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NATIONAL INTELLIGENCE ESTIMATE

NUMBER 11-8-65

Soviet Capabilities for Strategic Attack

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The following intelligence organizations participated in the preparation of this estimate:

The Central Intelligence Agency and the intelligence organizations of the Departments of State, Defense, AEC, and NSA.

Concurring:

Director of Intelligence and Research, Department of State

Director, Defense Intelligence Agency

The Atomic Energy Commission Representative to the USIB

Director of the National Security Agency

Abstaining:

The Assistant to the Director, Federal Bureau of Investigation, the subject being outside of his jurisdiction.

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Soviet Capabilities for Strategic Attack

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SOVIET CAPABILITIES FOR STRATEGIC ATTACK

THE PROBLEM

To estimate the strength and capabilities of Soviet strategic attack forces through mid-1967, and to estimate general trends in these forces over the next decade or so.

NOTE

Estimates of Soviet strategic attack capabilities for the present and the next few years can be made with high confidence; those for the period five to 10 years in the future are, of course, highly tentative. The Soviet planners themselves may not yet have set clear force goals for the 1970-1975 period. Even if they have, it seems certain that such decisions will be modified repeatedly in response to changes in military technology, in other Soviet weapons programs, in US forces, in resource availability, and in the general Soviet view of world affairs.

CONCLUSIONS

A. Over the next 10 years, we estimate a considerable strengthening of Soviet strategic attack forces, particularly in retaliatory capabilities, with chief emphasis on ICBMs. We do not believe, however, that the Soviets will expect to achieve, within the period of this estimate, forces which would make rational the deliberate initiation of general war. We believe that they will continue to adhere to the concept of a deterrent force. A stress on qualitative factors suggests that the Soviets see technological advance in weapons as a means by

which they can improve their strategic position relative to the West. (*Paras. 4-7*)[1] [2]

B. *ICBM Force.* The present Soviet ICBM force of 224 operational launchers represents a formidable capability in terms of deliverable megatonnage but it is a predominantly soft, concentrated force. Apparently recognizing its vulnerability, the Soviets are now deploying ICBMs in dispersed single silos. Within the next two years, the number of ICBM launchers will approximately double, but the number of separate launch sites will increase from about 100 to at least 300. (*Paras. 8-10, 25, 31*)

C. We estimate that the Soviet ICBM force in 1975 will be somewhere between 500 and 1,000 operational launchers. A force near the high side of the range would probably consist primarily of small ICBMs in single silos. By contrast, a force near the low side, though including substantial numbers of small, single silo launchers, would probably incorporate greater qualitative improvement and significant numbers of larger ICBMs, perhaps with multiple warheads and penetration aids. It is possible that within the next 10 years the Soviets will deploy a rail mobile ICBM system. (*Paras. 23, 26-30*)[3]

D. *MRBM/IRBM Force.* During the past year, the Soviet MRBM and IRBM force leveled off at about 735 operational launchers, some 135 hard, deployed at almost 200 sites. It is capable of delivering a devastating first strike against targets in Eurasia, but like the present ICBM force it is soft and concentrated. By 1975, the Soviets will

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[1] Deterrence is defined as the prevention from action by fear of the consequences. Deterrence is a state of mind brought about by the existence of a credible threat of unacceptable counteraction.

[2] The Assistant Chief of Staff, Intelligence, USAF, would reword the last two sentences as follows:

"We believe they will continue to adhere to the concept of a deterrent force so long as they continue to be in a posture of strategic inferiority, but the intensive Soviet military R and D effort raises the possibility that Soviet leaders already are focusing on achievement of a strategic superiority which would enable more aggressive pursuit of their political aims, perhaps within the time frame of this estimate."

[3] The Director, Defense Intelligence Agency, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, do not concur in the high side of the estimated ICBM launcher spread for mid-1975, believing it to be too high. See their footnote to paragraph 27.

The Assistant Chief of Staff, Intelligence, USAF, estimates that the Soviet ICBM force in 1975 will include at least 1,000 operational launchers and could well be above that figure.

probably have replaced the major portion of the force with new solid-fueled missiles deployed in dispersed hard sites and on mobile launchers. The flexibility and survivability of such a force may lead them to conclude that the same target system could be covered with fewer launchers. We estimate that in the 1970-1975 period Soviet MRBM/IRBM strength will stabilize at some 350-700 launchers. (*Paras. 38, 40, 42-46*)

E. *Missile Submarines.* The Soviet Navy has 43-48 ballistic missile submarines, including 8-10 nuclear-powered, with a total of 120-140 tubes. Construction of ballistic missile submarines of current classes ended in 1963. We estimate, however, that the Soviets will produce a new class which could become operational in 1968. It will almost certainly be nuclear powered and will probably carry more missiles than are carried by current classes, perhaps 6-12. A new submarine-launched ballistic missile with a range of about 1,000 n.m. will probably enter service in two or three years, and by 1975 a 2,000 n.m. missile may be available. At that time the Soviets will probably have some 60 ballistic missile submarines, including about 20 of a new type. Only recently have Soviet ballistic missile submarines regularly carried out ocean patrols; this activity will increase, and by 1975 about 25 percent of the force will probably be on station. (*Paras. 47, 49, 51, 53-54, 65*)

F. In recent years, the USSR has emphasized construction of cruise missile submarines. The Soviet Navy now has 39-43, including 16-18 nuclear-powered with a total of 195-210 launchers. These submarines were initially intended to counter naval task forces, but their mission may be expanded to include land targets. Construction appears to be tapering off, but will probably continue at a reduced rate for several years. By 1975, the Soviets will probably have 60-70 cruise missile submarines, possibly including some of a new type. At that time, they will probably also have available new types of cruise missiles. (*Paras. 47, 55-57, 65*)

G. *Bomber Force.* Long Range Aviation, a force of some 200 heavy bombers and 800 mediums, is in general much better suited for Eurasian than for intercontinental operations. This force will decrease gradually through attrition and retirement. The Soviets may

develop another new aircraft of medium bomber range, but we believe it unlikely that they will introduce a follow-on heavy bomber into Long Range Aviation. By 1975, the heavy bomber force will probably be reduced to about 50 aircraft, and the medium bomber force to some 250-500, comprised largely of Blinders.[4] (*Paras. 66, 70, 72-76*)

H. *Space Weapons.* Our evidence does not indicate that the USSR is developing offensive space weapons, but it is almost certainly investigating their feasibility. We do not believe that they will deploy such weapons within the next 10 years. This conclusion is based upon our judgment that such systems will not compare favorably in cost and effectiveness with ground-based systems and, to a lesser extent upon our view that the Soviets would see political disadvantages in deploying weapons in space. The USSR has, however, orbited reconnaissance and communications satellites, and is probably developing other military support systems. (*Paras. 83, 86, 87*)

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[4] The Assistant Chief of Staff, Intelligence, USAF, believes the Soviets will continue to consider manned strategic aircraft an important element of their intercontinental striking forces. He estimates that the USSR will introduce a follow-on heavy bomber into Long Range Aviation. He further estimates that in 1975 LRA will still include 125-200 heavy bombers and 450-600 medium bombers, up to half of which could be a follow-on to the Blinder.

DISCUSSION

I. SOVIET POLICY TOWARD STRATEGIC ATTACK FORCES

1. The change in leadership in the USSR has introduced a new element of uncertainty into Soviet military policy over the coming period. The main change has been one of style, but although the new leaders avoid Khrushchev's demagoguery, they appear no less committed than he to ambitious programs for overall economic growth, an improvement in agriculture, more consumer goods, and stronger defenses. Yet the tight economic situation continues, the competition for high-quality resources remains high, and agricultural deficiencies persist.

2. The major difference in the coming period may be the inability of a collective leadership to chart a clear course. It is already apparent that the USSR is proceeding into the next five-year economic plan period in a political environment more favorable to military interests than in the last years of the Khrushchev era. After a lull of a few months various military spokesmen are openly asserting the need for an enlarged defense effort, the importance of more professional participation in military-political decisions, and a claim to a greater share of industrial support. In particular, the issue of the proper allocation of manpower between civilian and military industry has been raised, along with calls for a greater research and development effort to support military needs. Moreover, the restoration of Chuykov as commander of the Ground Forces, may signify an end to Khrushchev's continual effort to pare down the general purpose forces and save money this way. In sum, Khrushchev's effort to keep a restraining hand on the military sector may be giving way to the various internal and external pressures for a total increase in the USSR's defense effort.

3. Even if this trend fails to develop, we think that strategic attack forces would not be significantly affected by any tightening of defense spending. We know of no significant opposition, under Khrushchev or since, to the buildup of large missile forces. What opposition did develop was largely over the issue of whether the buildup should be at the expense of other more traditional arms. Thus, while there are many political uncertainties inherent in a change of leadership, we think it unlikely that this will have any short-term effect on strategic attack forces. Over the longer term, of course, political and economic developments could lead to another crisis that could involve specific military programs as well as general doctrinal concepts. Thus our judgments about longer term programs and goals must be qualified because of the probability of important political shifts in the Soviet leadership during the period of this estimate.

