready for the start of a new program. The old hall could then be turned over to the conversion or overhaul of Y-class and other types of submarines. A new missile or an improved version of the

[25] If the Soviets stop building 16-tube units soon, as it appears they will, and continue building 12-tube units until they reach a total of 62 modern ballistic missile submarines, they will have far less than the 950 SLBM launchers permitted under the agreement.

SS-NX-8 could be developed and ready for deployment by 1976 or 1977, by which time the first submarine from the new construction hall could be reaching operational status.

94. Because the interim agreement permits the Soviets 950 SLBMs and 62 modern submarines and because of the existence of the new construction hall at Severodvinsk, we believe that the USSR will develop and deploy a new class of ballistic missile submarine by 1977. Similarly, because the interim agreement permits the Soviets to replace old launchers on G- and H-class submarines with new launchers on modern SSBNs, we believe it unlikely that any additional G- or H-class units will undergo further modernization or conversion for strategic attack purposes.

III. HEAVY BOMBERS AND TANKERS

Current Forces [26]

95. The heavy bombers and tankers of Soviet Long Range Aviation (LRA) comprise the third major component of Soviet forces for intercontinental attack. Currently this element is made up of 110 Bears—70 are air-to-surface missile (ASM) carriers and 5 are fitted for reconnaissance—and 85 Bisons, including 50 tankers. Delivery of these aircraft to LRA ceased in the early 1960s; they are the only ones in the Soviet inventory whose primary mission is intercontinental attack. In naval exercises of recent years it has become apparent that Bears equipped with ASMs also have a mission, probably a secondary one, of carrying out strikes against naval forces, particularly aircraft carriers.

Characteristics and Capabilities of the Force

96. Bears pose the most serious bomber threat to the US because of their numbers and range; they can cover virtually any US target on two way missions. The 70 ASM carriers, 45 of which are equipped for aerial refueling, are fitted with the 350 nm AS-3 and can launch their weapons while well out from the target, thereby avoiding terminal defenses. The Bears equipped for aerial refueling can operate directly from their home bases, but the non-refuelable types—25 ASM carriers and 35 free-fall bombers—would have to stage through bases in the Arctic to obtain extensive coverage of the US. Whether refueled or staged, the range of the Bear aircraft gives it greater flexibility in routing and in choice of flight profile than other Soviet bombers.

97. The 35 Bison bombers in the force are all capable of aerial refueling but even so they would have to resort to Arctic staging for extensive coverage of the US on two-way missions. None of them carries ASMs. The 50 Bison tankers are used to refuel the Bison bombers, the refuelable Bears, and, in some instances, Bears assigned to Naval Aviation.[27]

[26] LRA also has some 700 TU-16 Badger and TU-22 Blinder medium bombers based throughout the Soviet Union. These aircraft have a limited capability for intercontinental attack although some could be used on one-way missions if the Soviets felt a need to maximize an all-out nuclear assault against North America. However, evidence continues to support our judgment that Badger and Blinder forces are equipped and trained primarily for peripheral operations. The deployment of large numbers of medium bombers through Arctic bases would raise serious problems in airfield capacity and logistics. The use of medium bombers in the peripheral role is discussed in NIE 11-14-71, "Warsaw Pact Forces for Operations in Eurasia."

[27] Bear aircraft assigned to Naval Aviations units are not considered a threat to the continental US since they are used exclusively in naval reconnaissance or antisubmarine warfare activities.

The Backfire [28]

98. The Soviets have a new twin-engine bomber under development which is fitted with a variable-geometry wing; we refer to it as the Backfire. The Backfire was first seen in July 1970, and its test program is probably well advanced. A decision to produce the aircraft serially has probably been made.

99. An analysis undertaken during the past year suggests that the radius of action of the aircraft when flying a high altitude, subsonic mission, with wings fully extended throughout the flight, would be near the 3,000 nm figure estimated in NIE 11-8-70. Other analysis, mentioned in 11-8-71 still suggests that the radius of action is less, perhaps much less for this profile. Unfortunately we are in no better position to make a confident estimate of the aircraft's performance than we were last year. We may have to wait until the aircraft is assigned to operational units before this becomes possible.[29]

100. In the view of all but the Air Force, the Backfire is best suited for a peripheral attack role. The Air Force believes that the basic design of the aircraft indicates that the Soviets developed the Backfire to perform a variety of missions, including intercontinental attack. All believe that the Backfire will reach IOC late next year as an ASM carrier; a free-fall bomber version may reach IOC about the same time.

101. The suitability of the Backfire for an intercontinental role will be heavily dependent on the existence of a suitable force of tankers. Several aircraft other than the Bison, such as the Il-62 (Classic) or the Il-76 (Candid), could be adapted to the tanker role, or a new one could be developed.

102. The Backfire may have considerable growth potential. If, for example, the Soviets were to develop high efficiency turbofan engines for it, the range of the Backfire could be somewhat increased. Such improvements in performance are not likely to appear in deployed aircraft before the late 1970s.

Possible Follow-on Heavy Bomber

103. For the past several years we have considered Soviet development of a new heavy bomber unlikely. This judgment was based in part on our belief that as their ICBM and SLBM forces grew, the Soviets would come to rely less and less on bomber aircraft. Those missile forces have now reached significant proportions, but there has been no phase-out or appreciable attrition of the heavy bombers in LRA for several years, or any significant reduction in their training activity. Thus, it appears that contrary to Khrushchev, who believed the day of the manned bomber had passed, present Soviet leaders recognize the advantages of flexibility, recall, and follow-on attack afforded by a manned bomber force. For the present, at least, they apparently believe that these advantages are worth the cost of retaining an intercontinental bomber capa-

[28] See Figure 6 for a silhouette of the Backfire and, for purposes of comparison, silhouettes of the Bear, Bison, and Badger.

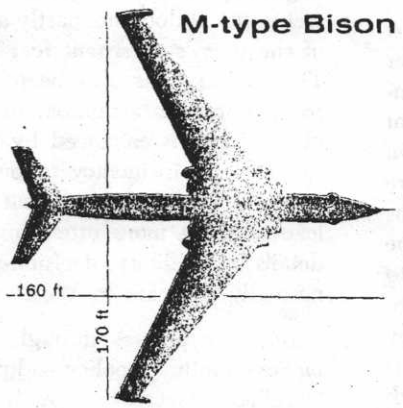
[29] Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, believes that we are in a better position to make a confident estimate of Backfire's performance than we were last year. He believes that additional correlation and analysis of available evidence during the past year permits a more confident assessment of the capabilities of Backfire to be made.

3.3(h)(2)
6.2(d)

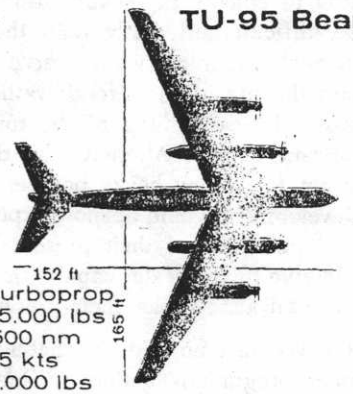
He would also note that the results of detailed engineering design analyses [redacted] indicate the performance and characteristics of Backfire are within about 10 percent of those estimated in NIE 11-8-70. These analyses show that Backfire has nearly twice the radius of the Badger medium bomber and about the same radius as the Bison heavy bomber.

Figure 6

Bomber Silhouettes

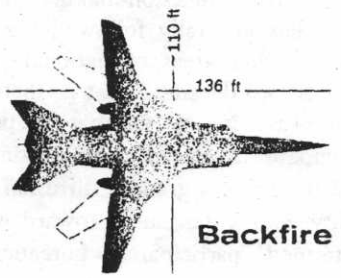


Engines	4 jet
Gross weight	400,000 lbs
Combat radius	3,050 nm
Cruise speed	445 kts
Assumed bomb load	10,000 lbs

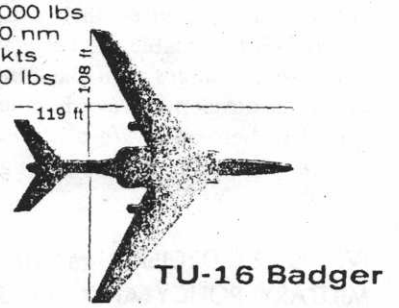


4 turboprop	
365.000 lbs	
4,500 nm	
435 kts	
10.000 lbs	

Engines	2 jet
Gross weight	see text
Combat radius	see text
Cruise speed	see text
Assumed bomb load	see text



2 jet	
167,000 lbs	
1,650 nm	
445 kts	
6,600 lbs	



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bility for some years to come. Other factors that may encourage them to do this are the exclusion of bombers from the recently signed US-USSR interim agreement on strategic attack systems, and the reduced state of US air defense.

104. If this is their view, and they persist in it, the Soviet leadership must sooner or later come to grips with the problem of the composition of their future forces. Their present bomber aircraft are aging rapidly and attrition will soon take its toll unless the Soviets are willing to engage in rehabilitation programs more difficult and costly than those in the past. Such programs would serve merely to extend the life of the aircraft rather than to improve the capabilities of the force to any significant degree. Alternatively, the Soviets may opt for a new heavy bomber. Although its development would be more expensive than the rehabilitation of their present aircraft, it would give them greater capabilities for intercontinental attack than their present force.

105. We have no evidence that a new heavy bomber program is underway, but development of such a bomber would not present any particularly difficult technical problems to the Soviets. They now have the capability to develop long-range, fixed-wing aircraft fitted with advanced turboprop or turbofan engines, and, based on their experience with the Backfire, variable-geometry wing aircraft with greater ranges than Backfire. If they do decide to develop a heavy bomber, we would expect to become aware of its existence four to five years prior to its reaching operational status.

IV. SOVIET DECISION-MAKING ON MILITARY POLICY AND PROGRAMS

106. Certain distinctive and enduring features of the Soviet political system affect the way in which decisions are made on military policies and programs. One of them is the primacy of the Party, particularly its central apparatus. The principle of close and relatively detailed party supervision of military affairs, in peace and in war, has from the beginning been an important element of Soviet political doctrine, partly as a consequence of the Party's persistent fear of Bonapartism. The military has also been drawn into the party system in a number of ways. The role of the Party is enhanced by the tendency of the Soviet bureaucracy to push decisions toward the top. This means that the top political leadership is more often involved with the details of military decision-making than is normally the case in Western countries.

107. The process through which decisions on Soviet military policy and programs emerge is veiled in secrecy. Enough is known, however, to show that the process is a complex one in which many groups and individuals play a part. A variety of advisory and executive bodies—drawn from the military, the scientific establishment, and defense industry—forward their views to the top political and military leadership, at times in competition with one another. This interplay of competing policy positions and special interest groups serves in effect to impose checks and balances on the power of the top leadership. As in other countries, final decisions are the result of organizational and personal politics as well as of an objective consideration of strategic needs.

108. Soviet decision-making on military affairs has generally followed the trend evident in other areas of national policy over the past two decades. That is, there has been an increase in the number of people who participate in the decision-making or who furnish advice, a gradual diffusion of responsibility, and a movement toward what might be termed "participatory bureaucracy". The

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movement has been roughly from a one-man command system under Stalin, to a system under Khrushchev using a mixture of personal and oligarchic procedures, to the present system of rule by committee, which makes wide use of councils, commissions, and second-level advisors.

109. The top leadership's dependence on various subordinate organizations for information, technical judgment, and recommendations is in large part necessitated by the detail and complexity of the issues with which the leadership deals. Limitations on the time and information available to top officials virtually compel the inclusion of subordinate echelons in the decision-making process. At a minimum, subordinate organizations play a role in framing the policy issues which come before the top leadership, and hence in circumscribing policy options. In addition, within a complex bureaucratic system, component organizations have their own institutional interests to protect and promote, and often have differing views on military requirements and goals.

110. At several key points in the system, the varying views and pressures generated by the groups discussed above come together and in one way or another are resolved, accommodated, rejected, or forwarded to another organizational level. There are presently four key institutions in the Soviet military decision-making structure. These are the Politburo, the Defense Council, the Military-Industrial Commission, and the General Staff of the Ministry of Defense.

The Politburo

111. The ultimate decision-making authority in the USSR on defense issues, as on other issues of national policy, is the Politburo of the Communist Party's Central Committee with its 15 voting and 8 non-voting members. There is no detailed information available on the exact responsibilities of the Politburo in the military sphere, but it is believed to set broad requirements for the armed forces and to make final decisions on military strategy and doctrine, the allocation of resources to defense, and the structure and employment of the armed forces. It normally meets once each week.

112. The Politburo's operations have evolved as political conditions have changed. Under Stalin the Politburo was not a genuine policy-making body. It made significant contributions to decision-making under Khrushchev (1957-1964), although it suffered from Khrushchev's heavy-handed dominance. Under the present regime, operating procedures have become more systematized, and the Politburo has adhered to orderly decision-making processes. The regime has sought to maintain a collectivity of leadership, as reflected by its separation of the top party and government posts, and the effort made at Politburo meetings to get full coordination of views and unanimity on important issues. Nonetheless, three officials, by virtue of their position, experience, and knowledge, play leading roles in discussions on defense and military industrial policy: Party General Secretary L. I. Brezhnev, Premier A. N. Kosygin, and D. F. Ustinov, a Party Secretary and a candidate member of the Politburo who is the party's overseer for military-industrial affairs.

113. Brezhnev is the *de facto* chairman of the Politburo and its most influential member. His prerogatives include the right to convene and chair Politburo meetings, to compose the agenda, to sum up the issues under consideration, to circulate or withhold various documents and proposals, and to enlarge or restrict attendance at meetings, including the right to exclude candidate members. As party leader, Brezhnev holds a post which tradi-

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tionally entails leadership over military affairs, and he is known to be chairman of the Defense Council (see below), the USSR's closest counterpart to the US National Security Council. His authority in the defense field is also reflected in his overall supervision of the Central Committee's Administrative Organs Department (which oversees the military, security, and judicial establishments on behalf of the Central Committee) and the Chief Political Directorate of the Ministry of Defense, which functions as a Central Committee department responsible for ensuring the political reliability of the armed forces.

114. Kosygin also has certain responsibilities in the defense and military-industrial field. As chairman of the Council of Ministers, he has constitutional authority over the Ministry of Defense and the eight ministries concerned with defense industry. In addition, the Military-Industrial Commission or VPK (see below), which oversees the various ministries and agencies involved in defense production, is formally attached to the Council of Ministers.

115. Ustinov apparently has direct supervisory authority over the VPK and over the production of advanced weapons generally. The VPK chairman, L. V. Smirnov, is known to report to Ustinov, who thus serves as a personal link between the VPK and the Defense Council and the Politburo. It is through Ustinov that the Politburo monitors the defense industrial sector. In addition, Ustinov has contacts with at least two departments of the Central Committee that deal with defense-related materiel and personnel matters.

116. Major questions relating to military matters are discussed and decided by the Politburo, often in considerable detail. This small elite group is occupied with a wide range of interests and issues, however, and devotes only a limited amount of attention to military affairs. To facilitate its decision-making tasks, the Politburo delegates some of its authority to other bodies and relies upon various councils and commissions, either permanent or *ad hoc*, to examine particular policy areas.

The Defense Council

117. The highest level body in the USSR dealing primarily with military affairs is the Defense Council. It is a political-military body, chaired by Brezhnev, which serves as a defense advisory committee to the Politburo. The Council's high-level membership—which includes at least the top three political leaders (Brezhnev, Kosygin, and Podgornyy), the Defense Minister (Grechko), and probably the Party authority on military-industrial affairs (Ustinov)—suggests that a recommendation by the Defense Council would seldom encounter opposition within the Politburo.

118. The Council's permanent membership seems designed to ensure that meetings are attended by at least one representative from the Party, the government, defense industries, and the military. A variety of other top civilian and military officials—such as the chairman of the KGB, the Chief of the General Staff, the Commander in Chief of the Strategic Rocket Forces (SRF), and the commander in chief of the Warsaw Pact—are also invited to participate on occasion. As a consultative forum, the Defense Council provides the military leadership and defense industry with direct institutionalized access to at least the top three political leaders, and hence with an opportunity to present advice and take positions on the issues under consideration. Conversely, the Council provides the political

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leadership with a formal means of effecting the controlled participation of senior military leaders in the consideration of military policy.

119. The Defense Council is evidently concerned with virtually all major military policy questions. Issues reported to have been discussed by the Council, or which clearly fall within its area of responsibility, include ABM development and deployment, revision of the military conscription law, national mobilization plans, military doctrine, civil defense matters, military intelligence activities, high-level military appointments, military aid, the SAL talks and various crisis situations throughout the world. There is little evidence on how the Council operates, and it is not known what form the discussions take, how differences are resolved, or whether the members forward a list of options or formulate a Council position as such. Brezhnev as its chairman, plays a central role in the Council's operation. He has authority to initiate Council meetings at his own discretion, to determine when and where the Council will meet, to establish the purpose and agenda for a given meeting, and to enlarge or restrict attendance. He presumably exerts considerable influence on the course of Council discussions and on any decisions or positions arrived at. To a large extent, Brezhnev probably determines the Defense Council's actual role within the Soviet policy-making system.

The Military-Industrial Commission

120. A second high-level body which provides defense policy support to the Politburo is the secret VPK, a supraministerial coordinating staff formally attached to the Presidium of the Council of Ministers. The VPK oversees the various ministries and agencies involved in defense production, and provides a high-level forum for the discussion of programs and problems relevant to the defense industries. It plays a supervisory role in coordinating activities in the defense industries and serves to facilitate negotiations with the defense industries' major customer, the Ministry of Defense.

121. As a governmental body, chaired by Deputy Premier L. Smirnov, the VPK is nominally subordinate to Premier Kosygin. On the most important matters of decision-making in the sphere of defense-related research, development, and production, Smirnov in practice reports to the Party Secretariat—in particular to Party Secretary Ustinov—and thus indirectly to General Secretary Brezhnev. Ustinov consequently provides the VPK and defense industries with a personal link to the Defense Council and the Politburo.

122. The VPK has a permanent staff of defense production experts, headed by Smirnov and his three deputies (G. Titov, G. Pashkov, and L. Gorshkov). The staff works closely with directors of defense plants, engineers, and leading officials of the eight ministries primarily responsible for defense production. The heads of these ministries are almost certainly members of the VPK. The deputy ministers and several other senior officials of the defense-related ministries, together with leading officials of certain scientific research institutes and the USSR Academy of Sciences, also attend VPK meetings on occasion and may constitute a sort of associate membership.

123. Defense Minister Grechko is also involved with the VPK, and appears to have some authority to request services and studies from technical specialists attached to it. The authority may derive from his membership on the Defense Council.

124. The extent to which the VPK is actively involved in defense decision-making is uncertain. It may have only limited authority to initiate and approve decisions itself, serving rather to recommend and coordinate on decisions by other groups. Certain VPK recommendations probably are forwarded through the Council of Ministers, and receive *pro forma* approval at that level. A second channel through which VPK views presumably reach the Politburo is the Defense Council, where Ustinov would be in a position to sum up and present VPK views. At times, however, VPK business is taken up directly by the Politburo.

The Military as an Interest Group

125. No professional military officer has served on the Politburo since the ouster of former Defense Minister Zhukov in 1957. But senior military leaders and top defense experts do attend Politburo sessions upon invitation, and presumably are able on those occasions to present their views and recommendations. In addition, the military is represented in formal deliberative bodies such as the Defense Council and the VPK.

126. All available evidence indicates that the Soviet hierarchy leans heavily on the military leadership for recommendations and advice on professional military matters, and that the leadership has a high regard for Marshal Grechko. Moreover, present political leaders, unlike Khrushchev, have preferred to avoid direct conflict with the military in the area of their professional competence. Although the exigencies of SAL talks may have led to some relaxation, Soviet security practice effectively prevents most civilian elements of the government, even including the Ministry of Foreign Affairs, from having any influence over, or even knowledge of, strategic military matters. While the staff directly serving members of the Politburo probably plays an important role in screening and evaluating recommendations, it is highly unlikely that it has or would claim to have any expertise in military matters.

127. As successful products of the Soviet system, the military almost certainly perceive the nation's destiny in much the same terms as the top civilian leaders. While they do not constitute a disaffected element, they do constitute a powerful pressure group with priorities and bureaucratic interests of its own. These interests may conflict with those of other groups, including at times even the top political leadership. Khrushchev said that it took every bit of his power, and certain sops as well, to push through the large cuts in military personnel which took place in the late 1950s.

128. The military leadership is not, of course, always of one mind. There is ample evidence of rivalries in the past. These became acute, for example, when Khrushchev was trying to build up the strategic forces at the expense of the general purpose forces, but they have been evident on other occasions and over other issues as well. These conflicts almost certainly continue, although they appear to have become muted. The combined arms tradition is strong, and since the time of Khrushchev, the services appear to have been generally successful in composing their differences and presenting a united front. Part of the reason, perhaps, is that under the collective leadership total military spending has been increasing, which may have made the competition within the military less keen than if spending were constant or diminishing. With one exception, the estimated shares spent for the individual services appear, in recent years, to have been remarkably steady. The

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exception is the SRF, whose share has declined as major deployment programs were brought to a conclusion.

129. The Ministry of Defense is an institution which reflects the interests of military professionals almost exclusively. Unlike its counterparts in Western countries, the Ministry is almost entirely a military organization. Its top positions are held by professional military officers, and it has few civilians in responsible jobs. It enjoys considerable autonomy in operational matters and seems to be highly compartmentalized, both within itself and vis-à-vis outside organizations.

130. Within the Ministry of Defense, by far the most influential component is the General Staff, which is directly responsible for the day-to-day management of the armed forces, for controlling them in operational situations, and for planning their future. As such, it frames and elaborates the Defense Ministry's position on such issues as weapon programs, force levels, employment concepts, and arms control. In all of these matters the political leadership has the final authority, but the General Staff's recommendations are believed to carry considerable weight since they represent the consensus of expert military opinion. This is probably especially true when complex technical questions are at issue. The General Staff's involvement in preparing the Soviet position at the SAL talks is an illustration of how the political leadership relies upon it for discerning what is militarily necessary to maintain the sort of strategic relationship with the US which the leadership deems desirable.

131. Recommendations on how the defense budget should be apportioned among the services and competing programs would probably emanate from the General Staff. Each of the services undoubtedly has its own goals with respect to resource allocations and future programs. Presumably each submits proposals justifying its requirements and setting forth its interpretation of the threat posed by potential adversaries of the Soviet Union. The *ex officio* status of the chiefs of the individual services as Deputy Ministers of Defense affords further opportunity for them to press their special claims. However, the top leadership in the Ministry of Defense would probably look in the first instance to the General Staff for studies and recommendations. The General Staff would almost certainly play an important role in the event of a major interservice conflict, say between the SRF and the Navy about the question of retiring older ICBMs in favor of additional SLBMs.

132. In dealing with the conflicting institutional interests of the military services, the General Staff appears to have some degree of immunity from the influence of individual service rivalries. Its senior officers are men with long experience in combined-arms planning and operations. Assignment to the General Staff is usually permanent, and some officers spend much of their military careers there. Presumably they progress within a separate General Staff career ladder rather than through their parent services. In addition, they are trained at the General Staff's own academy. With that kind of career pattern, General Staff officers probably tend to identify more with the larger concerns of the military establishment than with the parochial interests of a single service.

133. The General Staff has traditionally had a strong hand in coordinating Soviet military R&D. Although an organizational change raises some question about its present role in this area, the General Staff probably retains some responsibility for recommending what development programs should be pursued.

The Scientific Establishment

134. The scientific and technical elements in the defense establishment appear to have less leeway for innovation than their Western counterparts. Indications at the SAL talks and elsewhere are that scientists and technicians tend to be regarded more as skilled aides rather than as partners of the military. By and large, they are apparently told only enough about the task at hand to handle the requirements explicitly levied upon them.

135. Still, the influence of scientists and technicians is almost certainly felt in ways which are important, if indirect. For one thing, Soviet military and political leaders have their options at least partially defined for them by those responsible for R&D. To put it another way, new technology, and thus the nature of the weapon systems developed, is probably influenced as much from below as from above. To the extent that this is so, the result would not be a response to some integrated design, but a reflection of the interests of individual services, particular design bureaus, and the like.

Other Influences

136. Other individuals and groups also play a role in decision-making on military matters, but we do not know in detail how they operate, or their exact relationship to the top political and military leadership. Departments of the Central Committee deal with political affairs, personnel, and materiel. There is evidence of a small but growing body of military-academic specialists who concern themselves with questions of strategic doctrine and policy, and who have prepared studies on foreign military establishments. For example, studies and testimony by such officials as Yuriy Arbatov, head of the Institute of the USA in the Academy of Sciences, have apparently been used by members of the Defense Council. The top State economic planning organization, Gosplan, coordinates and integrates the national R&D program, including the military R&D program.

The Decision-Making Process

137. The preceding discussion provides an incomplete picture of the way in which decisions about military forces are made. Nonetheless, it permits the following inferences and generalizations:

a. It appears that the Soviet decision-making process involves clusters of advisory and executive bodies, which are likely at times to be in competition with one another. These clusters funnel their views to the top leadership, political and military, in a number of ways.

b. Brezhnev and his colleagues on the Politburo and the Defense Council work in a context of bureaucratic pressures, conflicts, and constraints, which may be heavy at times, and which serve, in practice, to limit the freedom of action of the top political and military leadership. This tendency is reinforced by the collective nature of the leadership and the consequent need to accommodate varying interests in order to achieve a consensus.

c. In the case of military programs, the decision-making process is probably centered on two key elements—the military and military-industrial authorities who formulate and propose new programs, and the top political leaders who make the final decisions, particularly those who serve on both the Politburo and the Defense Council. Other individuals and interest groups play a role, but almost certainly a lesser one.

d. The system of decision-making described above tends to have certain built in biases. For one thing, it gives consider-

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able weight to military claims and interests, in part because of the nature and objectives of the political system itself. Other reasons are the lack of open discussion and the extreme compartmentalization of information, particularly of the kind of information needed to make decisions on military policy. There is also considerable inertia in the system: it favors large, established bureaucratic interests, and works against sharp changes in direction, in spite of the concentration of political power at the top.

138. Thus, we can describe in a broad way how the institutions of Soviet decision-making work and what the characteristic biases of the system may be. What we cannot do, given our present state of knowledge, is to weigh the forces that may bear on particular decisions and, thus, be in a position to predict future program choices. The capability of intelligence in this matter is unlikely to improve very much unless and until the Soviet system becomes much more open than it is now.

V. ILLUSTRATIVE FUTURE FORCES [30]

Introduction

139. Soviet decisions on military policy spring from a complex of considerations, strategic, political, and economic, which change over time and are often in conflict with one another. Programs and goals that once appeared appropriate may subsequently be viewed in a more jaundiced light. Procurement is an incremental process, worked out year by year as choices and requirements change. Thus, many decisions about the makeup of Soviet forces for intercontinental attack will be altered, some more than once, during the period of this Estimate. Under these circumstances, and with our lack of direct and reliable evidence on Soviet planning for the future of their forces for intercontinental attack, judgments about the future are subject to great uncertainty.

140. Nevertheless, it is possible to circumscribe in a rough way the range of choices available in the light of certain major factors that Soviet planners and policy makers will have to take into account. Soviet strategic planning will obviously be affected both by the specific provisions of the SAL agreements and by the expectations and commitments generated in Moscow in the course of reaching them. Policy will also be greatly influenced by Soviet perceptions of US intentions and objectives in the new circumstances created by the agreements—and in particular, by the US buildup of its own strategic forces and the stress the US appears to be placing on it. Finally, Soviet military planners must work within the context of the practical choices available to them in terms of the weapons that can be made available and the feasibility of procuring and deploying them.[31]

[30] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, and Maj. Gen. William E. Potts, the Assistant Chief of Staff for Intelligence, Department of the Army, are in fundamental disagreement with several aspects of this Section. They believe that the influence of US actions on the structure of future Soviet strategic forces is unduly emphasized. They believe that the Soviets will press their strategic weapons R&D vigorously, regardless of the US level of effort, and consider that the text fails to put sufficient emphasis on this highly significant point. They disagree with certain assumptions concerning various weapon systems. For these reasons they believe that the Defense Intelligence Projections for Planning (DIPP) provide a more useful portrayal of the options available to the Soviets for future strategic weapons deployment than do the Illustrative Force Models contained in this Section. For a more detailed expression of their views see their footnotes throughout this Section.

[31] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, while agreeing with the substance of this paragraph, believes that the sum of the references in this and subsequent paragraphs (146, 147, 152, 153, 156, 159, 160, 210, 224, 232, 240, and 246) to the relationship between US actions in the strategic attack field and Soviet strategic planning has the effect of overstating the influence of US actions on the structure of future Soviet strategic forces.

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141. This Section discusses these three factors. It then presents a series of force projections illustrating various ways in which Soviet forces for intercontinental attack might develop in the next five to eight years.

The Impact of the Limitation on Strategic Arms

142. The accords signed in Moscow in May 1972 to limit strategic arms introduced a whole new set of constraints and political factors which will influence future Soviet decisions about strategic forces. The provisions of the agreements—what they prohibit and what they allow—will foreclose some options and make others more attractive. Perhaps of even greater significance are the commitments, concessions, and consensus that must have developed within the Soviet leadership over the issues arising from the talks.

143. Clearly, there were divergent views within the leadership and its advisory bodies about the positions to be taken, and even over the questions of whether negotiations were desirable. Some groups, such as those concerned with economic development or increasing the supply of consumer goods, had a clear self-interest in successful negotiations. Others, such as the military services, almost certainly had misgivings, and may have received concessions which made the agreements palatable to them. We do not know what specific bargains were struck during the evolution of the Soviet position, but the proponents of arms control were able to hammer out compromises and achieve enough of a consensus to make the initial agreements possible. The consensus no doubt embodies the views of many separate interest groups with disparate motivations and attitudes.

144. However fierce the infighting may have been, the top Soviet leaders now find themselves committed to the success of the accords. They will have personal and professional incentives to insure that the accords are not abrogated, and to avoid the intensification of the arms competition and the deterioration in US-Soviet relations that would result. At the same time, they will need to show that the agreements are beneficial to the Soviet Union. These concerns will tend to color decisions about future Soviet strategic weaponry. They will also cause the top leaders to involve themselves more deeply than ever in the details of strategic planning.

145. More now than in the past, the main questions about the future of Soviet forces for intercontinental attack center on the pace and scope of technological improvements. The interim offensive agreement places certain numerical limitations on ICBMs, SLBMs, and modern missile-carrying submarines but permits qualitative improvements and it places no restrictions on strategic bombers. Thus, it allows room for new programs in all major elements of the Soviet forces for intercontinental attack.

146. In planning for their forthcoming strategic weaponry, Soviet leaders will have strong incentives to exercise the options open to them under the SAL accords. They will want to avoid any deterioration of the Soviet Union's relative position as the US pushes ahead with the deployment of MIRVs and works on follow-on systems such as the B-1 bomber and ULMS. They will also wish to maintain a strong bargaining position for the follow-on SAL negotiations, and to develop new options which could be exercised if the follow-on talks break down. These incentives will be reinforced by pressures from individuals and groups which have a parochial interest in promoting specific weapon programs.

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147. Aside from the military considerations involved, the top political leaders have a personal stake in insuring that the Soviet Union suffers no real or apparent erosion of its position. Their pronouncements about the SAL talks have consistently emphasized the theme of "equal security", and it is likely that the consensus they forged to approve the accords is based on assurances to skeptical elements that the Soviet Union would not fall behind again. Indications that the US was pulling ahead would make Brezhnev and his supporters vulnerable to criticism and prompt them to consider countermeasures.

148. At the same time, there will be other pressures working to restrain the Soviet leadership. One of them is economic. Soviet spokesmen and Soviet literature continue to emphasize the high cost of the strategic arms race. This probably bespeaks a genuine desire by political leaders to realize some savings from the arms limitation accords—particularly in the high-quality, specialized resources that are needed to modernize the civilian economy and boost productivity. A *Pravda* editorial in May 1972, for example, noted that the SAL accords will help curb the arms race, which has diverted "huge funds from constructive purposes". Another article in a journal intended for the political indoctrination of Soviet military personnel described military expenditures in general as non-productive and as direct deductions from national income, and argued that "in peacetime the military organization must not be too burdensome to the national economy". Judging from statements of various high-ranking Soviet military leaders in recent years, however, this viewpoint is contentious within the military; a subsequent issue of the very same journal placed military needs first.

149. On the political side, there will also be strong incentives for the leadership to resist courses of action which might jeopardize the agreements, even though not actually violating them. The agreements play an important part in the current policy of détente with the West, and they have been hailed as a successful manifestation of that policy. The top political leaders, and Brezhnev personally, have identified themselves with the agreements and would have much to lose politically if they fail. If they in fact consider an unrestrained arms competition neither necessary nor desirable, they would also wish to stop short of actions which threatened to undercut the follow-on SAL negotiations.

150. Below the top leadership there will be similar forces at work. The consensus that was developed through compromise and concession during the period of negotiation and ratification is likely to produce a bureaucratic momentum of its own. That is, a wide variety of important pressure groups in the Soviet military and civilian bureaucracies now has a commitment to, and a stake in, the SAL agreements as a result of a long and difficult process which required a delicate balancing of individual interests. Any attempt to shift policy in a direction that might endanger the agreements would require another lengthy and difficult set of negotiations and understandings among the interested bureaucratic groups. Furthermore, the agreements have received laudatory publicity in Soviet periodicals and broadcasts; they are portrayed as a salutary result of Soviet policy and an important step in reducing the dangers of nuclear war. The Council of Ministers issued a formal directive ordering compliance with the agreements, and the necessity for strict implementation has been stressed in public media. The fact that compliance with the agreements is being monitored by both sides has been made known in the Soviet press.