4. These goals will be influenced by the Soviet view of their prospects in related military fields, especially antimissile forces. Developments on the US

side are equally important: for example, the large US ICBM force almost certainly influences the USSR to increase its force, and US deployment of ballistic missile defenses might incline them toward even higher numbers. Technological advances will play a major part, and a stress on qualitative factors is already evident as part of the USSR's effort to improve its relative strategic position.

5. Given all these uncertainties, we rely on past and present trends, as well as Soviet requirements and capabilities, in estimating the broad outlines of future developments. In general, we believe that over the next decade the Soviets will continue to adhere to the concept of a deterrent force.[5] We believe that strategic attack forces will include a variety of weapon systems, with chief emphasis upon ICBMs. We expect a considerable strengthening of these forces, particularly their capabilities for retaliation. We do not believe, however, that the Soviets will expect to achieve by the mid-1970s strategic attack capabilities which would make rational the deliberate initiation of general war.

6. We have considered the possibility of a Soviet attempt to acquire a combination of offensive and defensive forces, which, going beyond deterrence, would permit a first strike which would limit damage to the Soviet Union to acceptable proportions. Considering the number, hardness, and reaction times of targets to be struck in such an attack, and the likelihood that many, such as Polaris submarines, would escape destruction, such a Soviet effort would require both a large, highly sophisticated missile force and a widespread, very effective air and missile defense. In view of the technological and economic magnitude of the task and the likelihood that the US would detect and match or overmatch the Soviet effort, we believe it highly unlikely that the Soviets could achieve such a force during the next 10 years.[6]

7. Short of an effective first-strike capability as defined above, but greater than might seem adequate for deterrence, lie force levels which would reflect no comprehensive strategic or doctrinal design. Such forces might result from the sheer momentum of deployment programs, attempts to capitalize on a temporary technical advantage, or a psychological urge to match the US in delivery systems. But they would most likely result from Soviet difficulties in defining and agreeing on force levels which would constitute adequate deterrence.

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[5] For the view of the Assistant Chief of Staff, Intelligence, USAF, see his footnote to Conclusion A.

[6] The Assistant Chief of Staff, Intelligence, USAF, considers that a major Soviet effort to achieve a first-strike counterforce capability during the next ten years is likely in view of the emphasis which he believes the Soviets currently are devoting to their massive military R and D programs which might eliminate their strategic inferiority. Whether such a capability can be attained may depend in considerable measure on the timeliness with which any Soviet R and D programs or technological breakthroughs are detected.

II. INTERCONTINENTAL BALLISTIC MISSILES

A. Current Forces and Recent Deployment

8. We believe that the Soviet ICBM force now has 224 operational launchers in 18 deployment complexes. It consists almost entirely of second-generation systems, of which the SS-7 is the most widely deployed.[1] The ICBMs now operational are all large, liquid-fueled missiles, and they represent a formidable capability in terms of deliverable megatonnage. It is, however, a predominantly soft force, with 146 soft launchers and 78 hard. And it is relatively concentrated; the soft launchers are deployed two to a site, and the hard launchers in three-silo hard sites. These vulnerabilities were probably a major factor in the Soviet decision to stop second-generation deployment in 1963 and, late in the same year, to begin deployment of dispersed single silos for third-generation ICBMs.

9. We have now identified some 185 single silos in various stages of construction at several new deployment complexes and at some of the older ones. The new deployment involves two different types of silos, one small and one large. We have located about 65 silos of the larger type and about 120 of the smaller. The smaller are apparently being deployed in groups of 10. We believe that the SS-9 system will be deployed in the larger silos and that a new, smaller ICBM is probably intended for the smaller silos.

10. In addition to the single-silo deployment, we have detected two new soft sites under construction. The general scale of these sites, suggests deployment of a very large vehicle, perhaps larger than the SS-6. However, we continue to believe it unlikely that the Soviets will embark upon any substantial new program of soft-site deployment.

11. We are virtually certain that no additional complexes or launch sites for first- and second-generation systems remain undetected. On the other hand, we consider it likely that some single-silos have escaped detection, but we believe that these would be in early stages of construction; we make allowance for this in our estimate.

B. Trends in Deployment

12. Soviet ICBM deployment programs have followed an uneven course marked by spurts of activity, long pauses, and abrupt cutbacks of what initially appeared to be large-scale programs. Deployment of the first-generation SS-6 was ended in 1960 after construction of only four soft launchers. During 1962, there was a six-month hiatus in deployment of second-generation systems; the SS-8 program was stopped altogether at this time after a very limited deploy-

[1] For estimated characteristics and performance of Soviet ICBM systems, see Table 1.

ment. The SS-7 program resumed in the fall of 1962 and continued into 1963, but it too apparently stopped short of completion. In most cases, the primary cause of interruptions was probably the prospective availability of improvements or of new and superior missile systems. In some instances, important inadequacies in existing programs were probably contributing factors. Whatever the reasons, however, the record clearly indicates that in the past the USSR has accepted considerable slippage in progressing toward whatever force goals it has set for itself.

13. The current single silo program represents the greatest effort the Soviets have yet made in terms of ICBM site activations and sustained construction activity. This does not, however, appear to be a crash program. We believe that construction progress at individual launch sites has been relatively slow and deliberate. Moreover, during 1965 there have been indications of a decline in construction starts of small silos.

14. Present evidence does not indicate the reasons for this unevenness, but the past may provide some guidelines. In earlier ICBM programs, the Soviets evidently limited deployment because they recognized shortcomings of systems then available or had better systems under development. Soviet decisions to do so were made in the context of a strained economic situation in which the resources to be divided between development and deployment were limited. The advent of small-silo deployment, with its implication of a smaller, cheaper, more rapidly deployable ICBM, raised the possibility that the USSR had acquired the means of materially and rapidly improving its strategic position relative to the US. The Soviets may yet fix upon this system for very large-scale deployment, but evidence to date does not indicate that they have decided to do so.

C. Research and Development

15. The sustained and vigorous pace of Soviet ICBM research and development stands in sharp contrast to Soviet deployment programs. During the past year, ICBM development has involved the flight-testing of at least three new systems. There are now 34 operational launchers and probably another 15 under construction. Most of these facilities can be associated with known ICBM systems or with the space program. We believe that some, however, are intended for systems now under development which have not yet reached the flight test phase.

16. *The SS-9 System.* We think that the SS-9 is a product of the same design team that produced the SS-7 system; it appears to represent an intent to develop a more accurate missile with a larger payload. The SS-9 program at Tyuratam has been highly successful. Since December 1963, the Soviets have conducted 23 flight tests of the SS-9 with only five failures. Four of the tests were extended

range firings to the Pacific. Two re-entry vehicles have been tested with the SS-9. One carried a payload of 9,000-11,000 pounds; this was fired to 7,000 n.m. in the extended range tests. In the past year, five SS-9s have carried a heavier payload, estimated at 14,000 pounds; with this warhead, the maximum range would be about 4,700 n.m.

17. The characteristics of the SS-9 and the timing and progress of its development program lead us to estimate that the SS-9 system will be deployed in the large silos in the field. It will probably become operational early in 1966 with completion of the first of those silos, and it may be operational now in some of the three-silo hard sites.

18. *The SS-10 System.* The Soviets began flight-testing of another new ICBM system, the SS-10, in April 1964. The program appeared to progress satisfactorily, with only one failure in eight flight tests; the last firing, in October 1964, was a successful extended-range test (6,500 n.m.) to the mid-Pacific. There have, however, been no further tests since that time. It is possible that the present standdown represents only an interruption. In this case, we believe that the SS-10 would not be introduced into service until late 1966 and that deployment would be quite limited. We doubt, however, that the SS-10 system will be operationally deployed.

19. *Other Systems Under Development.* Since early this year the Soviets have been flight testing a new missile, which we believe to be a small, liquid-fueled ICBM and have designated the SS-11. The new system has probably been tested from a soft site. Early results were poor, but the program has recently been accelerated, with improved test results. Of 11 known attempts, six flight tests appear to have been generally successful. We estimate that the SS-11 will become operational by mid-1966 when many of the smaller silos, for which we think it is intended, are completed.

20. We believe that the Soviets are also developing a small, solid-fueled ICBM. They exhibited what may be a prototype of this missile, the Savage, in the Moscow parade last May. There have been several tests of unidentified vehicles at Tyuratam which failed, but there is no evidence that any of these involved a solid propellent missile, and we are virtually certain that the Savage has not been successfully flight-tested in its three-stage configuration. We believe, however, that the Soviets plan to deploy a solid-fueled ICBM system based on this prototype. If flight testing begins soon, it could become operational in late 1966 or early 1967.