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151. This is not to say, however, that the Soviets would be inhibited from pursuing any permitted options they considered necessary in order to maintain their relative status and their bargaining position during the next phase of negotiations or even that they would refrain from steps inviting or leading to termination of the agreements should their vital interests appear to require them. Nor would they, in so doing, be particularly sensitive to charges that their programs represented an escalation of the arms race or were destabilizing. The Soviet leaders almost certainly continue to regard the US as a crafty antagonist which is still ahead of the USSR in some important aspects of strategic power and which might well seek to achieve some further degree of advantage under the agreements.

152. Soviet public media have already said that increased US spending on strategic weapons and any effort to attach conditions to the SAL agreements would in effect constitute a rejection of the principle of "equal security" as the basis for the US-USSR strategic relationship and undermine the spirit of mutual restraint evident in the agreements. The point was most authoritatively put by Politburo member M. A. Suslov, who stressed that the USSR would closely follow the efforts of "certain US circles" to distort the "spirit and letter" of the agreements. To some extent such statements can probably be discounted as part of the rhetorical jockeying for position which has gone on intermittently since before the SAL negotiations began. Nevertheless, they almost certainly reflect an important point: that decisions about Soviet forces will be greatly influenced by Soviet perceptions of the US attitudes towards the SAL agreements as well as by specific US decisions on its strategic forces.

153. As a result of the opportunities and risks associated with the SAL agreements, future programming decisions will probably be even more directly influenced than in the past by the Soviet leadership's sense of stability or change in its strategic relationship with the US. To be sure, as China moves closer to establishing a credible nuclear force, the need to counter Chinese capabilities will also affect Soviet plans. For many years to come, however, the Soviets are likely to be concerned primarily with the US arsenal, in terms both of the strategic threat it poses and the diplomatic and political leverage it affords.

The Soviet Perception of the United States Strategic Threat

154. The Soviets are both well informed and sophisticated in their understanding of US strategic weapon programs. We know, for example, that the Soviet military conducts detailed analyses of the relative capabilities of US and Soviet strategic forces, using much the same kinds of measures as US analysts. It is also clear that the Soviets have accurate information about US strategic forces, both current and programmed, through a combination of open literature, satellite photography, and other intelligence sources.

155. How this information and analysis are used is not known. At a minimum, the military services and the General Staff probably cite it in buttressing their arguments for specific programs and budgetary allocations. It might also be used for high-level and relatively unbiased evaluations, although the Soviets apparently do not have any non-military organization to provide a thorough and independent review of military programs and requirements.

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156. Attempts to correlate specific Soviet strategic weapon programs with developments in US strategic forces have not produced conclusive results. It does appear, however, that Soviet strategic force planners have sometimes reacted to US strategic programs that were only in the planning stages when the key Soviet decisions were made. As an example, a likely explanation for the development of the multiple warhead versions of the SS-9 and SS-11 ICBMs is that they were intended to penetrate the countrywide area defense ABM system which was initially proposed for the US prior to the decision to concentrate on defense of Minuteman fields.

157. We have no direct evidence on how Soviet planners project US strategic forces for the remainder of the decade. At a minimum, however, they would certainly assume that the improvements presently programmed—and made public through congressional hearings and press reports—would be carried out. These improvements include the retrofit of over half of the Minuteman silos and three-quarters of the Polaris submarines with MIRV-carrying missiles; hardening of missile silos; deployment of a new class of missile submarines (Trident) with long-range, MIRV-carrying missiles (ULMS); replacement of older B-52 bombers with B-1s; deployment of new air-to-surface missiles (SRAM and SCAD); deployment of Safeguard ABMs at two sites; and improvements in the survivability of command and control systems.

158. In addition, the Soviets would probably consider it prudent to allow for the possibility that toward the end of the decade the US will press beyond current force goals—for example, by retrofitting all Minuteman silos, replacing Poseidon missiles with ULMS, and retaining most of its B-52s. Soviet planners would also need to consider reported US programs and proposals for the development of new strategic weaponry, such as hard-target MIRVs and strategic cruise missiles, and the effect these systems would have on the US-Soviet strategic relationship if they were deployed.

159. There will be those in the Soviet Union who will argue that the US has for some time been striving for strategic superiority. Their position is articulated in *First Strike*, a book published last year. It seeks to document the thesis that the US has historically tried to acquire a decisive first-strike capability against the USSR and has been frustrated only by the growing capabilities of Soviet forces. At a minimum, the element of the Soviet military advocating development and deployment of counterforce weapons such as hard-target MIRVs will probably seize on reports of US work in this field to press their case in policy-making councils. On the other hand, advocates of arms control might cite such reports as demonstrating the need for negotiating limitations on qualitative improvements in strategic weaponry. In any case, the prospect of improved counterforce capabilities for the US strategic arsenal is likely to be reflected in Soviet planning.

160. The following table illustrates how Soviet planners might view the future development of US strategic forces. The first two columns show the improvements currently programmed for mid-1977 (when the interim agreement on limiting strategic offensive weapons expires) and for mid-1980. The third column represents a possible Soviet projection of a "worst case" threat at the end of the decade, in which US deployment goals are raised and the results of intensive R&D are incorporated into US forces. The improvements shown in all three cases assume that the current SAL agreements continue in effect through 1980. The Soviets may also plan for the possibility that the interim agreement will not be renewed or replaced when it expires,

but the impact of new programs initiated in 1977 would not be felt appreciably until after 1980.

161. In addition to the major threat posed by the US, the Soviets must consider the capabilities of Great Britain, France, and China when structuring their forces. Great Britain now has four Polaris submarines in operational service. France has operational 18 IRBMs and one Polaris-type submarine. The French plan to build a total of five ballistic missile submarines, and deploy a total of 27 IRBMs in hardened silos. Both Great Britain and France have bomber aircraft capable of attacking the Soviet Union. At the last round of the SAL negotiations the Soviets attempted to gain compensation for these units and made the unilateral statement that any increase in NATO's "modern submarine" force would entitle the Soviet Union to equivalent increases. During the 1970s China will probably build up a missile force capable of attacking targets throughout the USSR. These weapons could have warheads in the megaton range. In the same period, China may also increase its capabilities for air attack along contiguous borders of the USSR and into key areas of the Soviet heartland.

POSSIBLE SOVIET VIEW OF IMPROVEMENTS IN UNITED STATES STRATEGIC FORCES

Programmed Force		Augmented Force
Mid-1977	Mid-1980	Mid-1980
Minuteman III retrofitted to 550 silos.	Minuteman III retrofitted to 550 silos.	Hard-target MIRVs incorporated in ICBM and SLBM forces.
Most Minuteman silos hardened.	All Minuteman silos hardened.	Minuteman III or more advanced ICBM retrofitted to all Minuteman silos.
Poseidon missiles retrofitted to 31 SSBNs.	Poseidon missiles retrofitted to 31 SSBNs.	First few Trident SSBNs with ULMS entering force.
	First few Trident SSBNs with ULMS entering force.	Poseidon missiles replaced with ULMS.
		Possibly some sea-launched strategic cruise missiles becoming operational.
Present B-52 and FB-111 bomber force maintained.	About 100 B-1 bombers introduced in place of equivalent number of older B-52s.	Most B-52s retained along with 100 or more B-1s.
Safeguard ABM deployed at 1-2 sites.	Safeguard ABM deployed at 2 sites.	Grand Forks ABM complex retrofitted with hard-site defense.
This force would have about 7,000 missile RVs and about 3,500 bomber weapons.	This force would have about 8,000 missile RVs and about 4,500 bomber weapons.	This force would have over 11,000 missile RVs and 5,000 bomber weapons.

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System Characteristics and Deployment Patterns [32]

162. This Section presents the judgments and assumptions about Soviet strategic attack systems which underlie the later projections of Soviet forces for intercontinental attack. It briefly reiterates earlier estimates of the structure of present forces and postulates likely characteristics, readiness dates, and deployment rates for possible new systems. Some of the assumptions differ for various projected forces and those differences are spelled out here and in the discussion of each projected force.

Intercontinental Ballistic Missiles

SS-7 and SS-8

163. The interim agreement permits the replacement of the old and relatively vulnerable SS-7s and SS-8s by modern SLBMs, with deactivation to occur by the time the submarines carrying these SLBMs begin sea trials. We assume that SS-7 and SS-8 missiles will be deactivated on this basis, in whole or in part.

SS-9

164. The present force of 288 SS-9 launchers at deployed complexes is assumed to be equipped with 54 Mod 1, 222 Mod 2, and 12 Mod 4 missiles.[33] We have assumed that at least some standard SS-9 silos will be converted to the new harder silo configuration and that a new large missile will be deployed in these silos.

New Large Missile

165. In some forces we postulate early initiation of flight testing of the new large missile under development at Tyuratam and a highly successful flight test program, with deployment beginning two years after the start of flight testing if present guidance technology is utilized, or three years after if the missile employs entirely new guidance techniques designed to achieve CEPs on the order of 0.15 nm. The new missile thus appears initially in the operational listings in mid-1975 or mid-1976.[34] Two other projections allow for the possibility that testing might start later, take longer to complete, or both. In these projections the initial appearance of the new large missile in the operational listings is delayed a year to mid-1976.

166. We postulate that the new large missile will be more accurate than the SS-9 and will carry MIRVs. With regard to accuracy, we have illustrated three possibilities, two assuming improvements in the present guidance system for the SS-9, the other assuming development of an entirely new guidance

[32] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, differs with many of the judgments and assumptions presented in this subsection. In addition to his major differences which are footnoted below, he has lesser differences which have not been footnoted. He would note, however, that when taken together, small differences on such issues as the construction rate of a projected new SSBN, the number of re-entry vehicles on a specific missile, and the kind of modernization a particular kind of silo is to undergo can result in significantly different projections even though there is general agreement on more fundamental postulations.

[33] These figures do not include the six SS-9 Mod 3 missiles believed to be operationally deployed at Tyuratam nor do they reflect the possibility that 12 or 18 Mod 3 missiles are deployed in the field. See paragraph 20.

[34] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, believes the likelihood that the Soviets are now developing a new large missile with a CEP on the order of 0.15 nm to be so remote that a projection of the deployment of such a system in mid-1976 should not be made. For a fuller explanation of his views on this subject, see his footnote to Force 5.

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system with a potential for CEPs on the order of 0.15 nm. The first is that the Soviets use essentially the existing SS-9 guidance system and get an accuracy on the order of 0.40 nm CEP. A second postulate is that significant improvements are made to the existing SS-9 guidance system resulting in a system accuracy of about 0.25 nm CEP.[35] A third postulate is that the Soviets develop an entirely new guidance system for the new large missile with an accuracy on the order of 0.15 nm CEP.

167. The throw weight for the new large missile is assumed to be about 15,000 pounds. We have postulated that such a missile would appear, alternatively, with three different MIRV systems, one with three RVs, another with six RVs, and one with 12 RVs. Twelve is the maximum number of RVs projected, because that number of RVs combined with the best accuracy postulated in the projections (0.15 nm CEP) produces better counterforce capabilities than a system with significantly more RVs but with a much lower yield per warhead. The missile would be capable of carrying more RVs, however, and a larger number cannot be ruled out, particularly if the Soviets are concerned about survivability.

168. The assumptions about MIRVs and accuracy used in the illustrative forces, as well as the combinations of these two variables shown, are intended to be representative of what the Soviets could achieve during the 1970s. Certainly, other combinations are possible. It is highly unlikely, however, that the Soviets could achieve system accuracies better than about 0.15 nm CEP during the 1970s.

[35] The CEPs in this paragraph and those used in the balance of this section refer to accuracies achieved under flight test conditions. Handling and maintenance of deployed missiles by operational personnel would degrade accuracy somewhat.

New Large Silos

169. We postulate that the new large missile will initially be deployed in the 25 new large silos under construction at SS-9 complexes. In addition, we postulate that the Soviets will retrofit the new large missile into reconstructed SS-9 silos.

170. How long it would take the Soviets to convert all or a major portion of their SS-9 silos to accommodate a new missile would depend on the time required per silo and on how many silos were under conversion at a time. The latter, in turn, would depend largely on how anxious the Soviets were to get the job completed on the one hand and on what level of operational missiles they desired to maintain during the conversion period on the other.

171. The Soviets might have as many as 10 launch groups—60 sites—under conversion at a time if the program were given sufficient priority. This would permit the entire force to be converted to the new missile in about five years, but reduce the number of operational launchers for large missiles by over 20 percent throughout this period. Alternatively, if the Soviets considered that all of the 288 SS-9 launchers now operational were needed to meet targeting requirements, they might deactivate silos for conversion only as new silos became operational—i.e., about 25 at a time. At this rate it would take over 10 years to retrofit the entire SS-9 force. In practice, however, Soviet targeting requirements are unlikely to produce that much inflexibility. The introduction of even a 3-MIRV missile in the 25 new silos now under construction, for example, would enable the Soviets to cover as many as 75 targets now assigned to SS-9 launchers (which could then be deactivated for retrofit), the number depending on how

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much redundancy of targeting was required because of the smaller MIRV warheads. If the Soviets were content to maintain only about the present number of independently targetable warheads, targeting requirements would place no effective restrictions on the rate of retrofit except at the outset.

172. Considering these factors, we have postulated four rates of retrofit—30, 42, 54, and 60 silos a year. We assume that the retrofit of each silo would take 12 months except in one illustrative force where we have assumed that it would take 18 months.

SS-11

173. The SS-11 force now consists of 850 Mod 1 missiles at regular ICBM complexes and 120 Mod 1 missiles at Derazhnya and Pervomaysk. We postulate that the 60 new small silos at Derazhnya and Pervomaysk will become operational in early 1973 and will be equipped with the SS-11 Mod 3.[36] We further postulate that the six new large silos at Derazhnya and Pervomaysk will not house a missile equipped with a nuclear payload.

174. Although there are differences of opinion as to whether the SS-11s at Derazhnya and Pervomaysk have a primary role in peripheral or intercontinental attack, we have included them in the illustrative forces because they are subject to the restrictions of the interim agreement.

New Small Missile

175. The Soviets apparently are developing a new small liquid-propellant missile but the evidence available does not yet permit a confident assessment of its characteristics. We assume that the new missile will have better payload characteristics than the SS-11 Mod 3 and postulate a system with three MIRVs in all the illustrative forces. In one case, however, the new small missile is initially equipped with a single RV and only later fitted with a 3-MIRV payload. The new small missile is postulated to incorporate either guidance system improvements resulting in CEPs of 0.50 or 0.25 nm, or a new guidance system with an accuracy on the order of 0.15 nm CEP.

176. A new small missile with a guidance system designed to achieve accuracies of either 0.50 nm CEP or about 0.25 nm CEP would require a minimum of two years of flight testing before it could be deployed. Thus, if flight testing has now started, development of such a missile could be completed by late 1974 at the earliest. Accordingly, the first year a new small missile appears in the illustrative forces is mid-1975. At least three years of testing would be required for a new guidance system with an accuracy of about 0.15 nm CEP. Thus, the first year such a missile appears in the illustrative forces is 1976.[37] In either case the test program could

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[36] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, believes the continued testing of the SS-11 Mod 3 system, [redacted] suggests that deployment will likely be broader than in just 60 such silos at Derazhnya and Pervomaysk. Moreover, as stated in the text, under certain circumstances the SS-11 Mod 3 is capable of greater coverage of urban areas than is the SS-11 Mod 1. In his view, the DIPP projection of the deployment of 200-400 SS-11 Mod 3s, better represents probable Soviet plans for deployment of the system.

[37] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, believes the likelihood that the Soviets are now developing a new small missile with a CEP on the order of 0.15 nm to be so remote that a projection of the deployment of such a system in mid-1976 should not be made. For a fuller explanation of his views on this subject, see his footnote to Force 5.

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take a year or more longer than the minimum times given here, and two projections take this into account.

New Small Silos

177. In all the illustrative forces we postulate that the Soviets will retrofit the new small missile into reconstructed SS-11 silos. Reconstruction of an existing SS-11 silo to the configuration of the new small silos would be much more difficult than in the case of the SS-9 silos, but it could be accomplished in about one year. Accordingly, we assume that it would require 12 months per silo for this conversion in all but one illustrative force, where we postulate it would take an average of 18 months. We have not illustrated the possibility that the SS-11 silos might be only partially reconstructed to accommodate the new small missile.

178. The factors that affect the rates of reconstruction of SS-9 silos and the deployment of a new large missile are also applicable to the deployment program for a new small missile. If the Soviets wish to maintain the present level of 970 SS-11 type operational launchers, then only some 60 launchers would be in conversion at any one time. If, however, the Soviets were content to maintain the number of independently targetable warheads, then deployment of a 3-MIRV system would permit retrofit of up to 180 silos in the year after the 60 new small silos at Pervomaysk and Derazhnya become operational, and, thereafter, there would be no restrictions on the rate of retrofit.