21. Our estimate that the liquid-fueled SS-11 will initially be deployed in the small single silos is based primarily upon the course and timing of its test program. It is possible that the delays observed in the small silo program in the field relate in some manner to the early lack of success in the SS-11 test program.

The small, solid-fueled ICBM now under development will almost certainly also be deployed in silos, possibly in some of the small silos now under construction.

22. *Future Trends in Development.* The Soviets are continuing the development of large, liquid-fueled vehicles. In July, they placed in orbit Proton I, their heaviest earth satellite to date. The booster used in this launching had an estimated thrust of 2.5 million pounds. As a missile, it could deliver a 30,000 pound payload to a range of 6,500 n.m. This vehicle has not yet been tested as an ICBM. We continue to estimate, however, that the Soviets will deploy a very large ICBM in small numbers for use as a "global rocket" or as a carrier for [ ] warhead. If testing begins soon, the Soviets could have a very large ICBM system operational in 1967. It may be deployed in the two new soft sites (see para. 10) or in the old SS-6 launchers after that system is phased out.

23. The substantial advantages in survivability of a rail-mobile ICBM system lead us to estimate that, if they have not already done so, the Soviets will investigate the possibility of developing one. If the Soviets do develop a rail-mobile ICBM, they might adapt some existing system to this concept. We believe, however, that the special problems involved in a mobile system would lead to a long period of development, and that such a system could probably not become operational until after 1970. They may deploy such a system in the period of this estimate, but we have no basis for making a confident estimate of the likelihood of their doing so.

24. The evidence of current Soviet R and D activity provides no basis for estimates of other follow-on systems which will be operational by 1975. These have not yet reached the flight test stage, and some probably have not reached the drawing boards. However, the history of Soviet ICBM development to date and current activities provide some indications of future trends. We believe that the Soviets will pursue solid propellant development and that sometime after 1970, they will probably introduce a follow-on small, solid fueled ICBM as a successor to their first system of this type. The Soviets will probably also continue with development of large liquid fueled missiles and could have a new system operational sometime after 1970. One effect of US deployment of an ABM system might be to put a premium on large payloads which could carry multiple warheads or penetration aids.

D. Future Force Levels

25. We do not believe that over the next two years the USSR could add substantially to the operational ICBM force beyond the sites which are now under construction in the field. We have noted the probability that some of these have not been detected and make allowance for this in our estimate. We have also assumed that all groups of small silos will be filled out to 10 silos each. In view of estimated construction times, it is unlikely that new launch groups

begun now or hereafter would be operational by mid-1967. Our estimate of operational Soviet ICBM strength over the next two years is presented in the following table.

ESTIMATED OPERATIONAL ICBM LAUNCHERS [a]

Deployed Complexes	1 October 1965	Mid-1966	Mid-1967
Soft			
SS-6	4	0–4	0
SS-7	128	128	128
SS-8	14	14	14
SS-Very Large	0	0	0–6
TOTAL	146	142–146	142–148
Hard (Triple Silo)			
SS-7 [b]	69	69	69
SS-8	9	9	9
TOTAL	78	78	78
Hard (Single Silo)			
Large (SS-9)	0	20–30	60–70
Small (SS-11) [c]	0	70–110	140–180
	0	90–140	200–250
TOTAL	224	310–364	420–476
Tyuratam			
Soft	19	19	21
Hard	15	28	28
TOTAL	34	47 [d]	49 [d]

[a] The Assistant Chief of Staff, Intelligence, USAF, would estimate the total number of operational ICBM launchers as follows:

1 October 1965	Mid-1966	Mid-1967
260	400–450	475–575

He considers that for the near-term, the majority estimate makes insufficient allowance for launchers and possible launch complexes not yet identified. He believes the completed launchers at Tyuratam would be available for operational use in wartime so he includes them in his total of operational launchers.

[b] It is possible that some of these sites are equipped with the SS-9 system.

[c] Some of the small silos now under construction may be intended for a solid-fueled ICBM.

[d] We estimate that some, say 10, of the launchers at Tyuratam have an operational as well as an R and D and training role. We judge that the other launch facilities at Tyuratam are not normally available for operational use. But varying numbers of them could be prepared to fire ICBMs at the US, depending on the amount of advance notice.

26. *Force Goals for 1970 and 1975.* In our previous estimate, we projected a Soviet ICBM force of some 400-700 operational launchers for mid-1970. This estimate took into consideration economic, strategic, and technical considerations. An important factor in the selection of this range was the timing of a possible new, small ICBM system. The low side of the range assumed that no such system would be brought in before 1970; the high side assumed its introduc-

tion in 1967. It now appears that such a system will be operational by mid-1968. Our present estimate for mid-1970 is 500-800 operational launchers.[8]

27. We recognize that Soviet planners may not yet have decided on the size and composition of the ICBM force for the 1970-1975 period. Even if they have, it seems certain that such decisions will be modified repeatedly in response to changes in military technology, in other Soviet weapons programs, in US forces, in resource availability, and in the general Soviet view of world affairs. Despite these uncertainties, we continue to estimate that, through 1975, the Soviets will regard their ICBM force as the primary element of a strategic posture designed to deter attack by providing a threat of heavy and assured retaliation. On this basis, and taking into consideration the factors cited above, we estimate that the Soviet ICBM force in mid-1975 will be somewhere between 500 and 1,000 operational launchers.[9]

28. Within this range, we think that as a general rule, the missile systems in a smaller force would be more advanced than in a larger one. A force near the high side of the range would probably consist primarily of small, less expensive ICBMs in single silos and would involve the retention of second-generation launchers well into the 1970-1975 period. By contrast, a force near the low side though including substantial numbers of small, single silo launchers,

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[8] The Director, DIA, disagrees with the high side of the spread of 500-800. In NIE 11-8-64 we estimated an ICBM force of some 400-700 operational launchers for mid-1970. We also said that it appeared that the attainment of the high side of such a force at that time would be likely only if the USSR developed a small ICBM and deployed it at a rapid rate beginning in 1967. The advent of single silo construction in early 1964 indicated that deployment of a small ICBM probably would occur about a year earlier than we had expected. Considering the scale of the construction starts in the small silo program it appears obvious that the low side of the 400 to 700 spread will no longer obtain. There appears, however, to have been somewhat of a decline in construction starts of small silos. Further, we cannot determine the construction time involved. Considering these factors, we cannot say that the high side of 700 is not still valid. Therefore, he believes that the high side of the spread should be 700.

The Assistant Chief of Staff, Intelligence, USAF, believes his previous estimate of 600-900 Soviet operational ICBM launchers by mid-1970 remains a conservative estimate.

[9] The Director, Defense Intelligence Agency, and the Assistant Chief of Naval Operations (Intelligence) do not concur in the high side of the estimated ICBM launcher spread for 1975. Such a force would reflect a far greater emphasis on numerical deployment of strategic missile forces than has been evidenced to date. Qualitative improvements in the ICBM force coupled with developments in other strategic systems, both offensive and defensive would tend to constrain the numerical growth of the force. Further, the Soviets must reason that an ICBM force which seems to reach for numerical parity with the US would generate a reaction to their disadvantage. For these reasons, The Director, Defense Intelligence Agency, and the Assistant Chief of Naval Operations (Intelligence) believe that the high side of the spread in mid-1975 should not exceed 800 launchers. The growth in force capabilities between 1970 and 1975 would be primarily qualitative rather than quantitative.

The Assistant Chief of Staff, Intelligence, USAF, estimates that the Soviet ICBM force in 1975 will include at least 1,000 operational launchers and could well be above that figure.

would probably incorporate greater qualitative improvement and significant numbers of larger ICBMs, perhaps with multiple warheads and penetration aids, and possibly rail mobile launchers. In the case of the smaller force, the phase-out of second-generation systems would probably begin earlier, and would probably be completed by 1975.

29. We choose 500 launchers as the lower limit for mid-1975, because we think it very unlikely that the Soviets would regard a force smaller than this as a satisfactory deterrent. On the other hand, they would probably judge that if they appeared to be acquiring as many ICBMs as the US they would simply stimulate a further arms race and that as they approached the upper limit of our estimate this danger would increase. We do not believe that a force goal near the upper limit would signify a departure from the doctrine of deterrence. Thus we intend our estimate as a range within which we believe the mid-1975 force will fall, not as alternatives representing alternative Soviet strategic concepts.

30. Whatever the Soviet force goal, deployment programs are likely to continue their uneven course of recent years. The Soviets will almost certainly not fix upon any one ICBM system for urgent deployment. Rather they will continue to experiment and to improve their missile technology. Interruptions and cutbacks will probably occur as improvements are incorporated and promising new weapons are brought in.

E. Capabilities of the Force

31. Whether falling toward the high or low side of the estimated range, the survivability of the Soviet ICBM force, and hence its retaliatory capability, will steadily increase. Within the next two years, the number of aiming points represented by individual launch sites will increase from about 100 at present to at least 300. As soft sites are phased out, and single silos come to comprise the great bulk of the force, the number of launchers will roughly equate to the number of aiming points. And a mobile system, if introduced, would pose difficult targeting problems.

32. There will also be a general improvement in the performance characteristics of operational ICBM systems.[10] For example, accuracy will probably be improved from about 1-2 n.m. for currently operational systems to about 0.5 n.m. by 1970 and .25 n.m. by 1975. Readiness and reaction time will improve markedly as single silos are deployed and soft sites are phased out and will become more uniform throughout the force. This development, together with improvements in control and communications and experience gained in exer-

[10] Such improvements are noted in detail in Table 1.

cises, will serve to improve coordination in operations. There should also be some improvement in reliability, particularly in the case of solid-fueled missiles.

33. *Refire Capability.* There is good evidence that most soft ICBM sites have a refire capability. We cannot determine the actual number of missiles available for refire from these sites, and we believe that this capability is not uniform throughout the force. We believe, however, that on the average at least two missiles are available for each soft launcher. Considering requirements of hard sites, which we believe have no refire capability, we estimate the current operational ICBM inventory at some 375-475 missiles. This refire capability will decline as soft sites are phased out. If the Soviets wish to emphasize a second-strike capability, they may come to rely more heavily on submarine-launched missile systems or mobile ICBMs.

34. *Hard Sites.* In NIE 11-8-64, we estimated the design overpressure of Soviet hard sites in 200-400 psi range.[11-12] We have acquired no evidence which would lead us to revise this judgment; indeed, a recent statement by Marshal Krylov (to the effect that design overpressure of Soviet hard sites is about 300 psi) tends to support it. We have no evidence that the Soviets are investigating superhardening techniques, but they almost certainly will do so over the next 10 years.

35. *Penetration Aids and Multiple Warheads.* We have no firm evidence that the Soviets are developing penetration aids or multiple warheads. However, the large payloads of some Soviet ICBM systems present an obvious opportunity for trade-offs between nuclear yield and such devices. Relatively unsophisticated types of peneration aids such as fragmenting boosters and balloons are within present Soviet technical capabilities and could be developed without testing. A precursor nuclear burst could be developed on the basis of information from the 1961-1962 tests. Development of other penetration aids such as shielding, decoys, and jammers would require flight tests. The chances are good that we would detect such testing [redacted] A US decision to deploy an ABM system would spur Soviet development of penetration aids.

36. Multiple warheads could be developed to increase the effectiveness of a given number of deployed missiles, although total megatonnage would be re-

[11] A hard site is designed to remain *completely operable* at a specified overpressure from given weapon yields. This specified overpressure is called design overpressure. Hardness is the overpressure at which, for given weapon yields, a site becomes *inoperable*. The design overpressure estimated above is for a 10 MT weapon. Hardness will vary with differences in engineering practice and in weapon yield.

[12] The Assistant Chief of Staff, Intelligence, USAF, considers that, given the uncertainties involved, no meaningful estimate of the design overpressure of Soviet hard sites can be made. If a figure is required, he believes that a figure of 100-300 psi should be used.

duced. These would also have a bonus effect of complicating the defense. Deployment of multiple warheads would probably be preceded by one or two years of testing, which we would probably detect. A more sophisticated multiple warhead could be designed to direct several warheads carried by a single missile against separate targets, although this would involve complex problems of system accuracy and reliability. The Soviets could probably attain an operational capability with a multiple independently guided re-entry vehicle (MIRV) in the period 1970-1975.

37. A Soviet decision to undertake development of MIRVs would affect both the size and composition of the ICBM force. If development were successful, it could lead to a greater emphasis on large ICBMs, and it might incline the Soviets toward smaller numbers of launchers. Present evidence does not indicate that such a decision has yet been made. Warheads and guidance systems now under development do not appear related to a MIRV system.

III. MEDIUM AND INTERMEDIATE RANGE BALLISTIC MISSILE FORCES

A. Force Levels

38. During the past year, deployment of the 1,020 n.m. MRBM and the 2,200 n.m. IRBM came to an end.[13] The force now has about 735 operational launchers, some 135 of them hard, deployed at almost 200 sites. Current strength is 20-30 less than we had estimated for mid-1965, reflecting the deactivation of some sites. A few more soft sites are likely to be deactivated over the next year or so, but the size and composition of the force will probably remain relatively constant through mid-1967.

ESTIMATED OPERATIONAL MRBM/IRBM LAUNCHERS

	1 October 1965	Mid-1966/Mid-1967
MRBM (SS-4)		
Soft	540	528
Hard	84	84
TOTAL	624	612
IRBM (SS-5)		
Soft	58	46
Hard	51	51
TOTAL	109	97
TOTAL MRBM/IRBM	733	709
(Hard)	(135)	(135)

[13] For estimated characteristics and performances of Soviet MRBM and IRBM systems, see Table 2.

B. Capabilities of the Force

39. The bulk of the MRBM/IRBM force is deployed within range of targets in Western Europe and parts of North Africa and the Middle East. The remainder, about 10 percent of the launchers, is deployed in the Caucasian, southern Asiatic, and Far Eastern regions of the USSR. This force is capable of delivering a devastating first strike or a powerful retaliatory attack against Eurasian targets; it can also attack some important targets outside of Eurasia, such as those in Greenland and Alaska. We believe that some of the MRBM/IRBM launchers would be used in support of theater operations.

40. Soft launchers are generally deployed four to a site, with two or three sites to a complex; the few remaining sites which are singly deployed will probably be deactivated. We believe that all of these soft launchers have a refire capability. The MRBM hard sites contain four launch silos, and the IRBM hard sites, three. Evidence acquired during the past year indicates that both MRBM and IRBM hard sites are configured for in-silo launching; they probably have not been provided with a refire capability. We still have no good evidence as to the hardness of these sites, and continue to estimate that they are comparable to hard ICBM sites (see para. 35).

41. In addition to the primary launch sites described above, fixed field sites have been prepared near about two-thirds of the Soviet MRBM complexes. These areas usually contain four clearings, believed to be launch positions, and few if any permanent facilities. We have now identified about 90 such sites. These sites do not all appear to serve the same purpose. We believe that some are intended for use by MRBM units as alternate firing positions under certain conditions, such as launching a second salvo. Others, which do not appear suitable as alternates, may be used for field training of launch crews.

C. Current Research and Development

42. We believe that the Soviets are developing follow-on missile systems of MRBM/IRBM range. In the past two years, we have not detected the tests of any such missile on the Kapustin Yar range, but, we believe that flight tests are in the offing which will include tests of a solid fueled missile. In the May 1965 parade, the Soviets displayed a mobile, solid-fueled missile (Scamp) for which Marshal Krylov claimed an intermediate range capability. Our analysis indicates that, depending on payload weight, this missile could probably achieve MRBM/IRBM ranges; if this is the case, however, it almost certainly has not yet been flight-tested to full range. Flight tests of a short range (300-500 n.m.) missile at Kapustin Yar, under way since early 1964, could relate to development of the Scamp, which may prove to be a tactical rather than a strategic missile. Nevertheless, the evidence points to increased mobility and solid-propellant mis-

siles as important new developments in the Soviet MRBM/IRBM force over the next several years.

D. Future Trends

43. We believe that the USSR will replace the major portion of its MRBM and IRBM force during the next 10 years. The Soviets are certainly aware of the vulnerability of their fixed soft sites and multi-launcher hard sites, and new deployment will probably involve a mix of dispersed hard sites and mobile launchers. Solid-fueled missiles will probably be used in both deployment modes. It is possible that a single solid-fuel missile system could fill both an MRBM and an IRBM role. It could become operational as early as mid-1967 in either a fixed or mobile mode.

44. Such a new missile system would probably be retrofitted, at least initially, into existing hard MRBM sites, but the Soviets would probably wish to augment this deployment with dispersed single silos. It may also be deployed in IRBM hard sites, but if the Soviets require very large payloads for some of the force they may develop a new liquid-fueled IRBM to replace the SS-5. If so, it probably would not become operational before 1969 or 1970.

45. By 1970, the USSR will probably have begun to phase out soft sites and to replace them with hard sites; some mobile units will probably be operational. By 1975, we believe that the SS-4 and SS-5 systems will have been largely phased out, and that the force will consist primarily of solid-fueled missiles deployed in hard sites; by that time there will probably be a sizable number of mobile units. The capabilities of the force will be greatly improved. Deployment of solid-fueled missiles in fixed sites will increase alert rate and reliability and decrease reaction time. Deployment of a mobile system would greatly decrease the vulnerability and increase the flexibility of the force. By employing concealment and irregular movement, the Soviets could make it very difficult to obtain evidence as to actual numbers and locations of mobile launchers. Mobile launchers could also be shifted to meet a changing threat; for example some might be deployed along the Chinese border in a period of worsening Sino-Soviet relations.