179. We have assumed a maximum construction start rate of 200 silos a year for one force and rates of 60, 100, and 150 a year for the other illustrative forces.

SS-13

180. The projections reflect the judgment that the 20 SS-13 launchers which became operational early in 1972 were equipped with the SS-13 Mod 2. In view of our present lack of information as to the advantages of the SS-13 Mod 2 over the Mod 1, we have made no assumptions regarding possible replacement of the 40 previously deployed Mod 1 missiles by the Mod 2.

Solid-Propellant Intercontinental Ballistic Missiles [38]

181. The Soviets appear to have begun testing a new solid-propellant ICBM from Plesetsk this year.[39] We postulate in all but one force that a new solid-propellant ICBM will be developed and deployed and that it will have an accuracy of about 0.50 nm CEP and carry a single RV. We further postulate that a minimum of about two years of flight testing will be required. Thus, the new solid-

[38] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, agrees with the projected deployment of solid-propellant ICBMs in only the 60 SS-13 silos already operational for low and medium level of effort force projections. He believes, however, that there is sufficient evidence to suggest that high level of effort force projections should reflect the possibility of greater solid-propellant ICBM deployment. He bases this judgment on the continuing expansion of Soviet solid-propellant development and production facilities, on certain evidence which indicates that several solid-propellant ICBMs may be under development, and on the relatively sophisticated nature of the new solid-propellant ICBM or highly modified SS-13 which the Soviets began to test this year. He believes an appropriate way to portray this judgment would be to project the development of two solid-propellant ICBMs, one for deployment in the 60 SS-13 silos beginning in about 1975 and another larger one for deployment in some SS-11 silos beginning in 1977. The DIPP projects deployment of over 500 of the larger one.

[39] It remains possible that this vehicle is a highly modified SS-13. See paragraphs 45-49.

propellant ICBM first appears in the illustrative forces in 1974. Because the Soviets have relatively little experience with solid-propellant missiles and because of the extended period it took to develop the SS-13, in two illustrative forces we have allowed one and two additional years for the flight test program. The new missile initially appears in these forces in 1975 and 1976.

182. For purposes of these projections, we have postulated deployment of the new solid-propellant missile only in a silo-launched configuration, as replacement for the 60 SS-13s. Such a limited deployment program might be justified simply by dissatisfaction with the SS-13 and a desire to advance solid-propellant technology and make use of some of the USSR's extensive solid-propellant production facilities. Alternatively, the Soviets might be developing a new solid-propellant missile as a backup to or in competition with a new small liquid-propellant missile—in which case the limited deployment we have postulated would represent victory for the other system.

Mobile Intercontinental Ballistic Missiles

183. Another possible aim of a new solid-propellant program is the development of a mobile ICBM, either as a SAL bargaining chip or for actual deployment. Because of the unilateral US statement during SAL negotiations that deployment of mobile ICBMs would be considered inconsistent with the objectives of the interim agreement, we have not projected deployment in any of the forces, postulating that the Soviets would not want to risk a showdown with the US on this matter.[40] In addition, the Soviets would probably hesitate because of the practical difficulties of deploying and maintaining mobile ICBMs. Assuming that testing has started, however, a solid-propellant mobile ICBM could be ready for deployment as early as 1975.

Ballistic Missile Submarines and Submarine-Launched Ballistic Missiles

Status of Y- and D-Class Submarines

184. The projections reflect the estimate in Section II above that as of 1 October 1972 there were 44 Y- and D-class submarines either operational or under construction—of which 31 were 16-tube Y-class units and 9 were of the 12-tube D-class, with the configuration of 4 units under construction at Komsomol'sk still undetermined. The Severodvinsk yard has now shifted over entirely to the D-class. The projections assume that the four units under construction at Komsomol'sk and all units subsequently produced there will also be of the D-class.

Size and Makeup of Forces

185. We postulate that the Soviets will move to achieve the force of 62 modern ballistic missile submarines permitted them under the interim agreement[41] and in all but one illustrative force, that they will seek to get as close as possible to the total of 950 SLBM launchers the agreement also allows. It is apparent that if they wish to achieve the latter goal they will sooner or later have to halt construction of the D-class submarine in favor of one with more launch tubes and that the longer production of the D-class is con-

[40] Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, believes that there is sufficient probability that the Soviets would deploy mobile ICBMs that he would include them in the force tables.

[41] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, agrees with this assumption in medium and high level of effort projections. He believes, however, that the possibility of a Soviet goal to deploy fewer than 62 modern SSBNs should be illustrated in a low level of effort projection.

tinued, the more launchers the new submarine would have to carry in order for the USSR to approach the 950 limit. If only D-class submarines were built from now on the Soviets would have only 868 SLBM launchers—on 31 Y-class and 31 D-class units—when they reached the level of 62 modern ballistic missile submarines in the mid-1970s.

186. To illustrate how the Soviets might seek to build up the number of SLBM launchers to the maximum number allowed, we have projected for all but one of the forces introduction of a new nuclear-powered ballistic missile submarine—either a further modification of the Y-class or an entirely new design—with either 18 or 20 tubes. A new submarine with fewer than 18 or more than 20 tubes is also possible and other combinations of submarine types could result, particularly if the Soviets convert older Y-class units to the new 12-tube SS-NX-8 D-class configuration.

Submarine-Launched Ballistic Missiles [42]

187. We postulate that the SS-N-6 will be deployed only in the Y-class submarine and that the D-class will utilize the SS-NX-8. We postulate the introduction in due course of one or more of the following missiles for retrofit into Y- or D-class submarines or installation in a new SSBN:

—A new small missile with a range of at least 2,000 nm which would replace the SS-N-6. It would incorporate improvements in accuracy and in some cases would have MIRVs as well. With a 2,000 nm range this missile would nearly quadruple the potential on-station operating area of the Y-class submarine with its present 1,300 nm missile. This missile appears in all illustrative forces.

—An improved version of the SS-NX-8 for use in a new submarine and eventual retrofit into the D-class is included in all but one illustrative force. We postulate a range of about 3,000 nm, a 3-MIRV payload, and improved accuracy for this missile.

—In one illustrative force we postulate a new large SLBM in the SS-NX-8 class with very high accuracy, a 3-MIRV payload, and a range of 4,500 nm. The missile would be available both for a new submarine and for retrofitting into the D-class.

188. In all projections we assume that MIRVs will be deployed on ICBMs before they are on SLBMs and that there will be a similar lag in any achievement of high accuracies—in part because of our sense of probable Soviet priorities and in part because there is no indication of new missile development programs in the SLBM field as there is for ICBMs. As with ICBMs, the achievement of very high accuracies would require improved guidance systems and RVs either with higher betas or terminal guidance.

[42] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, notes that in each of the illustrative force models it is postulated that the development of SLBMs in general lags behind the development of ICBMs. He believes that the first appearance of components for potentially more accurate guidance systems on naval associated systems (SS-NX-8 and KY-9) indicates that this postulation may be in error. Moreover, he believes it is possible that the Soviets will have greater incentive to develop MIRVs for SLBMs than for ICBMs, particularly if they continue to maintain only a few ballistic missile submarines on station at any given time. The deployment of MIRVs on the SLBMs carried on these submarines might be a desirable way to increase the weight of a retaliatory strike. He therefore believes that a postulation of at least equal priority for SLBM development should underlie projections that are judged to be more likely or of a higher level of effort.

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Production Rates

189. We postulate that the production rate for D-class submarines will average about seven units a year—four-five from the existing assembly hall at Severodvinsk and two-three from the facility at Komsomol'sk. We further postulate that the introduction of a new submarine would cause a falling off in total production, because it would probably take longer to produce the new submarine than the D-class.

190. Construction of a new submarine might begin in the existing main assembly hall at Severodvinsk, conceivably by early 1973. If so, the lead units would be available for deployment by mid-1976; production could later take place at the new assembly hall now under construction as well. But it appears more likely—and we so postulate—that construction of a new submarine will take place only in the new hall, which we postulate to be completed in early 1974, with the first units of the new class showing up in the operational tables in mid-1977. We postulate construction rates of three or four units of the new submarine a year.

191. Waiting for the new construction hall to become available would in most cases force a halt in starts of D-class units six to nine months before assembly of the new submarine could begin, if the Soviets desire to maximize the number of SLBM launchers on the authorized 62 modern submarines. As space became available in existing construction facilities at Severodvinsk, the ways concerned could be used for overhaul or retrofit of existing submarines or for other purposes. We make no specific assumptions on this point, beyond assuming that the ways would not be used for the construction of ballistic missile submarines.

G- and H-Class Submarines

192. Older submarines which are counted against the ceiling in the SAL agreement are carried in the illustrative forces. This includes 8 H-II, 1 H-III, and 1 G-class submarine.[43] In all but two illustrative forces, all of the H-II class units and the one G-class submarine that carries the SS-NX-8 missile are decommissioned as new SSBNs enter the force.

Bombers [44] [45]

193. We assume that the Soviets will maintain the small Bear and Bison heavy bomber force in service for the 1970s, although some slight attrition is indicated in the projections. Because of the absence of indications that development of a new bomber for intercontinental use is under way, such a bomber is included only in the high forces.

194. The Backfire is not included in the projections. However, it almost certainly will be produced in substantial numbers and, if it proves to have adequate range and if an appropriate tanker is developed, might be

[43] The other modified G-class submarine is assumed to be a test bed [redacted] and is not included in the projections.

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[44] Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency, believes the possibility of the Soviet's deploying the Backfire with a suitable tanker force to augment or eventually replace the Bear/Bison force is sufficiently high to warrant its inclusion in future projections as an alternative to the deployment of a new heavy bomber.

[45] Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, noting that bomber inventories are not affected by the SAL agreement, would include a new bomber in all of the force tables. Moreover, he believes that the basic design of the Backfire indicates that the Soviets developed that aircraft to perform a variety of missions, including intercontinental attack. He would, therefore, include Backfire in the projections.

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used for intercontinental missions. We estimate that Backfire will begin to enter operational units in late 1973. The table below illustrates the growth of the operational Backfire force assuming two different production rates for the 1970s—one likely and the other high.

Alternate Force Developments

195. With the signing of the interim offensive agreement, the Soviets are faced with important decisions involving trade-offs among different systems, rates of deployment or retrofit, and the degree of risk to be taken in development programs. The more ambitious the development programs for new ICBMs, the higher the risk of delays or possible failure. Moreover, a technologically ambitious program takes longer to complete and delays the introduction of new systems. The more rapid the rate of retrofit of a new missile, the sooner the program is completed. But during the period of rapid retrofit, more delivery vehicles are offline and for a time total capability may be reduced. The continued production of the D-class would provide 62 modern SSBNs in the shortest possible time. To approach the limit of 950 SLBMs, on the other hand, would require going back to production of the Y-class or a new SSBN with more than 12 tubes. The freedom to substitute new SLBMs for older SLBMs or ICBMs adds another variable to the force planner's problem.

196. The alternative force developments presented in this section represent possible directions that Soviet strategic policy could take. Many other models could be postulated and for any one model illustrating a particular force planning philosophy and level of weapons technology, many other force levels could be projected in general or in detail. Nevertheless, we believe the models chosen represent possible directions Soviet intercontinental attack forces could take. It should be emphasized that we consider no one of them an estimate that Soviet intercontinental attack forces will be composed of the particular weapon systems in the precise numbers listed. They are intended only to be illustrative models of possible trends and differing emphases, and are developed primarily for broad policy use at the national level. They are not intended for defense planning purposes; projections developed for planning in the Department of Defense are included in the Defense Intelligence Projections for Planning (DIPP).

197. We present five illustrative forces representing different levels of effort by the Soviets and different degrees or rates of technological advance. All assume that the Soviets adhere to the SAL agreements and, so as to illustrate more fully what the Soviets might do under the interim agreement on strategic offensive weapons, further assume that it is extended through 1980. Additional possibilities that would be open to the Soviets if the interim agreements were *not* extended beyond mid-1977 are discussed in paragraphs 248-250. No attempt is made to indicate the possible impact of a permanent treaty which replaces the interim agreement, since we lack any good basis for prejudging the content or timing of such a treaty.

Postulated Growth of Backfire Force

	Mid-Year 1974	1975	1976	1977	1978	1979	1980
Likely Production Effort	15	45	80	115	150	185	220
High Production Effort	15	50	100	150	200	250	300

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198. In constructing the illustrative force models, we have assumed in all but Force 1 that the Soviets push ahead with qualitative improvements as rapidly as their technology permits, subject to the limitations of the interim agreement on offensive forces. It is possible, however, that they will not, for fear of jeopardizing the follow-on negotiations or of provoking a US response. Also, they may wish, in the follow-on negotiations, to constrain technological possibilities, in an effort to further stabilize the US-Soviet strategic relationship. If so, they may resist the temptation to take immediate advantage of all that technology may offer. Thus, they may choose, for example, not to develop MIRVs for any of their missile systems.

199. All five of the illustrative forces assume that MIRVs will be used in one or more of the new missile systems now under development. Three of them postulate that the Soviets *do not* introduce new and highly accurate systems of guidance for their missiles within the period of this Estimate. Force 3 represents about the most the Soviets could be expected to achieve under this postulate; it assumes that testing of new missile systems begins soon and proceeds without significant difficulty or delay, permitting IOCs to be achieved in minimum times. Force 2 illustrates what could happen if, for one reason or another, new weapon programs were not carried out as promptly as postulated for Force 3. Force 1 postulates, in addition, less ambitious technological goals than those of Forces 3 and 2.

200. Two other forces postulate that within the period of this Estimate the Soviets *do* introduce new and improved guidance systems for their strategic missiles which produce accuracies of the order of 0.15 nm CEP. Force 4 postulates the introduction of new guidance and other improvements later in the decade, and hence represents a step upward from Force 3. Force 5 postulates that new, highly accurate guidance systems, along with other improvements, are incorporated in the weapon systems now under development, that the earliest possible IOCs are achieved, and that deployment or retrofit proceeds thereafter at about the highest rates achieved in the past. It thus constitutes a possible case but a highly artificial one. It is designed to show the maximum that the Soviets could theoretically achieve under the present SAL agreements if they have highly ambitious new weapon programs already well underway and are able to carry them out without appreciable setbacks or delays.

201. The inclusion in two forces of missiles with an accuracy on the order of 0.15 nm CEP represents a departure from the projections of previous years. We have for some time considered that this level of accuracy was within the capacity of the Soviets if they decided to make the effort. Up through last year, however, we saw insufficient indication that the Soviets were actually working on the kinds of new technology that would be required to warrant postulating such high accuracy in the projections. Missiles with such accuracy do appear in some of this year's projections

3.3(h)(2)
6.2(d)

[redacted] There is still no evidence, however, as to whether the Soviets will

[redacted]

3.3(h)(2)
6.2(d)

actually attempt to achieve such high accuracy either in the generation of new missiles now at or near the flight test stage or at a later time.

202. Conceptually, Forces 3 and 2, and to a lesser extent Force 1, correspond to SALT Force 1 of NIE 11-8-71, which illustrated a Soviet attempt to maintain a strong retaliatory capability throughout the decade, and Force 5 corresponds to SALT Force 2, which illustrated a maximum Soviet effort within the constraints of a postulated agreement limiting offensive weapons. The two sets of forces differ, however, in many particulars, reflecting such diverse factors as the

3.3(h)(2)
6.2(d)

the differences between the terms of the agreement actually signed and those postulated for last year's projections, the delay in full-range testing of the new missiles under development, which necessitated changes in postulated IOCs, and various indications that Soviet qualitative goals may be somewhat higher than we thought last year.

203. In the discussion that follows, the summary tables show the status of the various postulated forces as of mid-1977. The year 1977 represents the end of the near-term period of about five years for which we are able to project with some confidence. In modeling these forces, however, we have further extended the projections to 1980 and have briefly summarized these extended projections and their rationales in the text. By extending the projections for these three additional years, we are able to depict more clearly the trends effected by major qualitative improvements—more accurate MIRVs and follow-on SLBMs, for example—which do not enter service until the mid-1970s and are not available in significant numbers until the late 1970s.

Force 3

204. Force 3 postulates that the Soviets do not introduce highly accurate new systems of guidance during the period of this Estimate. It postulates that a new generation of missiles incorporates MIRVs and the greatest accuracy attainable through improvement in present systems. It further postulates that testing proceeds without significant difficulties or delays, permitting the earliest possible IOCs, and that deployment of new systems is carried out at about the average rate at which comparable systems were deployed during the buildup of the mid- and late-1960s.

205. The new large missile in Force 3 is postulated to have six MIRVs and an accuracy of about 0.25 nm CEP. It would initially be deployed in the 25 new silos now under construction at SS-9 complexes beginning in late 1974, so that it would first appear in the mid-1975 operational totals. Thereafter, it would be retrofitted into reconstructed SS-9 silos at a rate of seven launch groups—42 silos—a year. At this rate, deployment of the new large missile would not be completed until the early 1980s.

206. It is postulated that a new small missile with three MIRVs and an accuracy of 0.25 nm CEP would be deployed in reconstructed SS-11 silos at a rate of about 10 launch groups—100 silos—a year starting in late 1974, showing up initially in the mid-1975 operational totals. By 1980 about one-half of the SS-11 force would be converted to the new harder silos with the new small missile.

207. It is postulated that construction of Y-class SSBNs stops at 31 units and that a total of 18 D-class units would be completed by mid-1976. Construction of a new class SSBN with 18 launch tubes is assumed to start in the new hall at Severodvinsk in 1974 with the

6.2(d)

first unit appearing in the operational totals in 1977. This new class SSBN would carry a MIRVed variant of the SS-NX-8; this missile would also be retrofitted into the D-class late in the decade. Ten of the new SSBNs would be deployed by mid-1980, bringing the total of modern submarines and missiles to 59 and 892, respectively. Three more SSBNs would become operational in 1981, bringing the force up to totals of 62 modern submarines and 946 modern launchers. A new small SLBM with a range of at least 2,000 nm, on which flight testing is postulated to begin in the next few months, would be retrofitted into the Y-class submarine starting in 1975.

208. The SS-7 and SS-8 ICBMs would be phased out of service by 1980, as required by the interim agreement, under the conditions

ILLUSTRATIVE FORCE MODEL 3*

(Mid-1977)

	Delivery vehicles	Independently targeted re-entry vehicles
ICBMs	1,450	2,495
SS-7	180	180
SS-8	9	9
SS-9 Mod 2	162	162
New Large Missile		
6-MIRV, 0.25 nm CEP	109	654
SS-11	680	680
Mod 1	(620)	(620)
Mod 3	(60)	(60)
New Small Missile		
3-MIRV, 0.25 nm CEP	250	750
New Solid Missile		
1 RV, 0.5 nm CEP	60	60
SLBMs	670	706
H-II/SS-N-5	8/24	24
H-III/SS-NX-8	1/6	6
G/SS-NX-8	1/6	6
Y/SS-N-6	13/208	208
Y/New SLBM, 1-RV, 0.25 nm System CEP	12/192	192
D/SS-NX-8	18/216	216
New SSBN/New SLBM, 3 MIRV, 0.25 nm System CEP	1/18	54
Bombers	105	*NA*
Bear ASM Carrier	65	...
Bear Bomber	20	...
Bison Bomber	20	...
TOTAL	2,225	3,201

*It should be noted that some Agencies have taken issue with certain of the assumptions on which this table is based. Their differences are noted at appropriate points earlier in the paper.

postulated. A new solid-propellant ICBM would replace the SS-13 starting in 1975. The existing heavy bomber force—less some attrition—is assumed to remain operational for the remainder of the decade.

209. This illustrative force would provide the Soviets with strong strategic capabilities throughout the decade. The large Soviet SLBM force and the low level of ABM deployment in the US would ensure the Soviets an excellent retaliatory capability. In addition, the deployment of accurate MIRVs on ICBMs would considerably improve Soviet counterforce capabilities.

210. The Soviets might build something like Force 3 if they wished to carry out vigorous development and deployment programs within the constraints of the agreement but felt no need to take chances with advanced technology or to make an all-out effort to deploy their new weapon systems rapidly. They might well consider something like Force 3 as an appropriate level of effort for maintaining rough parity if they view US forces as developing along the lines of programmed forces and wanted to maintain a strong deterrent against something like the postulated US augmented force. They might also see Force 3 as a desirable "bargaining chip" during the follow-on SAL negotiations.

Force 2

211. Force 2 postulates that the Soviets undertake the same programs as in Force 3 but take longer to develop and deploy the new weapon systems—either because flight testing begins later, difficulties or delays are encountered, or both. In all other respects, the forces are identical, because they reflect the same objectives and goals. Although the discussion proceeds on this basis, the force could also reflect a lesser sense of urgency than Force 3.

212. In the case of the new large and new small liquid-propellant ICBMs, both of which appear to be at or close to the flight test stage, Force 2 postulates that three years of testing takes place before IOC, or one year more than in Force 3. The new solid-propellant missile, though probably already in flight test, appears two years later than in Force 3, reflecting the possibility that the Soviets, who have had less experience and success with this type of technology than with liquid-propellant systems, could encounter difficulties and delays of the sort experienced in other solid-propellant programs. Force 2 also depicts IOC dates for the new SSBN and new large SLBM which are two years later than those of Force 3, reflecting the possibility that the new construction hall at Severodvinsk may not be completed as soon as we expect, that the first of the new submarines is not as far along in planning or will take longer to construct and deploy than is postulated in Force 3, or that there may be similar delays in the new SLBM program. Only one year's delay is postulated, however, for IOC of the new small SLBM, because the technical problems involved are potentially less formidable.

213. The postulates regarding IOC are purely illustrative and their application is to some extent arbitrary. It is unlikely that *all* new systems would take longer to reach IOC than what we consider the minimum feasible time. Where a new technology—e.g., MIRVs—is being applied in more than one program, however, delays to several might be involved. In any event, we cannot determine in advance which programs might lag, or by how much; some might take even longer to complete than depicted here. Force 2 illustrates the general point that many successful development programs do not progress as rapidly and smoothly as is postulated in Force 3.

6.2(d)

ILLUSTRATIVE FORCE MODEL 2*

(Mid-1977)

	Delivery vehicles	Independently targeted re-entry vehicles
ICBMs	1,460	2,095
SS-7	190	190
SS-8	9	9
SS-9 Mod 2	204	204
New Large Missile		
6-MIRV, 0.25 nm CEP	67	402
SS-11	780	780
Mod 1	(720)	(720)
Mod 3	(60)	(60)
New Small Missile		
3-MIRV, 0.25 nm CEP	150	450
SS-13	30	30
New Solid Missile		
1 RV, 0.5 nm CEP	30	30
SLBMs	652	652
H-II/SS-N-5	8/24	24
H-III/SS-NX-8	1/6	6
G/SS-NX-8	1/6	6
Y/SS-N-6	19/304	304
Y/New SLBM, 1-RV, 0.25 nm System CEP	6/96	96
D/SS-NX-8	18/216	216
Bombers	105	*NA*
Bear ASM Carrier	65	...
Bear Bomber	20	...
Bison Bomber	20	...
TOTAL	2,217	2,747

*It should be noted that some Agencies have taken issue with certain of the assumptions on which this table is based. Their differences are noted at appropriate points earlier in the paper.

214. The strategic capabilities of Force 2 are comparable to those of Force 3. Since the two forces reflect the same objectives and goals, the comments made in the last section about the reasons for adopting Force 3 and about its strategic capabilities also apply here.

Force 1

215. The major difference between this Force and Force 2 are that Force 1 postulates more modest technological goals and a slower rate of deployment for new systems. In addition, it lacks the new solid-propellant ICBM and the new SSBN provided for in Force 2.

216. In Force 1 we postulate that flight tests for a new large ICBM and a new small ICBM are not completed until late 1975 or early 1976 because the Soviets encounter problems in the final development of these systems or because flight testing does not

ILLUSTRATIVE FORCE MODEL 1*

(Mid-1977)

	Delivery vehicles	Independently targeted re-entry vehicles
ICBMs	1,343	1,453
SS-7	66	66
SS-8	9	9
SS-9 Mod 2	213	213
New Large Missile 3-MIRV, 0.4 nm CEP	55	165
SS-11	850	850
Mod 1	(790)	(790)
Mod 3	(60)	(60)
New Small Missile 1 RV, 0.5 nm CEP	90	90
SS-13	60	60
SLBMs	642	642
H-II/SS-N-5	8/24	24
H-III/SS-NX-8	1/6	6
Y/SS-N-6	10/160	160
Y/New SLBM, 1-RV, 0.5 nm System CEP	11/176	176
D/SS-NX-8	23/276	276
Bombers	105	*NA*
Bear ASM Carrier	65	...
Bear Bomber	20	...
Bison Bomber	20	...
TOTAL	2,090	2,095

*It should be noted that some Agencies have taken issue with certain of the assumptions on which this table is based. Their differences are noted at appropriate points earlier in the paper.

begin soon or both. Accordingly, as in Force 2, the first time they appear in the tables is mid-1976.

217. The new large ICBM which is initially deployed in Force 1 would carry only three MIRVs with a CEP of about 0.40 nm, reflecting minor improvements in existing guidance systems. This missile would be deployed in the 25 new large silos by mid-1976 and subsequently deployed in reconstructed SS-9 silos. Continued development results in the introduction of a new payload for the missile with more MIRVs (six) and better accuracy (about 0.25 nm CEP) in late 1978. About five SS-9 groups are retrofitted each year until 1980 when about one-half of the present SS-9 force would have been retrofitted with new silos and new missiles.

218. To take account of the possibility that the Soviets do not develop MIRVs for their small ICBMs, we postulate development of a new small ICBM with one RV which has a somewhat better accuracy than the SS-11 Mod 3—a CEP of about 0.50 nm. It is introduced in late 1975 and first appears in the operational totals in mid-1976. About six SS-11 launch groups—60 silos—are converted each year.

219. Production of 16-tube Y-class submarines is postulated to cease with the launching

6.2(d)

of the 31st unit. Construction of the D-class submarine is postulated to continue at both Severodvinsk and Komsomol'sk until 31 units have been completed. The new hall at Severodvinsk is assumed to be used either for construction of general purpose submarines or for overhaul of nuclear submarines.

220. This program would allow the Soviets to build a fleet of 62 modern ballistic missile submarines carrying a total of 868 modern SLBMs by late 1977. The number of SLBMs in the force falls short of the ceiling of 950 but would permit retention of some 75 hard SS-7 and SS-8 missiles, a choice that could be proposed by the SRF.

221. A new missile about the size of the SS-N-6 with at least a 2,000 nm range is assumed to be retrofitted into the Y-class units. Deployment of this missile would begin in 1975. Another new missile of about the same size and range as the SS-NX-8 but MIRVed would be retrofitted into the D-class submarine with the first units becoming operational in 1978.

222. The SS-7 and SS-8 soft sites are deactivated as SLBMs enter service but the 75 hard sites are retained in the force. The G- and H-classes are decommissioned by 1978. The existing bomber force—less some attrition—is maintained throughout the decade.

223. Force 1 would give the Soviets a good retaliatory capability because of the increased number of sea-based missiles and hardened ICBM silos. Hard target capabilities would be enhanced at the end of the decade by the improved accuracy and additional MIRVs on the new large missile.

224. The Soviets might build something like Force 1 if they decide to pursue development programs with low risks and if some of their R&D is not as far along as postulated in Force 3. The Soviets might consider something like Force 1 as an appropriate level of effort to maintain a credible deterrent against programmed US forces.

Force 4

225. Force 4 postulates, like Force 3, that: (a) the Soviets will soon begin flight testing a new generation of missiles which incorporate MIRVs and the level of accuracy attainable through improvements in present systems; and (b) testing proceeds without significant difficulties or delays, so that the earliest possible IOCs are achieved. It differs from Force 3 in postulating the introduction later in the decade of new missile systems with accuracies on the order of 0.15 nm CEP. It also postulates that new missile systems will be deployed at a higher rate than in Force 3.

226. The new large missile under development is postulated to have a 6-MIRV warhead and, initially, improvements in existing guidance systems, resulting in a CEP of about 0.25 nm. This missile would be deployed in the 25 new large silos by mid-1975 and subsequently in reconstructed SS-9 silos at a rate of 54 a year. Flight testing of a new guidance system would begin in 1975 and be completed in three years. This missile system—with six MIRVs and a CEP of about 0.15 nm—would enter the force in late 1978 and be deployed at the same rate as the earlier system. It first appears in the operational totals in mid-1979.

227. A new small missile with three MIRVs and a CEP of about 0.25 nm is postulated to be available in late 1975. It is deployed in SS-11 silos reconstructed to the new configuration described earlier. It first appears in the mid-1976 operational totals. A follow-on missile program would involve new and highly

ILLUSTRATIVE FORCE MODEL 4*

(Mid-1977)

	Delivery vehicles	Independently targeted re-entry vehicles
ICBMs	1,350	2,715
SS-7	142	142
SS-8	9	9
SS-9 Mod 2	126	126
New Large Missile 6-MIRV, 0.25 nm CEP	133	798
SS-11	530	530
Mod 1	(470)	(470)
Mod 3	(60)	(60)
New Small Missile 3-MIRV, 0.25 nm CEP	350	1,050
SS-13	10	10
New Solid Missile 1 RV, 0.5 nm CEP	50	50
SLBMs	748	788
H-II/SS-N-5	8/24	24
H-III/SS-NX-8	1/6	6
G/SS-NX-8	1/6	6
Y/SS-N-6	29/464	464
D/SS-NX-8	19/228	228
New SSBN/New SLBM, 3 MIRV, 0.25 nm System CEP	1/20	60
Bombers	115	*NA*
Bear ASM Carrier	65	...
Bear Bomber	25	...
Bison Bomber	25	...
TOTAL	2,213	3,503

*It should be noted that some Agencies have taken issue with certain of the assumptions on which this table is based. Their differences are noted at appropriate points earlier in the paper.

accurate techniques of guidance. Flight testing would begin in 1976; the system would be available for deployment in late 1979 and appears in the tables in 1980. We project a deployment rate of 150 a year for both systems.

228. It is postulated that construction of Y-class SSBNs stops at 31 units and that a total of 21 D-class units would be completed by mid-1976. The submarine building program for Force 4 is postulated to include a new SSBN with 20 launch tubes. Construction of the new SSBN would start in 1974 in the new hall at Severodvinsk. By mid-1980 the Soviets would have 31 Y-class, 21 D-class and 10 new class SSBNs—a total of 62 modern submarines carrying 948 modern SLBMs.

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229. A 3-MIRV variant of the SS-NX-8 missile with an 0.25 nm system CEP would be developed for the new SSBN and also retrofitted to the D-class. A new longer range (2,000 nm) missile with three MIRVs and with a system CEP of about 0.25 nm would be developed to replace the SS-N-6 on the Y-class commencing in 1978.

230. The SS-7 and SS-8 missiles and the H-class submarines would be phased out as the new SSBNs are delivered. A new solid-propellant ICBM replaces the SS-13 starting in 1975. The current bomber force would be reduced somewhat through attrition. A new intercontinental bomber would be introduced in 1978 and deployed at a rate of 15 a year.

231. The deployment of Force 4 would provide the Soviets with excellent strategic capabilities by the late 1970s even when compared with the augmented US force. The sea-based component would provide a significant deterrent capability by itself. The large number of accurate warheads in the ICBM force would give the Soviets a substantial capability to destroy hardened targets.

232. Force 4 represents a decision to press ahead vigorously with the modernization of strategic forces without undertaking the all-out and highly successful effort to advance technology portrayed in Force 5. Either for specific purposes of counterforce targeting or out of a general desire to catch up to the US, the Soviets may already have decided that they must have highly accurate MIRVs and other force improvements as soon as possible. Alternatively, Force 4 could represent a later decision by the Soviets to step up their own efforts in response to new US moves—though they could not under these circumstances meet the deployment time tables called for in Force 4 unless R&D on the systems with highly accurate MIRVs were already underway.

Force 5 [47]

233. Force 5 illustrates what the Soviets might be able to accomplish if they decided to push the limits of their state-of-the-art in the development of new weapon systems, and proceeded to deploy (or retrofit) these systems at the highest rates achieved in the past. It postulates specifically that the new generation of missiles now at or near the flight test stage is equipped with new guidance systems providing accuracy on the order of 0.15 nm CEP, that new SLBMs are well along in R&D, and that the Soviets encounter no significant difficulties or delays in any of their flight test programs. It thus assumes that the basic decisions to undertake such ambitious programs were initially made several years ago, and that the Soviets enjoy an unprecedented degree of success in meeting successive program goals.

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[47] Dr. Ray S. Cline, the Director of Intelligence and Research, Department of State; Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency; Lt. Gen. Samuel C. Phillips, the Director, National Security Agency; Maj. Gen. William E. Potts, the Assistant Chief of Staff for Intelligence, Department of the Army; Rear Adm. Earl F. Rectanus, the Director of Naval Intelligence, Department of the Navy; and Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, consider the chances of Soviet forces evolving as shown by Force 5 to be so remote that it should not be included in the Estimate. They contend that the mid-1970s development of two new ICBMs and one new SLBM, each carrying MIRVs with an accuracy on the order of 0.15 nm CEP, is so unlikely that their deployment should not be illustrated. (For the views of State, NSA, and Air Force on missile accuracy see their footnote to paragraph 54.)

Vice Adm. de Poix, Maj. Gen. Potts, and Rear Adm. Rectanus further believe the Soviets almost certainly were not in a position 2 to 3 years ago to solve the complex problems attendant to the development of guidance systems capable of such accuracy in conjunction with the development of MIRVed payloads. They are convinced that solutions to those problems would have been necessary 2 to 3 years ago to permit the initiation of testing this year; such testing in turn allowing for first deployment of the systems no earlier than late 1975. They believe that the high DIPP projection is a better representation of maximum Soviet ICBM and SLBM technological capability through 1980.