46. We believe that in general the number of Eurasian targets which the Soviets will wish to cover will remain fairly stable over the next decade, and that they are unlikely to expand their MRBM/IRBM force beyond present levels. Some portion of the present force, however, probably represents an attempt by the Soviets to enhance survivability through numbers. If, as we believe, the future force will be a mix of mobile and hard deployment, they may conclude that the same target system could be covered with lesser numbers. We estimate, therefore, that by 1970 the MRBM/IRBM force will probably

have 600-700 operational launchers and that in the 1970-1975 period the force will stabilize at some 350-700.[14]

IV. MISSILE SUBMARINE FORCES

47. Current Soviet missile submarine forces are the outgrowth of decisions taken about 1954-1955 to develop quickly an extensive but unsophisticated capability. Initially, long-range conventional Z-class submarines were converted to carry ballistic missiles; this effort was followed by construction of two new classes of ballistic missile submarines, the diesel-powered G-class and the nuclear-powered H-class. The later development of cruise missile submarines followed a similar pattern, with conversion of the W-class by installation of cruise missile launchers topside, and subsequent production of two new classes, the nuclear-powered E-class and the diesel powered J-class. The Soviet Navy now has from 43-48 ballistic missile submarines with 120-140 tubes and some 39-43 cruise missile submarines with 195-210 launchers.[15]

48. Since their inception, Soviet missile submarine forces have been plagued by changing concepts of their missions, by the operational limitations of their weapon systems, and by technical problems in developing advanced propulsion and navigational systems. These factors delayed their maturation as an effective strategic strike force. Only recently have Soviet ballistic missile submarines regularly carried out ocean patrols, and even these patrols appear to be in staging areas rather than on strike stations. During the past year, some nuclear-powered cruise-missile submarines have also conducted out-of-area operations.

49. Initially, the Soviets intended to employ missile submarines against strategic targets. A decision was apparently made in 1959 to limit potential targets for naval ballistic missile strikes to enemy naval bases and naval support facilities. This decision influenced training, construction programs, and weapons development. It led to a halt in new construction of current classes of ballistic missile submarines and to an increase in cruise missile submarine construction. The last ballistic missile submarine, an H-class unit, was delivered in 1963. In that year, however, public statements by senior Soviet officials suggested that the Navy may have once again been assigned to strategic attack roles.[16] If so, new ballistic missile submarines systems may now be under development or in production.

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[14] The Assistant Chief of Staff, Intelligence, USAF, would insert the following new paragraph at this point:

As part of their program of retrofitting MR/IRBM sites and assigning part of the MRBM role to mobile units, the Soviets may elect to deploy some new small ICBMs in existing hard or soft MR/IRBM sites. Such a program is technically feasible and would improve the Soviet ICBM position at lesser cost than the construction of new ICBM launch facilities.

[15] For characteristics of Soviet submarine-launched missiles and of Soviet missile submarines, see tables 3 and 6, respectively.

[16] For coverage of US targets by submarine-launched missiles, see map.

50. Such new programs are not likely, however, to affect Soviet missile submarine strength for the next few years. Our estimate for the period through mid-1967, which follows, reflects the hiatus in construction of ballistic missile submarines, and the continuation of cruise missile submarine programs.

ESTIMATED SOVIET MISSILE SUBMARINE STRENGTH

	1 October 1965	Mid-1966	Mid-1967
Ballistic Missile[a]			
Nuclear			
H-I	6–7	3–3	1–0
H-II[b]	2–3	5–7	7–10
Subtotal	8–10	8–10	8–10
Diesel			
G-I	27–30	27–27	27–23
G-II[b]	1–1	1–4	1–8
Z-Conversion	7–7	7–7	7–7
Subtotal	35–38	35–38	35–38
TOTAL BALLISTIC MISSILE	43–48	43–48	43–48
Cruise Missile[c]			
Nuclear			
E-I	5–5	5–5	5–5
E-II	11–13	16–18	19–22
Subtotal	16–18	21–23	24–27
Diesel—J Class	10–12	14–18	16–24
W Conversion	13–13	13–13	13–13
Subtotal	23–25	27–31	29–37
TOTAL CRUISE MISSILE	39–43	48–54	53–64

[a] The H-class and G-I class carry three missile tubes each; and the Z-Conversion class, two; we believe that the G-II class will also carry three missiles.

[b] Equipped with the 700 n.m. SS-N-5 submerged-launch missile. The earlier classes carry the 350 mile surface-launched SS-N-4.

[c] Numbers of launchers carried by these classes varies as follows: E-I, 6; E-II, 8; J-class, 4; W-Conversion, 1-4.

A. Ballistic Missile Submarines

51. We estimated in NIE 11-8-64, that a new class of large ballistic missile submarines was in production. We based this estimate on evidence which, upon subsequent analysis, appear to relate to existing classes. Nevertheless, we think that the Soviets will probably produce a new class of ballistic missile submarine. There is no direct evidence of such a program, but Soviet statements of interest in naval strategic strike forces, plus the particular advantages of these forces, point in this direction. Such a program may have started during the readjustments of Soviet military forces which took place after the Cuban missile crisis; if so, the first unit could become operational during 1968. The

class will almost certainly be nuclear powered. It will probably carry more missiles than are carried by current classes, perhaps 6-12, and these will probably be of an improved type. [redacted]

52. *Missile Systems.* All three ballistic missile submarine classes originally carried the 350 n.m. SS-N-4 missile system. A slow-paced program is now converting the H-class to the SS-N-5, which has the advantages of longer range (700 n.m.) and submerged launch. Some G-class submarines may be similarly converted; the Soviets have done extensive work on the superstructure of several of these units.

53. New ballistic missiles may be under development. A naval missile, which we designate Serb, was paraded in late 1964 and mid-1965. The external configuration of the Serb indicates that it could be either a single stage liquid or two-stage solid vehicle. If the former, it may be the SS-N-5, a single-stage 700 n.m. missile using liquid propellants. A high Soviet naval officer recently claimed that they have another missile, newer than the Serb. This new missile allegedly employs solid propellants, is capable of underwater launch, and has a range in excess of 1,000 kilometers (540 n.m.). To date, however, we have not seen evidence that such a missile is being tested.

54. We think it probable that a new ballistic missile employing solid or improved liquid propellants and having a range of about 1,000 nautical miles, will come into service in two or three years. By 1975 the Soviets may have available a solid propellant missile with a range of about 2,000 nautical miles. In any event, we believe that many of the presently operational ballistic missiles will be phased out over the next ten years.

B. Cruise Missile Submarines

55. The Soviet cruise missile submarine fleet was initially designed to counter naval task forces, particularly carrier forces. As the number of cruise missile submarines increases, however, their mission will probably expand, and the submarines may be targeted against land targets. We believe that cruise missile submarines are now being built at four of the five Soviet submarine construction yards, and 8-11 units are being delivered each year. Of these, four or five are nuclear-powered E-II submarines, and 4-6 are J-class diesel powered units. For the next few years the Soviets will probably continue to build both the E- and J-classes, but J-class production will probably end by 1968 or 1969. E-class production apparently is to be reduced after 1965; late this year, production of this class will probably end at one of the two yards now building it.

56. Soviet force level goals for their cruise missile fleet will be determined in part by future developments in both US and Soviet weapons systems. The Soviets may continue to expand this fleet in order to complicate defensive

measures with diversified strategic capabilities. In this case, construction of cruise missile submarines would probably continue for the next 10 years, and might include a follow-on for the E-II class. On the other hand, the Soviets may decide to restrict cruise missile submarines to tactical missions. If so, they may now be approaching planned force levels, and cruise missile submarine construction would probably be phased out by 1970.

57. *Missile Systems.* Most, and perhaps all, Soviet cruise missile submarines now carry the 300 n.m. SS-N-3A missile, which entered service in 1961. This low-altitude missile has active radar homing guidance, possibly supplemented by an infrared system for use against naval targets. If used against shore targets, the missile would probably employ an inertial guidance system. We believe that a longer range version of this missile, the 450 n.m. SS-N-3B will enter service in the next year or two. We also believe that the Soviets, during the period of this estimate, will develop new types of cruise missiles having higher speeds, longer ranges, and better protection against countermeasures.

C. Operational Capabilities

58. During the past 18 months, the Soviets have greatly stepped up ballistic missile submarine operations and have begun to send these units regularly into the north central Atlantic and the north central Pacific. These submarines are not deployed on strike stations, that is, within missile range of potential targets, but generally patrol within two or three days steaming time of important target areas. We estimate that this patrol activity will slowly but steadily increase, and that some 25 percent of the Soviet ballistic missile submarine force will consistently be on station by 1975.