ILLUSTRATIVE FORCE MODEL 5*

(Mid-1977)

	Delivery vehicles	Independently targeted re-entry vehicles
ICBMs	1,294	2,697
SS-7	142	142
SS-8	9	9
SS-9 Mod 2	168	168
New Large Missile 12 MIRV, 0.15 nm CEP	85	1,020
SS-11	580	580
Mod 1	(520)	(520)
Mod 3	(60)	(60)
New Small Missile 3-MIRV, 0.15 nm CEP	250	750
New Solid Missile 1 RV, 0.5 nm CEP	60	60
SLBMs	664	1,024
H-II/SS-N-5	8/24	24
H-III/SS-NX-8	1/6	6
G/SS-NX-8	1/6	6
Y/SS-N-6	13/208	208
Y/New SLBM, 3 MIRV, 0.15 nm System CEP	10/160	480
D/SS-NX-8	20/240	240
New SSBN/New SLBM, 3 MIRV, 0.15 nm System CEP	1/20	60
Bombers	115	NA
Bear ASM Carrier	65	...
Bear Bomber	25	...
Bison Bomber	25	...
TOTAL	2,041	3,721

*Certain Agencies do not believe that Force 5 should be included in this Estimate. See their footnote to the discussion of Force 5.

234. It is postulated that a new large missile with a highly accurate 12-MIRV warhead (about 0.15 nm CEP) will be ready for deployment in the 25 new large silos in late 1975 after a 3-year test program, and the missile first appears in the table in mid-1976. SS-9 silos would be converted to the new harder configuration and fitted out with the new missile at a rate of 10 groups—60 silos—a year.

235. The development of a highly accurate new small missile with a CEP of about 0.15 nm and a 3-MIRV payload would also be completed by late 1975 and the missile would be deployed in SS-11 silos that had been reconstructed to the new configuration described earlier. The deployment rate would be about 200 per year.

236. The submarine building program would be planned to meet the constraints posed by

6.2(d)

the interim agreement and the completion of the new construction hall at Severodvinsk. All submarine starts at Komsomol'sk and Severodvinsk would be of the D-class through 1974. A new SSBN with 20 launch tubes would be built in the new hall at Severodvinsk beginning in 1974, with the first unit appearing in the operational totals in 1977. A new large SLBM with a 3-MIRV warhead and a wholly new guidance system would be developed for this submarine; it would also be retrofitted into the 21 D-class submarines starting in 1978. Also a new small SLBM—with 3-MIRVs and a system CEP of 0.15 nm—would be retrofitted into Y-class units starting in 1976. By mid-1980 the Soviets would have 31 Y-class, 21 D-class, and 10 new SSBNs, for a total of 62 modern submarines with 948 modern SLBMs.

237. The SS-7 and SS-8 missiles and all the H-class and the one G-class submarines would be phased out as the new SSBNs begin sea trials. A new solid-propellant ICBM would replace the SS-13 starting in 1974. The current bomber force would be reduced somewhat through attrition. A new modern intercontinental bomber would be developed and deployed in the late 1970s.

238. Force 5, like Force 4, would provide the USSR with excellent retaliatory capabilities through the 1970s even when compared with the augmented US force. The Soviets could use their accurate SLBMs to target a large number of military targets as well as to maintain an assured destruction capability. The counterforce capabilities of Force 5 are greater than those of Force 4 because of the larger number of accurate MIRVs on ICBMs.

239. Force 5 is designed to show the maximum that we believe the Soviets could achieve under the SAL agreement. It reflects our view of maximum technical progress in all the major components of the Soviet forces for intercontinental attack. The rate and extent of progress in development and deployment could not be achieved unless the Soviets were making an all-out effort, and a highly successful one. It is, thus, a limiting case, and, in a sense, an artificial one.

240. Nevertheless, Force 5 is indicative of a direction in which Soviet planning might go. It is probable that at least some elements have been urging for some time that the Soviets must move rapidly to achieve MIRVs with high accuracies for at least a part of their ICBM-SLBM force, to keep pace with likely improvements in the US strategic posture and to sustain the USSR's bargaining position in SAL talks. Soviet inclinations to move toward the goals of Force 5 would have been reinforced if they had become convinced that the US, for its part, would make an all-out effort to improve its position under the agreement—or, conversely, if the Soviets saw sufficient chance of significantly improving their position to warrant the possibility of an adverse US reaction. Any demonstrable progress in achieving the advanced technology called for under Force 5 would probably strengthen the hand of those who favored the use of the new technology.

Likely Soviet Courses of Action

241. It bears repeating that we consider none of our projections an estimate that Soviet forces for intercontinental attack will be composed of the particular weapon systems listed in the precise numbers shown. The projections are intended to be illustrative of possible trends and differing emphases. Consequently, the paths actually adopted by the Soviets will inevitably differ from those we have depicted, not only in matters of detail but in broader aspects as well.

242. Much will depend on the outcome of the follow-on SAL talks. A permanent treaty replacing the interim offensive agreement

could contain new and more restrictive provisions governing the size and characteristics of the strategic attack forces of both sides. This would reduce both opportunity and incentive for the Soviets to continue their force buildup as originally planned.

243. Even in the absence of significantly greater restrictions than those of the interim agreement, the Soviets may consider it unnecessary, now or later, to do most or all of the things permitted them under the interim agreement, as we have generally postulated. For example, they might not retrofit all of their SS-9 and SS-11 silos to the new and harder silo configuration, or get as close as possible to the SSBN/SLBM totals permitted under the interim agreement. Also, it has not been feasible in constructing the illustrative projections to take full account of the possibility of slippage in meeting program target dates. The projections do not take account of the possibility that, as in the past, some development programs will be cancelled before completion or result in only limited deployment.

244. Given these limitations and qualifications, our best judgment is that the Soviets will probably head into the resumed SAL talks with something like the goals of Force 3, incorporating into their new systems the best technology which can be exploited without undue risk of delay or failure, and moving promptly forward with deployment. They probably will be forced, however, to settle for some slippages of the type illustrated on an across-the-boards basis in Force 2. The outcome would thus be something between Force 3 and Force 2.

245. Other possibilities must also be taken into account. We may be wrong about how close the Soviets are to unveiling a workable MIRV system, and may be attributing to the first MIRVs better characteristics than they in fact will have. We could even be mistaken in our long-held belief that the Soviets place great store on having MIRVs. The Soviets might conclude that limited MIRV programs and more modest technical goals, of the kind portrayed in Force 1, were adequate for their needs, at least initially. They might also believe that the US has more to gain than the USSR from a continuing technological race, and that a policy of restraint along the lines of Force 1 would facilitate the negotiation of desirable restrictions on technological change.

246. Alternately, the Soviets could have incorporated new techniques of guidance in weapon systems now under development. This could reflect a desire to have at least the option of developing something like Force 4—i.e., going ahead initially with more conservative design goals but laying the groundwork for achieving very high accuracies later in the decade. The extent of follow-through would depend on a number of factors: the progress of the development programs involved; the degree of bureaucratic momentum they had generated; and, above all, the prospects for SAL and the extent to which the competitive situation vis-à-vis the US appeared to require the effort.

247. In the light of the work now going on in guidance technology, we cannot rule out the possibility that the Soviets are even now seeking to achieve the high accuracies and other technological advances depicted in Force 5, and that the necessary R&D is already well along. We consider this highly unlikely however. For one thing, Force 5 represents a technological leap greater than those of the past and one which is uncharacteristic of the Soviets. Even if they were willing to make the necessary effort, they are unlikely to be as consistently successful

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as the projections in Force 5 indicate. Aside from such considerations, the Soviets would have to recognize that the kind of buildup depicted in Force 5 would almost certainly be viewed with great alarm in the US and provoke a strong reaction.

248. As we have indicated, all of the projections postulate that the interim agreement will be extended at least through 1980. How much more of a Soviet buildup might take place if the interim agreement were allowed to lapse in mid-1977 is hard to determine. Much would depend on what programs the Soviets were pursuing, on how much preparation had been made in anticipation of termination, and on the state of the US-Soviet strategic rivalry at the time.

249. In general, the most significant changes that the Soviets could effect would be in their ICBM forces. The SLBM forces shown in the tables would probably be affected very little in the near term because in most of the forces we postulate that the Soviets would be fully occupied up through the end of the decade in building up to the SSBN/SLBM levels permitted by the interim agreement. The arms limitation agreements impose no constraints on bombers.

250. Lifting the ban on the construction of additional ICBM silos would not only enable the Soviets to increase the number of ICBMs, but also to install newer missiles without taking sizable numbers of existing silos off line for retrofit. Assuming sufficient advance preparation and the availability of the missiles for deployment, they might be able to add as many as 120 new large ICBMs, up to 400 new small ICBMs, and up to 300 mobile ICBMs to the force by mid-1980, on the basis of a two year construction time for each new silo and deployment at the highest rate achieved in the past. The achievement of these numbers would require them to forego the retrofit of existing silos unless they were willing and able to deploy at rates higher than those achieved in the past.

251. In sum, we are at a point of particular uncertainty about Soviet capabilities and objectives. The provisions of the interim agreement and the evidence of development activities now under way provide a basis for assessing the general course of current Soviet programs. But it is still unclear what levels of technology the Soviets are seeking and how far and how fast they will deploy. In the course of the next five to 10 years the Soviets are almost certain to embark on some strategic programs of which we now have little inkling. As in the past, the Soviets will doubtless continue to make strategic program decisions which we will find hard to explain in terms of clear-cut military or political goals.

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APPENDIX TO SECTION V

ILLUSTRATIVE FORCE MODEL PROJECTIONS BY YEAR 1972-1980

The alternative force developments presented in this Appendix represent possible directions that Soviet intercontinental attack forces could take. It should be emphasized that we consider no one of them an estimate that Soviet intercontinental attack forces will be composed of the particular weapon systems in the precise numbers listed. They are intended only to be illustrative models of possible trends and differing emphases, and are developed primarily for broad policy use at the national level. They are not intended for defense planning purposes; projections developed for planning in the Department of Defense are included in the Defense Intelligence Projections for Planning (DIPP).

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FORCE MODEL 3*

(mid-year)

	1972	1973	1974	1975	1976	1977	1978	1979	1980
ICBMs									
Launchers on Line	*1527*	*1587*	*1587*	*1470*	*1460*	*1450*	*1396*	*1336*	*1261*
SS-7	190	190	190	190	190	180	126	66	0
SS-8	19	19	19	19	9	9	9	9	0
SS-9	288	288	288	246	204	162	120	78	36
Mod 1	(54)	(54)	(54)	(24)	(0)	(0)	(0)	(0)	(0)
Mod 2	(222)	(222)	(222)	(222)	(204)	(162)	(120)	(78)	(36)
Mod 4	(12)	(12)	(12)	(0)	(0)	(0)	(0)	(0)	(0)
New Large, 6-MIRV, 0.25 nm CEP	0	0	0	25	67	109	151	193	235
SS-11	970	1030	980	880	780	680	580	480	380
Mod 1	(970)	(970)	(920)	(820)	(720)	(620)	(520)	(420)	(320)
Mod 3	(0)	(60)	(60)	(60)	(60)	(60)	(60)	(60)	(60)
New Small Liquid, 3-MIRV, 0.25 nm CEP	0	0	0	50	150	250	350	450	550
SS-13	60	60	50	30	10	0	0	0	0
New Solid, 1-RV, 0.5 nm CEP	0	0	10	30	50	60	60	60	60
Launchers in Modernization	*0*	*0*	*50*	*142*	*142*	*142*	*142*	*142*	*142*
Large Silos	0	0	0	42	42	42	42	42	42
Small Silos	0	0	50	100	100	100	100	100	100
Total ICBMs	1527	1587	1587	1612	1602	1592	1538	1478	1403
SSBNs/SLBMs									
Operational	*33/424*	*40/508*	*43/532*	*50/616*	*53/652*	*54/670*	*55/700*	*53/700*	*59/810*
H-II/SS-N-5	8/24	8/24	8/24	8/24	8/24	8/24	8/24	8/24	8/24
H-III/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6
G/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	1/6	0	0
Y/SS-N-6	25/400	28/448	25/400	23/368	19/304	13/208	7/112	1/16	0
Y/New SLBM, 1-RV, 0.25 nm System CEP	0	0	0	2/32	6/96	12/192	18/288	24/384	30/480
D/SS-NX-8	0	2/24	8/96	15/180	18/216	18/216	16/192	12/144	8/96
D/New SLBM, 3-MIRV, 0.25 nm System CEP	0	0	0	0	0	0	0	0	2/24
New SSBN/New SLBM, 3-MIRV, 0.25 nm System CEP	0	0	0	0	0	1/18	4/72	7/126	10/180
Submarines in Modernization	*1/16*	*2/32*	*6/96*	*6/96*	*6/96*	*6/96*	*8/120*	*12/168*	*9/112*
Y-Class	1/16	2/32	6/96	6/96	6/96	6/96	6/96	6/96	1/16
D-Class	0	0	0	0	0	0	2/24	6/72	8/96
Total Modern SSBN/SLBM	26/416	32/504	39/592	46/676	49/712	50/730	53/784	56/838	59/892
Total SSBN/SLBM	34/440	42/540	49/628	56/712	59/748	60/766	63/820	65/868	68/922
Bombers									
Bear ASM Carrier	70	70	70	65	65	65	60	55	45
Bear Bomber	35	35	30	30	25	20	15	10	5
Bison Bomber	35	35	30	30	25	20	15	10	5
Bison Tanker	(50)	(50)	(45)	(40)	(40)	(35)	(30)	(25)	(20)
Total Bombers	140	140	130	125	115	105	90	75	55

* It should be noted that some Agencies have taken issue with certain of the assumptions on which this table is based. Their differences are noted at appropriate points earlier in the paper.

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FORCE MODEL 2*

(mid-year)

	1972	1973	1974	1975	1976	1977	1978	1979	1980
ICBMs									
Launchers on Line	*1527*	*1587*	*1587*	*1537*	*1460*	*1460*	*1460*	*1432*	*1378*
SS-7	190	190	190	190	190	190	190	162	108
SS-8	19	19	19	19	9	9	9	9	9
SS-9	288	288	288	288	246	204	162	120	78
Mod 1	(54)	(54)	(54)	(54)	(24)	(0)	(0)	(0)	(0)
Mod 2	(222)	(222)	(222)	(222)	(222)	(204)	(162)	(120)	(78)
Mod 4	(12)	(12)	(12)	(12)	(0)	(0)	(0)	(0)	(0)
New Large, 6-MIRV, 0.25 nm CEP	0	0	0	0	25	67	109	151	193
SS-11	970	1030	1030	980	880	780	680	580	480
Mod 1	(970)	(970)	(970)	(920)	(820)	(720)	(620)	(520)	(420)
Mod 3	(0)	(60)	(60)	(60)	(60)	(60)	(60)	(60)	(60)
New Small Liquid, 3-MIRV, 0.25 nm CEP	0	0	0	0	50	150	250	350	450
SS-13	60	60	60	60	50	30	10	0	0
New Solid, 1-RV, 0.5 nm CEP	0	0	0	0	10	30	50	60	60
Launchers in Modernization	*0*	*0*	*0*	*50*	*142*	*142*	*142*	*142*	*142*
Large Silos	0	0	0	0	42	42	42	42	42
Small Silos	0	0	0	50	100	100	100	100	100
Total ICBMs	1527	1587	1587	1587	1602	1602	1602	1574	1520
SSBNs/SLBMs									
Operational	*34/440*	*42/540*	*47/596*	*50/616*	*53/652*	*53/652*	*53/652*	*53/664*	*52/670*
H-II/SS-N-5	8/24	8/24	8/24	8/24	8/24	8/24	8/24	8/24	8/24
H-III/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6
G/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6
Y/SS-N-6	26/416	30/480	29/464	25/400	23/368	19/304	13/208	7/112	1/16
Y/New SLBM, 1-RV, 0.25 nm System CEP	0	0	0	0	2/32	6/96	12/192	18/288	24/384
D/SS-NX-8	0	2/24	8/96	15/180	18/216	18/216	18/216	16/192	12/144
New SSBN/New SLBM 3-MIRV, 0.25 nm System CEP	0	0	0	0	0	0	0	2/36	5/90
Submarines in Modernization	*0*	*0*	*2/32*	*6/96*	*6/96*	*6/96*	*6/96*	*8/120*	*12/168*
Y-Class	0	0	2/32	6/96	6/96	6/96	6/96	6/96	6/96
D-Class	0	0	0	0	0	0	0	2/24	6/72
Total Modern SSBN/SLBM	26/416	32/504	39/592	46/676	49/712	49/712	49/712	51/748	54/802
Total SSBN/SLBM	34/440	42/540	49/628	56/712	59/748	59/748	59/748	61/784	64/838
Bombers									
Bear ASM Carrier	70	70	70	65	65	65	60	55	45
Bear Bomber	35	35	30	30	25	20	15	10	5
Bison Bomber	35	35	30	30	25	20	15	10	5
Bison Tanker	(50)	(50)	(45)	(40)	(40)	(35)	(30)	(25)	(20)
Total Bombers	140	140	130	125	115	105	90	75	55

* It should be noted that some Agencies have taken issue with certain of the assumptions on which this table is based. Their differences are noted at appropriate points earlier in the paper.

FORCE MODEL 1*

(mid-year)

	1972	1973	1974	1975	1976	1977	1978	1979	1980
ICBMs									
Launchers on Line	*1527*	*1587*	*1587*	*1557*	*1427*	*1343*	*1343*	*1343*	*1364*
SS-7	190	190	190	190	150	66	66	66	66
SS-8	19	19	19	19	9	9	9	9	9
SS-9	288	288	288	288	243	213	183	153	144
Mod 1	(54)	(54)	(54)	(54)	(21)	(0)	(0)	(0)	(0)
Mod 2	(222)	(222)	(222)	(222)	(222)	(213)	(183)	(153)	(144)
Mod 4	(12)	(12)	(12)	(12)	(0)	(0)	(0)	(0)	(0)
New Large, 3-MIRV, 0.4 nm CEP	0	0	0	0	25	55	85	85	85
New Large, 6-MIRV, 0.25 nm CEP	0	0	0	0	0	0	0	30	60
SS-11	970	1030	1030	1000	910	850	790	730	670
Mod 1	(970)	(970)	(970)	(940)	(850)	(790)	(730)	(670)	(610)
Mod 3	(0)	(60)	(60)	(60)	(60)	(60)	(60)	(60)	(60)
New Small Liquid, 1-RV, 0.5 nm CEP	0	0	0	0	30	90	150	210	270
SS-13	60	60	60	60	60	60	60	60	60
Launchers in Modernization	*0*	*0*	*0*	*30*	*135*	*135*	*135*	*135*	*114*
Large Silos	0	0	0	0	45	45	45	45	24
Small Silos	0	0	0	30	90	90	90	90	90
Total ICBMs	1527	1587	1587	1587	1562	1478	1478	1478	1478
SSBNs/SLBMs									
Operational	*34/440*	*40/508*	*44/548*	*49/600*	*55/676*	*53/642*	*46/636*	*47/656*	*51/736*
H-II/SS-N-5	8/24	8/24	8/24	8/24	8/24	8/24	0	0	0
H-III/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	0	0	0
G/SS-NX-8	0	1/6	1/6	1/6	1/6	0	0	0	0
Y/SS-N-6	26/416	28/448	26/416	22/352	18/288	10/160	4/64	0	0
Y/New SLBM, 1-RV, 0.5 nm System CEP	0	0	0	2/32	7/112	11/176	17/272	23/368	31/496
D/SS-NX-8	0	2/24	8/96	15/180	20/240	23/276	23/276	16/192	8/96
D/New SLBM, 3-MIRV, 0.4 nm System CEP	0	0	0	0	0	0	2/24	8/96	12/144
Submarines in Modernization	*0*	*2/32*	*5/80*	*7/112*	*8/120*	*16/232*	*16/232*	*15/212*	*11/132*
Y-Class	0	2/32	5/80	7/112	6/96	10/160	10/160	8/128	0
D-Class	0	0	0	0	2/24	6/72	6/72	7/84	11/132
Total Modern SSBN/SLBM	26/416	32/504	39/592	46/676	53/760	60/844	62/868	62/868	62/868
Total SSBN/SLBM	34/440	42/540	49/628	56/712	63/796	69/874	62/868	62/868	62/868
Bombers									
Bear ASM Carrier	70	70	70	65	65	65	60	55	45
Bear Bomber	35	35	30	30	25	20	15	10	5
Bison Bomber	35	35	30	30	25	20	15	10	5
Bison Tanker	(50)	(50)	(45)	(40)	(40)	(35)	(30)	(25)	(20)
Total Bombers	140	140	130	125	115	105	90	75	55

* It should be noted that some Agencies have taken issue with certain of the assumptions on which this table is based. Their differences are noted at appropriate points earlier in the paper.

FORCE MODEL 4*

(mid-year)

	1972	1973	1974	1975	1976	1977	1978	1979	1980
ICBMs									
Launchers on Line	*1527*	*1587*	*1587*	*1408*	*1370*	*1350*	*1290*	*1235*	*1235*
SS-7	190	190	190	190	162	142	82	36	0
SS-8	19	19	19	19	9	9	9	0	0
SS-9	288	288	288	234	180	126	72	18	0
Mod 1	(54)	(54)	(54)	(12)	(0)	(0)	(0)	(0)	(0)
Mod 2	(222)	(222)	(222)	(222)	(180)	(126)	(72)	(18)	(0)
Mod 4	(12)	(12)	(12)	(0)	(0)	(0)	(0)	(0)	(0)
New Large, 6-MIRV, 0.25 nm CEP	0	0	0	25	79	133	187	211	211
New Large, 6-MIRV, 0.15 nm CEP	0	0	0	0	0	0	0	30	84
SS-11	970	1030	980	830	680	530	380	230	80
Mod 1	(970)	(970)	(920)	(770)	(620)	(470)	(320)	(170)	(20)
Mod 3	(0)	(60)	(60)	(60)	(60)	(60)	(60)	(60)	(60)
New Small Liquid, 3-MIRV, 0.25 nm CEP.	0	0	0	50	200	350	500	650	700
New Small Liquid, 3-MIRV, 0.15 nm CEP.	0	0	0	0	0	0	0	0	100
SS-13	60	60	60	50	30	10	0	0	0
New Solid, 1-RV, 0.5 nm CEP	0	0	0	10	30	50	60	60	60
Launchers in Modernization	*0*	*0*	*50*	*204*	*204*	*204*	*204*	*204*	*168*
Large Silos	0	0	0	54	54	54	54	54	18
Small Silos	0	0	50	150	150	150	150	150	150
Total ICBMs	1527	1587	1587	1612	1574	1554	1494	1439	1403
SSBNs/SLBMs									
Operational	*34/440*	*42/540*	*49/628*	*56/712*	*60/752*	*59/748*	*58/744*	*58/774*	*50/780*
H-II/SS-N-5	8/24	8/24	8/24	8/24	8/24	8/24	8/24	8/24	0
H-III/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	1/6	1/6	0
G/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	1/6	0	0
Y/SS-N-6	26/416	30/480	31/496	31/496	29/464	29/464	23/368	17/272	11/176
Y/New SLBM, 3-MIRV, 0.25 nm System CEP.	0	0	0	0	0	0	2/32	8/128	14/224
D-Class/SS-NX-8	0	2/24	8/96	15/180	21/252	19/228	19/228	15/180	9/108
D-Class/New SLBM, 3-MIRV 0.25 nm System CEP	0	0	0	0	0	0	0	2/24	6/72
New SSBN/New SLBM 3-MIRV, 0.25 nm System CEP	0	0	0	0	0	1/20	4/80	7/140	10/200
Submarines in Modernization	*0*	*0*	*0*	*0*	*2/32*	*4/56*	*8/120*	*10/144*	*12/168*
Y-Class	0	0	0	0	2/32	2/32	6/96	6/96	6/96
D-Class	0	0	0	0	0	2/24	2/24	4/48	6/72
Total Modern SSBN/SLBM	26/416	32/504	39/592	46/676	52/748	53/768	56/828	59/888	62/948
Total SSBN/SLBM.	34/440	42/540	49/628	56/712	62/784	63/804	66/864	68/918	62/948
Bombers									
Bear ASM Carrier	70	70	70	65	65	65	60	60	55
Bear Bomber	35	35	30	30	25	25	20	20	15
Bison Bomber	35	35	30	30	25	25	20	20	15
Bison Tanker	(50)	(50)	(45)	(40)	(40)	(35)	(30)	(25)	(20)
New Bomber	0	0	0	0	0	0	5	15	30
Total Bombers	140	140	130	125	115	115	105	115	115

*It should be noted that some Agencies have taken issue with certain of the assumptions on which this table is based. Their differences are noted at appropriate points earlier in the paper.

FORCE MODEL 5*

(mid-year)

	1972	1973	1974	1975	1976	1977	1978	1979	1980
ICBMs									
Launchers on Line	*1527*	*1587*	*1587*	*1537*	*1314*	*1294*	*1218*	*1143*	*1235*
SS-7	190	190	190	190	162	142	66	0	0
SS-8	19	19	19	19	9	9	9	0	0
SS-9	288	288	288	288	228	168	108	48	0
Mod 1	(54)	(54)	(54)	(54)	(6)	(0)	(0)	(0)	(0)
Mod 2	(222)	(222)	(222)	(222)	(222)	(168)	(108)	(48)	(0)
Mod 4	(12)	(12)	(12)	(12)	(0)	(0)	(0)	(0)	(0)
New Large, 12-MIRV, 0.15 nm CEP	0	0	0	0	25	85	145	205	265
SS-11	970	1030	1030	980	780	580	380	180	60
Mod 1	(970)	(970)	(970)	(920)	(720)	(520)	(320)	(120)	(0)
Mod 3	(0)	(60)	(60)	(60)	(60)	(60)	(60)	(60)	(60)
New Small Liquid, 3-MIRV, 0.15 nm CEP	0	0	0	0	50	250	450	650	850
SS-13	60	60	50	30	10	0	0	0	0
New Solid, 1-RV, 0.5 nm CEP	0	0	10	30	50	60	60	60	60
Launchers in Modernization	*0*	*0*	*0*	*50*	*260*	*260*	*260*	*260*	*168*
Large Silos	0	0	0	0	60	60	60	60	48
Small Silos	0	0	0	50	200	200	200	200	120
Total ICBMs	1527	1587	1587	1587	1574	1554	1478	1403	1403
SSBNs/SLBMs									
Operational	*34/440*	*42/540*	*49/624*	*55/692*	*54/656*	*54/664*	*55/714*	*55/794*	*56/876*
H-II/SS-N-5	8/24	8/24	8/24	8/24	8/24	8/24	8/24	4/12	0
H-III/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	1/6	1/6	0
G/SS-NX-8	0	1/6	1/6	1/6	1/6	1/6	0	0	0
Y/SS-N-6	26/416	30/480	30/480	29/464	21/336	13/208	5/80	0	0
Y/New SLBM, 3-MIRV, 0.15 nm System CEP	0	0	0	0	2/32	10/160	18/288	26/416	31/496
D-Class/SS-NX-8	0	2/24	9/108	16/192	21/252	20/240	18/216	12/144	6/72
D-Class/New SLBM, 3-MIRV, 0.15 nm System CEP	0	0	0	0	0	0	0	3/36	9/108
New SSBN/New SLBM, 3-MIRV, 0.15 nm System CEP	0	0	0	0	0	1/20	5/100	9/180	10/200
Submarines in Modernization	*0*	*0*	*1/16*	*2/32*	*8/128*	*9/140*	*11/164*	*11/152*	*6/72*
Y-Class	0	0	1/16	2/32	8/128	8/128	8/128	5/80	0
D-Class	0	0	0	0	0	1/12	3/36	6/72	6/72
Total Modern SSBN/SLBM	26/416	32/504	40/604	47/688	52/748	53/768	57/848	61/928	62/948
Total SSBN/SLBM	34/440	42/540	50/640	57/724	62/784	63/804	66/878	66/946	62/948
Bombers									
Bear ASM Carrier	70	70	70	65	65	65	60	60	55
Bear Bomber	35	35	30	30	25	25	20	20	15
Bison Bomber	35	35	30	30	25	25	20	20	15
Bison Tanker	(50)	(50)	(45)	(40)	(40)	(35)	(30)	(25)	(20)
New Bomber	0	0	0	0	0	0	5	15	30
Total Bombers	140	140	130	125	115	115	105	115	115

*For the views of Dr. Ray S. Cline, the Director of Intelligence and Research, Department of State; Vice Adm. Vincent P. de Poix, the Director, Defense Intelligence Agency; Lt. Gen. Samuel C. Phillips, the Director, National Security Agency; Maj. Gen. William E. Potts, the Assistant Chief of Staff for Intelligence, Department of the Army; Rear Adm. Earl F. Rectanus, the Director of Naval Intelligence, Department of the Navy; and Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, on this Force Model see their footnotes to the discussion of Force 5.

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APPENDIX

GLOSSARY OF MISSILE TERMS

GLOSSARY OF MISSILE TERMS

NOTE: Except for minor changes in the definition of a nuclear system, this Appendix is reproduced verbatim from NIE 11-8-71.

DEPRESSED TRAJECTORY ICBM (DICBM)

An ICBM system launched on a trajectory having a much lower apogee than one launched on a normal ICBM trajectory. The only Soviet DICBM, the SS-9 Mod 3, is retrofired (see definition below) just prior to reentry to increase the re-entry angle and deboost the re-entry vehicle (RV) onto the desired target.

FRACTIONAL ORBIT BOMBARDMENT SYSTEM (FOBS)

A FOBS is placed into orbit and deorbited on the target prior to completion of the first revolution. Its operational and control requirements are like those for an ICBM; i.e., it is deployed on the ground, targeted prior to launch, and launched with intent to attack. This concept is contrasted with a multiple orbit bombardment system (MOBS) which would be deployed in space, launched into orbit with no immediate commitment to attack, targeted after launch, or retargeted as necessary.

INERTIAL GUIDANCE SYSTEM

A guidance system that is completely contained within the missile and has no link with a ground station after launch. Two principal elements of such guidance systems are:

Accelerometer—A device that measures the missile's acceleration in a given direction. Three accelerometers mounted at right angles to each other can measure the entire acceleration profile of a missile's powered flight.

Gyroscope—A device that measures deviation of the missile away from a reference direction. Three gyroscopes mounted at right angles to each other can measure any movement of the missile during powered flight.

OPERATIONAL CHARACTERISTICS

Alert Rate—The percentage of the operational missile force that is maintained in a condition of readiness.

Circular Error Probable (CEP)—A conventional index of accuracy defined as the radius of a circle centered on the intended target, within which 50 percent of the arriving mis-

sile warheads are expected to fall. The other 50 percent of successfully arriving warheads are expected to detonate within 3½ CEPs of the target.

Initial Operational Capability (IOC)—The date on which the first operational unit is equipped with its weapons and capable of carrying out an attack.

Maximum Operational Range (nm)—

(Air-to-Surface Systems)—Slant range between the launching aircraft and the target at the time of missile launch.

(Surface-to-Surface Systems)—Maximum range under operational conditions with warhead weight indicated. In the case of ballistic missiles the maximum range figures disregard the effect of the earth's rotation.

Reaction Time—The time required to launch from a given readiness condition. The time required is a function of the type of system, the mode of deployment (i.e., hard or soft), and the checkout procedures used.

Refire Time—The time required to launch a second missile from the same launcher.

RE-ENTRY VEHICLES AND WARHEADS

Re-entry Vehicle (RV)—That part of a missile which carries the warhead and is designed to survive re-entry into the earth's atmosphere and detonate on target.

Multiple Independently-Targetable RVs (MIRVs)—Two or more RVs in a single missile payload package, with each RV capable of being directed at a separate aiming point.

Maneuverable RV (MaRV)—An RV which has the capability to maneuver during free flight or re-entry.

Multiple RVs (MRVs)—Two or more RVs in a single missile payload package. The individual RVs are dispersed but not independently-targeted or maneuvered.

Retrofire—A technique whereby the RV is deorbited or is deboosted out of a normal ballistic trajectory.

Ballistic Coefficient (beta)—An RV characteristic whose value is a function of the RV weight and shape and is defined as the weight of the RV divided by its drag coefficient and area. The speed with which an RV passes through the atmosphere increases as the ballistic coefficient increases. An RV having a higher ballistic coefficient is less susceptible to the re-entry error induced by the effects of wind and density in the atmosphere. Re-entry vehicles with lower ballistic coefficients are less susceptible to the effects of prior nuclear bursts in the impact area, e.g., wind, dust, debris; are more adaptable to hardening against the radiation effects of attacking ABMs; and facilitate the design and packaging of nuclear weapons.

Nuclear System Weight—The weight, in a warhead, of the nuclear materials, high explosives, radiation case, and channel filler only.

Warhead Weight—The weight of the nuclear system of an explosive device and of its safing, arming, fuzing, and firing mechanism.

RV Weight—The weight of the warhead plus necessary shielding and structure, of any internal penetration aids that may be present, and of any other necessary or desired components of the RV including hardening.

Throw Weight—The weight of that part of the missile above the last booster stage. In

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the case of MIRVs or MRVs, for example, throw weight would include the weight of the MIRV or MRV release mechanism as well as that of the RVs.

RELIABILITIES

Force Reliability—The percentage of the operational missile force that, in the absence of countermeasures, will successfully detonate in the target area. This is the product of alert rate and weapon system reliability.