59. We have not identified any significant changes in the operational characteristics of Soviet missile submarines during the past year. We believe that the Soviets are presently concentrating on improving the reliability of existing components and subsystems. For example, they appear to have gained considerable confidence in the reliability of their nuclear-powered submarines and now send them on frequent long patrols and on under-ice operations. In contrast, as recently as two years ago these submarines rarely left local waters and then only when accompanied by supporting surface ships.

60. Present Soviet nuclear submarines can probably develop submerged speeds of about 20 knots, and with improvements in existing propulsion systems may reach speeds of about 25 knots within the next few years. By 1975, the newest Soviet submarines may be capable of reaching 30 knots.

61. The radiated noise levels of existing Soviet nuclear submarines appear higher than those of early US nuclear submarines. These levels can be reduced, but we have insufficient evidence to determine the extent to which noise reduction techniques have been applied to existing operational Soviet submarines.

Incremental improvements could be made at any time; however, an effective noise reduction program for existing submarines would probably require extensive modification of the engineering plant. We do not believe that a new, significantly quieter Soviet submarine could appear before 1968.

62. The diving capabilities of existing Soviet missile submarines range from 675 feet (normal operating limit) for the converted W-class to an estimated 1,000 feet for the E-II. With present materials and technology, the Soviets should soon be able to achieve normal operating depths of about 1,300 feet. The Soviets are studying the feasibility of very deep diving submarines; Soviet publications continue to report the progress of a research submarine capable of operating at 6,500 feet which is scheduled to carry out test dives in 1965. In 1970-1975 they may develop a military submarine capable of operating from two to three times deeper than present units.

63. We have little evidence on which to base an estimate as to whether the Soviets still rely mainly on celestial and bottom contour methods of navigation. There is evidence, however, of Soviet interest in Loran C equipment. Several under-ice cruises by nuclear submarines suggest the existence of an advanced navigation system, perhaps inertial. New navigation systems will probably be in service within the next few years; these might include a VLF system, an earth satellite system, or an inertial system.

64. *Support.* The Soviets have made strong efforts during the past two year to improve logistics support for their submarine forces. New types of auxiliaries have been built, new bases established, and existing bases have been expanded and hardened by building bunkers and underground storage. Training facilities and devices have also been improved. We believe that the submarine base structure is nearly complete, although the Soviets will probably establish a few more small dispersal bases or sites. They will, however, continue to expand their fleet of submarine auxiliaries, constructing several large, modern submarine tenders and special purpose ships.

D. Future Force Levels

65. The present rate of submarine construction will probably not change greatly over the next 10 years. The nature of the construction programs, however, will change considerably. It is likely that the oldest classes of both cruise and ballistic missile submarines, both of which are conversions, will be scrapped or placed in reserve by 1975. We estimate that by mid-1970 some 50 ballistic missile submarines, including perhaps seven of a new class, will be in service. By mid-1975 some 60 ballistic missile submarines including about 20 of a new class will probably be operational. If, as we believe, cruise missile submarine construction will be curtailed, we estimate that about 60 of these submarines will be in service in mid-1970. Construction may stop altogether at that time. On the other hand, the Soviets may see a strategic attack role for this type, in

which case construction would probably continue throughout the period of the estimate, and about 70 of these submarines, possibly including a new type, would be in service by mid-1975.

V. LONG RANGE BOMBER FORCES [17]

66. During the past year there has been no major change in the capabilities and structure of Soviet Long Range Aviation (LRA). The bomber force still constitutes a significant portion of the USSR's capability for intercontinental strategic attack, but Soviet LRA, by reason of its equipment, basing, and deployment, is in general much better suited for Eurasian operations. Long Range Aviation now consists of some 200 heavy bombers and 800 mediums, some of which are utilized as tankers.[18]

A. Recent Developments in Long Range Aviation

67. In general, LRA flight activity during the past year has continued to reflect training for the primary missions of intercontinental attack by the heavy bombers and peripheral attack by the medium bombers.[19] . Longe Range Aviation has long had a secondary mission of supporting naval operations. Since 1962, this mission has received more emphasis. Maritime operations by medium and heavy bombers of LRA have been conducted both independently and in cooperation with Naval Aviation. Naval Aviation has now acquired a few Bear reconnaissance aircraft, and there are indications that it will acquire some more. The extent of LRAs involvement in maritime operations may gradually diminish as Naval Aviation acquires more long-range aircraft.

68. The heavy bomber force contains about equal numbers of Bear turboprops and Bison jets. A modification program for the Bear has produced several variants. The Bear A is a bomber, not equipped for aerial refueling. The Bear B is modified to carry the 350 n.m. Kangaroo (AS-3) missile; some of this type are equipped for aerial refueling. The Bear C is a missile carrier which is equipped both for aerial refueling and reconnaissance. The current operational force contains about 40 Bear As and about 70-80 of the B and C variants. The Bears assigned to Naval Aviation appear to represent still another variant, Bear D, which is configured for reconnaissance missions and does not retain a weapons delivery capability. There is firm evidence that Bear production extended into 1962, and there has been considerable activity since then at the

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[17] The Assistant Chief of Staff, Intelligence, USAF, generally dissents to this section because he considers that it minimizes the present and future capabilities of Soviet Long Range Aviation and seriously underestimates the manned aircraft threat to the continental United States in the event of war.

[18] For characteristics of air-to-surface missiles and bomber aircraft of Long Range Aviation, see tables 4 and 5.

[19] The Assistant Chief of Staff, Intelligence, USAF, believes that the intelligence available on training indicates continued Soviet interest in intercontinental use of the medium bomber.

Bear production facility. At least part of this activity is accounted for by the Bear modification programs, but a gradual rise in the number of Bears identified in operational units suggests that production may have continued at a low rate.

69. Introduction of the Blinder, a new medium bomber with supersonic dash, has proceeded slowly. Deliveries may have been interrupted by technical difficulties. Whatever the reason, however, only 70-80 are now in the LRA inventory after three years of production, and these are concentrated in a few regiments. We have no evidence that the Blinder B, which was designed to carry the Kitchen (AS-4) air-to-surface missile, has as yet appeared in operational units, but we believe that it will enter service within the next year or so.

B. Force Levels and Future Trends

70. We believe that the Soviets will maintain their heavy bomber force at about the present level over the next two years. Blinder deliveries will probably be stepped up, but not sufficiently to offset the continued phase-out of Badgers. Our estimate of the composition of Soviet LRA over the next two years is shown below.

STRENGTH OF SOVIET LONG RANGE AVIATION[a][b]

	1 October 1965	Mid-1966	Mid-1967
Heavy Bombers & Tankers			
Bison	95–100	85–100	80–95
Bear	110–120	110–120	105–120
Subtotal	205–220	195–220	185–215
Medium Bombers & Tankers			
Badger	700–740	550–670	400–525
Blinder	70–80	100–150	140–200
Subtotal	770–820	650–820	540–725
TOTAL	975–1,040	845–1,040	725–940

[a] In addition to the bombers of LRA, we believe that there are 5 Bears, more than 400 Badgers, and about 50 Blinders in Naval Aviation.

[b] The Assistant Chief of Staff, Intelligence, USAF, estimates that LRA force composition for the next two years will reflect the high side of the heavy bomber and tanker position and will reflect retention of 650-725 Badgers in mid-1966 and 575-675 in mid-1967. He therefore estimates the total bomber force as 950-1,100 for both mid-1966 and mid-1967.

71. It is evident that, in building their strategic attack forces, the Soviets are placing chief reliance on ballistic missiles. Nevertheless, the introduction of Blinder indicates that they still see a requirement for manned aircraft in Eurasian operations, although it is certainly a much smaller requirement than they envisioned for the Badger. They will probably attempt to preserve and extend the life span of the present force of heavy bombers, but we do not believe that

they will replace them. Thus we believe that the Soviets intend to retain sizable bomber forces which will decrease gradually through attrition and retirement.[20]

72. *New Aircraft Development.* There is no evidence which identifies specific Soviet development effort toward a follow-on heavy bomber. Current Soviet work in large aircraft seems directed primarily toward the development of new transports. This work advances the state-of-the-art and provides a technological and production base which could apply to bomber development. If the USSR has actively pursued R and D and committed funds for production and deployment, a new heavy bomber could enter service in the 1968-1970 period. On the basis of previous experience, we believe that US intelligence would obtain indications of the development and production of such an aircraft one to three years before its introduction into operational units.

73. Considering the probable growth of Soviet ballistic missile capabilities over the next 10 years, we consider it unlikely that the USSR will introduce a follow-on heavy bomber into Long Range Aviation during the period of this estimate.[21] It is possible, however, that Soviet views on the primacy of missile weapons will change. For example, US deployment of an ABM system might lead them back to the manned bomber as a means of penetrating the new defenses.

74. The requirement which led to the Blinder may lead the Soviets to develop a follow-on aircraft to perform specialized missions in peripheral areas, such as reconnaissance and antiship operations with air-to-surface missiles. In the 1970-1975 time period, the Soviets could introduce a new supersonic-dash medium bomber with better range and altitude than Blinder, or possibly a supersonic cruise bomber of somewhat shorter range than Blinder. In any case, the Soviets' decision to develop a new bomber for LRA or naval use will depend in part upon their experience with Blinder. We have no evidence that such an aircraft is now under development.

75. *Force Levels to 1975.* We estimate that the heavy bomber force will be gradually reduced by about one-fourth over the next five years. From 1970-1975, the aging force will decline more rapidly. We believe that at the end of this period the Bear component will have been reduced to about 50 aircraft. The Bison bombers will probably all be phased out, but a number

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[20] The Assistant Chief of Staff, Intelligence, USAF, would delete the last two sentences and substitute the following:

"A follow-on medium bomber probably will be introduced. The Soviets will probably attempt to preserve and extend the life span of the present force of heavy bombers, and we believe a follow-on heavy bomber is likely to be introduced to maintain the size of the force as well as improve its capabilities. Thus we believe that the Soviets intend to retain sizable bomber forces throughout the period of this estimate."

[21] The Assistant Chief of Staff, Intelligence, USAF, believes it is likely that the Soviets will introduce a new heavy bomber in the 1968-1970 period.

of Bison tankers will probably be retained. The reduction of the heavy bomber force may be more rapid than we have estimated, possibly as the result of transfers to Naval Aviation, or even a decision to cut the force. For at least the next several years, however, the Soviets will probably continue their efforts to extend the life of the heavy bombers now in service.[22]

76. The Badger force will probably continue to decline more rapidly than the heavy bomber force. By 1970, it will probably number 100-250 aircraft, and by 1975, some 50-150. The number of Blinders will probably increase to about 200-300 by 1970, and then remain relatively constant through 1975. Thus, we estimate that in mid-1975, the Soviets will have a medium bomber force of some 250-500, possibly including some aircraft of a new type.[23]

C. Operational Capabilities

77. Our evidence has reflected continuing Soviet efforts to maintain an efficient and well-organized strategic air force. Crew training and maintenance, while not up to US standards, appear adequate. Bombing proficiency and use of ECM have received particular emphasis. Heavy bombers have probably engaged in low altitude penetration practice. The bulk of the force is based at 28 permanent airfields, some of which are now being improved probably to accommodate the Blinder; a few aircraft are permanently based at two Arctic airfields. There is no evidence that LRA units are routinely on airborne or constant alert status.

78. The force has formidable capabilities for operations in peripheral areas. Its capabilities for intercontinental attack, however, have remained limited primarily by the range of the jet bombers which make up the bulk of the force.[24] Aerial refueling and Arctic training in the past several years have reflected Soviet efforts to overcome this limitation. The USSR has not developed aircraft specifically for tanker use; instead, Bisons and Badgers are converted for use as tankers. In-flight refueling and proficiency is probably

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[22] The Assistant Chief of Staff, Intelligence, USAF, believes the Soviets will continue to emphasize improvement of their manned strategic bomber capability as an important adjunct to their ICBM force. He estimates the heavy bomber force will be maintained close to its present strength by a combination of efforts to extend the life of bombers now in service and the introduction of a follow-on bomber.

[23] The Assistant Chief of Staff, Intelligence, USAF, does not believe the medium bomber force will decline at the rate indicated by this paragraph. He estimates the future medium bomber strength as follows:

	Mid-1970	Mid-1975
BADGER	350–450	0
BLINDER	250–350	150–300
FOLLOW-ON	50	300
TOTAL	650–850	450–600

[24] See Maps depicting range capabilities of LRA bombers against North America.

fairly high in those heavy bomber regiments where it has been regularly practiced.

79. Long Range Aviation has gained extensive flying experience in the Arctic region. Its capabilities, however, are limited by an Arctic base structure which must be supplied almost entirely by sea during the short navigation season. The Soviets have not yet demonstrated a logistics support capability to stage a large force (several hundred bombers) quickly through the region.

80. LRA activity in the Arctic has centered around four or five bases which appear adequate in terms of POL storage, navigational aids, and minor maintenance facilities to support heavy and medium bomber operations on a year-round basis. To stage a large bomber force in an initial intercontinental attack, the Soviets would have to use other Arctic airfields as well. There are about 28 Arctic airfields with runways long enough for LRA bombers. Some of these have natural surface runways usable only in winter; some are already occupied by other services; and most, except those so occupied, have little POL storage or servicing facilities. We believe that the Soviets would have great difficulty in using these airfields as staging bases, although they could be used for recovery operations as indicated by recent training activity.[25]

81. Training patterns and range capabilities of Soviet bombers indicate that aircraft attack against the US (except Alaska) would involve heavy bombers almost exclusively.[26] We estimate that the Soviets would commit virtually their entire heavy bomber force to this mission as weapons carriers and tankers. A few of these aircraft might be diverted to maritime missions. Considering the requirements for Arctic staging and refueling as well as non-combat attrition factors, we estimate that at present the Soviets could put somewhat over 100 heavy bombers over target areas in the US on two-way missions.

82. We do not believe that medium bombers now figure prominently in Soviet plans for an initial attack on North America. A few squadrons of Badgers would probably be employed in attacks on Alaska, Canada, Greenland, and Iceland. When the Soviets have acquired some operational experience with the Blinder, it might be used against Alaska and other targets within its range capabilities. The success of any attempt to use Badgers in attacking the US would depend primarily upon logistics. We do not believe that the Arctic stag-

[25] The Assistant Chief of Staff, Intelligence, USAF, recognizes the difficulties of staging through Soviet Arctic bases, but he believes that available facilities are sufficient to enable the Soviets to launch enough bombers and tankers to put more than 400 bombers over the continental US.

[26] For the view of the Assistant Chief of Staff, Intelligence, USAF, see his footnote, page 28, para. 82.

ing bases could simultaneously support heavy bomber and medium bomber strikes of major proportions.[27]

VI. SPACE WEAPONS

83. The Soviets are almost certainly investigating the feasibility of space weapons, but we have no evidence that they now have programs under way for the development of such weapons. Soviet published statements and writings on the subject deal almost entirely with US programs, and, attributing aggressive designs to the US, hint that the USSR cannot safely ignore such developments. In recent months there have been a number of allusions to "orbital rockets," which may be intended to indicate that the USSR has an orbital bombardment system. This claim was probably advanced for propaganda purposes, since we do not believe that the USSR now has such a system, and there is no evidence that the Soviet leadership intends to develop one.

84. The Soviets have, of course, long had the capability to orbit a nuclear-armed satellite. Since 1960, they have launched and de-orbited an increasing number of satellites in the 10,000-15,000 pound classes using the SS-6 booster with suitable upper stages; such spacecraft could de-orbit a weapon payload of some 6,000-8,000 pounds. With the launching of Proton I in July 1965 they orbited a 27,000 pound spacecraft which could carry a weapon payload of about 19,000 pounds. But while the Soviets could orbit such a satellite at any time, we consider it unlikely that they will do so. Such a weapon would have limited military effectiveness. Moreover, the Soviet leadership would probably recognize that this would be an act of major international import which would greatly intensify East-West hostility and give a strong new stimulus to US military programs.

85. We believe that the attainment of reliability and accuracy, particularly for out-of-orbit detonation near the earth's surface, would require a series of flight tests extending over at least a year after an initial launching. After such testing, the USSR probably could deploy a small number of bombardment satellites with CEP's on the order of 5-10 n.m. against targets located up to several hundred nautical miles from its earth track and with orbital life-times ranging up to several months. For an orbital bombing system of military significance, there is a wide range of delivery techniques and types of orbital bombardment

[27] The Assistant Chief of Staff, Intelligence, USAF, considers the majority assessment seriously underestimates the manned aircraft threat to the continental US. In the event war should eventuate and the USSR attacks the US with nuclear weapons, he believes this will be an all-out effort aimed at putting a maximum number of weapons on US targets. In any such attack, he believes that the Soviets would augment their ICBM force with strategic bombers. Considering all factors except combat attrition, the Soviets could, by using Arctic bases put about 300 bombers over North America on two-way missions. If the USSR were to employ Badgers extensively on one-way missions as part of the attack, the number of bombers reaching the US could exceed 400.

forces which might be sought by the Soviets, with considerable differences in developmental requirements, costs, and effectiveness. To provide a threat of retaliation against population centers, they might consider a relatively small force of limited effectiveness composed of some 10-25 weapons in orbit. For large-scale use against smaller or harder military targets, however, a much larger, sophisticated force with short times to target, near-simultaneity of delivery, and an accuracy approaching that of ICBMs would be necessary. Even the lesser of these forces would be extremely complex and expensive, and would require a major Soviet effort to perfect new hardware and to develop advanced techniques. In any case, developmental testing of an orbital bombardment system should be observable to us at least a year or two prior to attainment of an accurate, reliable system.