Weapon System Reliability—The percentage of the alert missiles that will successfully detonate within 3.5 CEPs of their targets. This is the product of launch, in-flight, and warhead reliabilities.

ANNEX A

ESTIMATED CHARACTERISTICS AND PERFORMANCE OF SOVIET INTERCONTINENTAL WEAPON SYSTEMS

TABLE I

CURRENT SOVIET INTERCONTINENTAL BALLISTIC MISSILE SYSTEMS
ESTIMATED CHARACTERISTICS AND PERFORMANCE

	SS-7		SS-8	SS-9					SS-11			SS-13
						Mod 3						
	Mods 1 & 2	Mod 3		Mod 1	Mod 2	As DICBM	As FOBS	Mod 4 [a] (3 RVs)	Mod 1	Mod 2	Mod 3 (3 RVs)	
IOC	1962-1963	1963	1963	1967	1966	[b]	[b]	See Text	1966	Probably Terminated	See Text	1969 Mod 1; Possibly Early 1972 Mod 2
Maximum Operational Range (NRE-nm)	6,500	5,500	6,000	7,000	See Text	About 6,000	—	5,500-6,000	See Text	About 6,000	About 5,500	About 5,100
Re-entry Vehicle Weight (Pounds)	3,500 ± 500	4,200 ± 500	3,500 ± 500	9,500 ± 750	13,500 ± 1,000	3,000-4,000	3,000-4,000	Each RV About 3,000-3,200	See Text	See Text	See Text	About 1,200 (Both Mods)
Nuclear System Weight	2,250-2,800	2,750-3,350	2,250-2,800	6,150-7,600	8,800-10,800	1,950-3,200	1,950-3,200	Each RV About 1,950-2,550	See Text	See Text	See Text	About 775-950
Accuracy (CEP-nm) [c]	1.0-1.25	1.0-1.25	1.0	See Text	See Text	1-2	1.5-3	[a]	About 1	0.6-0.7 [d]	0.6-0.7 [d]	1.0-1.5 Mod 1 About 1.0 Mod 2
Deployment Mode	Soft/Hard	Soft/Hard	Soft/Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard
Reliability (Percent)												
Weapon System	80	80	65	85	85	75	75	80	85	85	85	85
Alert Rate	85	85	85	90	90	90	90	90	90	90	90	90
Force [e]	70	70	55	75	75	70	70	70	75	75	75	75
Launch Facility Hardness (PSI) Against a 1 MT Weapon [f]												
Silo	500	500	Not computed	500	500	500	500	500	700	700	700	1,300
LCC	N/A	N/A	N/A	400	400	400	400	400	400	400	400	1,100
Time to Fire (Minutes)	Soft / Hard	Soft / Hard	Soft / Hard									
Normal Readiness [g]	60-180 / 5-15	60-180 / 5-15	60-180 / 30-45	3-5	3-5	3-5	3-5	3-5	0.5-3	0.5-3	0.5-3	0.5-2
Peak Readiness	3-5 / 3-5	3-5 / 3-5	5-10 / 5-10	3-5	3-5	3-5	3-5	3-5	0.5-3	0.5-3	0.5-3	0.5-2
Hold Time (Peak Readiness)	Many Hours / Many Days	Many Hours / Many Days	About 1 Hour / About 1 Hour	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Refire Time	2-4 Hours [h]	2-4 Hours [h]	2-4 Hours [h]	[h]	[h]	[h]	[h]	[h]	[h]	[h]	[h]	[h]
Configuration	Two-Stage	Two-Stage	Two-Stage	Two-Stage	Two-Stage	Two-Stage Plus Deboost/ Deorbit Stage	Two-Stage Plus Deboost/ Deorbit Stage	Two-Stage	Two-Stage	Two-Stage	Two-Stage	Three-Stage
Gross Lift-Off Weight Class (Pounds)	325,000	325,000	165,000	400,000	400,000	400,000	400,000	400,000	410,000	425,000	425,000	100,000
Guidance	Inertial	Inertial	Radio-Inertial	Inertial	Inertial	Inertial	Inertial	Inertial	Inertial	Inertial	Inertial	Inertial
Propellant	Storable Liquid	Storable Liquid	Non-Storable Liquid	Storable Liquid	Storable Liquid	Storable Liquid	Storable Liquid	Storable Liquid	Storable Liquid	Storable Liquid	Storable Liquid	Solid

[a] See text for statements of various views on the SS-9 Mod 4 and for a discussion of its accuracy.

[b] The SS-9 Mod 3 is believed to have achieved IOC in late 1969, but it is not known whether it is intended to be used as a DICBM or a FOBS.

[c] These CEPs are under flight test conditions. Handling and maintenance of deployed missiles by operational personnel would degrade accuracy somewhat.

[d] CEP value is for the Mod 2 RV and the centroid of the Mod 3 impacts.

[e] These reliabilities are based on a normal readiness posture. In the case of a generated alert, normal maintenance is suspended and the alert rate is thereby increased; under these conditions, force reliabilities could be improved by as much as five percent.

[f] The figures given represent the overpressure that would render 50 percent of the targets inoperable.

[g] Assumes that the gyros are running. If not, an additional 20-25 minutes would be required for systems deployed in silos.

[h] We do not believe that silos have a refire capability.

TABLE II

SOVIET SUBMARINE-LAUNCHED BALLISTIC MISSILE SYSTEMS
ESTIMATED CHARACTERISTICS AND PERFORMANCE

	SS-N-5	SS-N-6	SS-NX-8
IOC	1963	1968–1969	See Text
Maximum Operational Range (NRE-nm).	700	1,300	See Text
Type and Propulsion	Single-Stage Ballistic, Storable Liquid.	Single-Stage Ballistic, Storable Liquid.	Two-Stage Ballistic. Storable Liquid.
Guidance	Inertial	Inertial	Inertial (Stellar Corrected).
Re-entry Vehicle Weight (Pounds)	2,800± 500	About 1,500	1,500± 100
Nuclear System Weight (Pounds)	1,800–2,250	975–1,200	975–1,200
System CEP (nm)[a]	1–2	About 0.7	See Text
Missile CEP (nm)	About 1	About 0.4	See Text
Launch Mode	Submerged	Submerged	Submerged
Reliability (Percent)[b]			
Weapon System	80	80	About 80
Alert Rate	95	95	About 95
Force	75	75	About 75
Salvo Time[c]			
Class / No. Missiles			
H-II, G-II / 3	6 Minutes	..	..
Y / 16	..	2–4 Minutes	..
Time to Fire[d]			
From Normal Readiness	15–20 Minutes	About 15 Minutes	About 15 Minutes
From Peak Readiness	6–8 Minutes	About 1 Minute	About 1 Minute
Hold Time (Peak Readiness)	About 1 Hour	About 1 Hour	About 1 Hour

[a] System CEP includes both missile errors and submarine position-location errors.
[b] Pertains only to submarines on patrol.
[c] Time from launch of first missile until all missiles are launched.
[d] Time required to proceed from a specified readiness condition to launch, after receipt of order of fire.

TABLE III

SOVIET BALLISTIC MISSILE SUBMARINES
ESTIMATED CHARACTERISTICS AND PERFORMANCE

Class	Maximum Speed Submerged (Knots)	Approximate Shaft Horsepower	Number Screws and Turns per Knot	Diving Depth [a] Normal Operations (Feet)	Collapse Depth (Feet)	Length (Feet)	Beam (Feet)	Displacement (Tons)	
								Surfaced	Submerged
Y..............	30	60,000	2 9.5–	1,300	2,000	425	38	7,500	9,400
D..............	29 [b]	60,000 [b]	2 (9.8)[b]	1,300	2,000	450	38	8,000	10,000
H-II..........	26	30,000	2 19.5	1,000	1,500	380	30	4,900 [c]	5,900 [c]
H-III..........	24	30,000	2 21	1,000	1,500	425	30	5,500 [c]	6,400 [c]
G-III..........	12	5,100	3 Unknown	1,000	1,500	380	28	2,800 [c]	3,500 [c]
G-IV..........	12	5,100	3 Unknown	1,000	1,500	390	28	2,850 [c]	3,560 [c]
G-I..............	13	5,100	3 35	1,000	1,500	320	28	2,300 [c]	2,800 [c]
G-II..............	13	5,100	3 35	1,000	1,500	320	28	2,300 [c]	2,800 [c]

[a] Normal operating depth limit is defined as the depth to which a submarine may proceed an unlimited number of times. During emergencies, a submarine may exceed this depth to an indeterminate point approaching collapse depth and still survive.
[b] These figures are not based on direct evidence, but represent assumptions based on apparent similarity to Y-class.
[c] These estimates are subject to uncertainties on the order of 20 percent because of inadequate supporting intelligence.

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[redacted]

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TABLE III (Continued)

SOVIET BALLISTIC MISSILE SUBMARINES
ESTIMATED CHARACTERISTICS AND PERFORMANCE

Class	Patrol Characteristics			Missiles				Torpedoes		Navigation Accuracy
	Normal Duration [d] (Days)	Average Transit Speed (Knots)	Patrol Speed (Knots)	Type	Number	Estimated Range (nm)	Total Salvo Time	Number	Type	
Y	75	12 [e]	5	SS-N-6	16	1,300	2-4 Minutes	18	Various	0.2 nm
D	75	12 [e]	5	SS-NX-8	12	See Text	Unknown	18	Various	Unknown
H-II	60	12 [f]	5	SS-N-5	3	700	6 Minutes	22	Various	0.5 nm
H-III	60	12 [f]	5	SS-NX-8	6	See Text	Unknown	22	Various	Unknown
G-III	60	6 [g]	5	Unknown	4	Unknown	Unknown	22	Various	Unknown
G-IV	60	6 [g]	5	Unknown	See Text	SS-NX-8	Unknown	18	Various	Unknown
G-I	60	6 [g]	5	SS-N-4	3	300	6 Minutes	18	Various	0.5-1.0 nm
G-II	60	6 [g]	5	SS-N-5	3	700	6 Minutes	18	Various	0.5 nm

[d] Patrol duration is defined as the normal length of time that a submarine will remain at sea without replenishment under combat conditions. It is estimated on the basis of crew endurance, general habitability, and consumption of food, spare parts, and other consumables including fuel. Extended patrols can exceed this length of time.

[e] The Y-class has been noted to use an average speed of eight knots while transiting straits, choke points and the G/I/UK gap. A 12-knot speed is expected for the remainder of the transit. The same type of transit routine is assumed for the D-class.

[f] The H-class is usually expected to shift to the turbo-electric mode of propulsion and slow to about 6-8 knots during transit of restricted passages.

[g] With snorkel.

TABLE IV

SOVIET STRATEGIC BOMBERS
ESTIMATED PERFORMANCE UNDER OPTIMUM MISSION PROFILE

Model	IOC	Gross Weight (Pounds)	Payload (Pounds)	Speed (Knots)/Altitude (Feet): Over Target or ASM Launch	Speed (Knots)/Altitude (Feet): Maximum	Combat Ceiling (Feet)[a]	Radius/Range (nm) High Altitude Subsonic[b]: Unrefueled	Radius/Range (nm) High Altitude Subsonic[b]: One Refuel	Force Effectiveness (Percent)[d]
Bear A..........	1956	365,000	25,000	435/42,000	500/25,000	40,300	4,150/7,800	...../.....	79-85
(Tu-95)			10,000				4,500/8,800	...../.....	
			6,600				4,600/9,000	...../.....	
			3,300				4,700/9,300	...../.....	
Bear B..........	1960	365,000	One AS-3	430/36,000-39,000	500/25,000	41,000	3,950/7,150	5,050/9,200	59 64
(Tu-95)			(25,000)						
Bear C..........	1962	365,000	One AS-3	430/36,000-39,000	500/25,000	41,000	3,750/6,800	4,850/8,850	59-64
(Tu-95)			(25,000)						
Bison A.........	1956	365,000	25,000	465/43,000	545/19,500	47,100	2,500/4,800	3,800/6,700	79-85
(M-4)			10,000				2,800/5,400	4,000/7,300	
			6,600				2,900/5,600	4,100/7,500	
			3,300				2,950/5,700	4,150/7,650	
Bison B.........	1958	400,000	25,000	465/43,000	540/18,800	46,100	2,800/5,200	3,950/7,300	79-85
(3-M)			10,000				3,050/5,950	4,150/7,900	
			6,600				3,100/6,050	4,200/8,100	
			3,300				3,150/6,150	4,250/8,250	
Bison C.........	1960	400,000	25,000	465/43,000	540/18,800	46,100	2,800/5,200	3,950/7,300	79-85
(M ?)			10,000				3,050/5,950	4,150/7,900	
			6,600				3,100/6,050	4,200/8,100	
			3,300				3,150/6,150	4,205/8,250	

[a] Associated combat load is 10,000 pounds for Bison and Bear A; one AS-3 for Bear B and C.

[b] The range and radius figures given in this table are maximum figures. They are applicable to the most up-to-date models of these aircraft, flying optimum mission profiles. The use of older model aircraft, other mission profiles, indirect routes, low-level penetration or other tactics designed to delay or evade detection and interception would reduce the effective range. The calculation of degradation in range and radius resulting from sophisticated penetration tactics is a complex process which can best be accomplished for individual missions. As a rule-of-thumb for low level operations of heavy bombers, the radius mission at optimum altitude will be decreased about 1.6 to 2 miles for every mile flown at sea level.

[c] The first figure for free-fall bombs represents CEP from a 20,000 foot altitude. The second represents CEP from 40,000 feet. Bombing accuracies indicated are for visual bombing or radar bombing against well defined targets with free-fall bombs. These figures are not applicable to drogue-retarded bombs.

[d] These figures represent percentages of the total inventory and do not necessarily reflect reliability of a single aircraft. These rates may be high, since the effects of Soviet operational concepts and troop training standards are at least as important as technical characteristics in determination of force effectiveness, and we have no reliable basis for estimating these effects. These figures are based on the following non-combat attrition rates: (1) 90 percent of the aircraft assigned to home base would be in commission after a 5-10 day standdown prior to initial operations, and would become airborne at launch time; (2) 94 percent of the aircraft airborne would reach the bomb release line directly from home base or from staging base; (3) 95 percent of those aircraft which deploy from home bases to staging bases will successfully launch from staging base; (4) The reliability rates also assume additional degradation for those requiring in-flight refueling to accomplish their mission: a 98 percent reliability is applied to aircraft equipped with probe and drogue. The low side of the range given assumes all aircraft are staged and refueled in flight; the high side assumes no aircraft are staged or refueled in flight.

TABLE V

KANGAROO AS-3 AIR-TO-SURFACE MISSILE SYSTEM
ESTIMATED CHARACTERISTICS AND PERFORMANCE

IOC	1960–1961
Maximum Range	350 nm (Mach 1.8 at Altitude of 55,000 Feet).
Nuclear System Weight	4,500–5,500 Pounds
[redacted]	
Accuracy (CEP)	1–3 nm
Carrier Aircraft Number of Missiles.	Bear 1

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TABLE VI

ESTIMATED PERFORMANCE OF THE BACKFIRE *

Model	IOC	Weight	Assumed Payload (Pounds)	Speed (Knots)/Altitude (Feet): Over Target or at ASM Launch	Speed (Knots)/Altitude (Feet): Maximum	Combat Ceiling (Feet)	Radius/ Range (nm)
Backfire With ASM.....	1973–1974	See Text and Annex F	14,000[a]	~500/35,000 Subsonic 1,150/50,000 Supersonic	1,150/40,000 and Higher Altitudes	42,000 Subsonic 50,000 Supersonic	See Text and Annex F
Backfire With Bombs....	1973–1974	See Text and Annex F	6,600	Same as Above	Same as Above	44,000 Subsonic 50,000 Supersonic	See Text and Annex F

[a] The ASM to be carried by the Backfire is unknown. The AS-4, carried by the Blinder, weighs 14,000 pounds and we have assumed that the ASM to be carried by the Backfire will weigh about the same.

* Maj. Gen. George J. Keegan, Jr., the Assistant Chief of Staff, Intelligence, USAF, believes there is sufficient evidence to make a confident estimate of the performance characteristics of Backfire as:

Model	Gross Weight (Pounds)	Payload (Pounds)	Radius/Range (nm) Unrefueled	One Refuel
			(High-Altitude Subsonic)	
Backfire A............ (With ASM)	272,000	One ASM (14,000)	2,900/5,450	3,950/7,400
			(Low-Level Penetration)[1]	
			2,650/4,650	3,700/6,650
			(High-Altitude Subsonic)	
Backfire A............ (Free-Fall Bomber)..	254,000	6,600	3,000/5,600	3,950/7,650
			(Supersonic Dash)[2]	
			2,150/4,450	3,100/6,550

[1] A 200 nm low-level (sea level) segment at Mach 0.85.

[2] Mach 2.0, 200 nm dash (100 nm in and out) a radius mission and a 100 nm dash (in only) on a range mission.

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