86. For the foreseeable future, we think that offensive orbital weapons will not compare favorably with ICBMs in terms of effectiveness, reaction time, targeting flexibility, vulnerability, average life, and positive control. In view of these factors, the much greater cost of such orbital weapons, and Soviet endorsement of the UN resolution against nuclear weapons in space, we believe that the Soviets are unlikely to deploy an offensive orbital weapon system within the next five to ten years. Even without any special efforts, however, Soviet technology applicable to this field will improve in the normal course of continued development of nuclear technology, and space projects. We recognize that the Soviets might reach different conclusions as to cost and effectiveness, and that altered political considerations in some future phase of East-West relations might lead them to a different decision. Even in these circumstances, we belive that they would regard space weapons primarily as a means of supplementing existing forces, of introducing additional complications into US defense planning, and of supporting Soviet claims to strategic parity or even superiority.

87. The USSR has orbited reconnaissance and communications satellites and is probably developing other military support systems. Throughout the period of the estimate, new military space applications will be introduced as Soviet technology advances and as requirements for such systems are developed. We believe that they will experiment with a variety of space systems which could be used for military purposes, that they will employ those systems which can be economically and militarily justified, and that some military role for man in space may emerge by the end of the period, particularly as the ability to operate manned space stations grows.

VII. COMMAND AND SUPPORT ELEMENTS

A. Command and Control

88. Final authority over the Soviet strategic attack forces and nuclear weapons is exercised by the Presidium of the Central Committee of the CPSU; its decision would initiate any strategic strike action. We have no evidence that any

of the present leaders has succeeded to a position of sufficient authority within the party to fill the office of Supreme Commander-in-Chief, held by Khrushchev. Nevertheless, the functions that were vested in this office are of such vital national interest that no long delay could have been tolerated in continuing this instrument of control or developing substitute arrangements. It is certain that such arrangements would provide for the continuity of ultimate authority at the top level of the party and that they would insure a capability for quick decision in the event of emergency.

89. The chain of command from the political leadership to the strategic attack forces apparently proceeds through a central authority in the Ministry of Defense which coordinates the operations of the several elements of the strategic attack forces: Long Range Aviation (LRA), the Soviet Navy, and the Strategic Rocket Forces (SRF). The Soviet Navy and LRA have long had their own channels of command and control and their own communications; the SRF have developed channels and networks since 1960. In addition, the Ministry of Defense maintains a separate communications network throughout the country.

90. We believe that the central authorities in Moscow are developing a capability for access to the lower echelons of the strike components, both directly and through intermediate headquarters, in order to reduce reaction times and to exercise more direct control. We have no firm evidence of provisions to insure survival of the command structure, but we assume that such provisions have been made.

B. Communication

91. The communications systems available to the strategic attack forces are probably adequate for most purposes, but would be degraded in a nuclear environment. We believe that, in general land-lines and microwave systems are the primary means of communication. Secondary communications systems probably rely on high frequency (HF) transmission, which would be subject to radiation blackout, and in Siberia there are inadequate land lines. These communications weakenesses are being remedied. We believe that the Soviets are emphasizing very low frequency (VLF) radio transmitters, which retain high reliability under adverse conditions of propagation. Additional land lines including hardened cables are being built, land-line capabilities are being increased through multiplexing, and facilities are being hardened. It is probable that a reliable tropospheric scatter system will be constructed in the Arctic.

C. Long-Range Reconnaissance and Targeting

92. The considerable Soviet effort to pinpoint potential targets for strategic attack in the US and elsewhere has resulted in the acquisition of a target data base that is adequate for directing a strategic attack. The most important factor affecting Soviet targeting capabilities is the photographic reconnaissance

program, which started in 1962. It employs both search and high resolution cameras, and coverage appears adequate to have photographed all important US installations. The increased pace of this program suggests that the Soviets find it valuable in targeting and monitoring the status of US installations and in establishing an accurate geodetic base. The vehicles used are sufficiently large to carry other collection devices in addition to photographic equipment.

93. The satellite reconnaissance program and a high competence in geodetic mapping provide the USSR with an excellent targeting base. Soviet target location errors against US missile launch sites have almost certainly been reduced significantly over the past year as the result of their use of high resolution satellite photography. We estimate that, including geodetic uncertainties concerning the size, shape, and gravity anomalies of the earth, total Soviet targeting and geodetic error against US missile launch sites is on the order of 1,000-2,000 feet. With full realization of the potential of existing Soviet geodetic surveying programs employing earth satellites, the USSR will probably be able to reduce total targeting and geodetic error to 500-1,000 feet by 1970.

94. Continuous and up-to-date information on the location and movement of key Western forces is a high priority Soviet requirement. In peacetime, this requirement is met in large part by the extensive Soviet radio direction-finding effort, which permits location of Western communications circuits and the units employing them. The Soviet direction-finding effort could retain a high degree of effectiveness under wartime or alert conditions in the absence of strict Western communications security measures and electronic emissions control. We have no evidence as to Soviet plans for post-strike reconnaissance. Manned aircraft could be used against Eurasian targets, and photographic satellites against the US. The increasing use of electronic computers will greatly improve the assessment of fast-changing situations and should permit rapid re-targeting of strategic weapons.

D. Control of Nuclear Weapons

95. We believe that the Ministry of Defense maintains direct control over the storage and logistics systems for nuclear weapons. It would also implement high level decisions to release nuclear weapons to operational military units and to authorize the use of such weapons; the order to release and the authorization for use would probably be transmitted through separate channels. Nuclear weapons allocated to the LRA and the SRF are for the most part stored in operational storage facilities of the Ministry of Defense, which are part of the air base or of the missile launching complex. We have no information on the control of nuclear weapons in Soviet submarine missile forces, which probably have nuclear weapons on submarines at sea as well as in shore storage. An alert posture would require the Soviets to keep the bulk of their nuclear warheads allocated to SRF mated to the missiles. We have no evidence as to the method of control under such an alert posture, or of fail-safe procedures in general.

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ANNEX A

TABLES OF WEAPON SYSTEMS CHARACTERISTICS AND PERFORMANCE

GLOSSARY OF MISSILE TERMS

Initial Operational Capability (IOC)—Date the first operational unit is trained and equipped with a few missiles and launchers.

MAXIMUM OPERATIONAL RANGE (N.M.)

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

Surface-to-Surface Systems—Maximum range under operational conditions with warhead weight indicated. The maximum range figures disregard the effect of the earth's rotation.

ACCURACY

Circular Error Probability (CEP)—The radius of a circle centered on the extended target, within which 50 percent of the arriving missile warheads are expected to fall.

RE-ENTRY VEHICLES AND WARHEADS

Re-entry Vehicle—That part of a missile designed to re-enter the earth's atmosphere in the terminal portion of its trajectory. Re-entry vehicle weight includes that of the warhead, necessary shielding and structure, any penetration aids that may be present, and any other necessary or desired components.

Multiple Re-entry Vehicles—A payload package consisting of two or more re-entry vehicles. The individual re-entry vehicles are dispersed during the free flight or terminal portion of the trajectory in order to confuse enemy radars, aid penetration, and/or increase kill area.

Multiple Independent Re-entry Vehicle (MIR V)—A payload consisting of two or more RV's each of which is independently targeted.

Warhead Weight—The weight of the explosive device and its associated fuzing and firing mechanism.

RANGE CLASSES

Short Range Ballistic Missiles (SRBM)
Up to about 600 n.m.

Medium Range Ballistic Missiles (MRBM)
About 600 to 1,500 n.m.

Intermediate Range Ballistic Missile (IRBM)

About 1,500 to 3,000 n.m.

Intercontinental Ballistic Missiles (ICBM)

About 3,000 to 8,000 n.m.

Fractional-Orbital Weapon

Exceeds ICBM range by significant factor but re-enters short of full orbit. Practical limits are on the order of 15,000 to 18,000 n.m. (The term global rocket as used by the Soviets probably applies to this class of weapon.)

Orbital Weapon

A weapon system which achieves orbital velocity.

RELIABILITIES

Ready Missile Rate—The percentage of the operational missile force that will be available to immediately initiate launch preparation from a normal readiness condition. The ready missile rate may vary with international conditions and will probably be somewhat higher during periods of tension and strategic alert.

Overall Reliability—The percentage of the operational missile force that will successfully detonate in the target area. (Overall Reliability is the product of the Ready Missile Rate, Countdown Reliability and Inflight Reliability.)

Reaction Time—Time required to proceed from a readiness condition to launch.

Refire Time—Time required to launch a second missile from the same pad or launcher.

READINESS CONDITIONS

Soft Site Readiness Conditions

Condition 3—Launch crew in launch area and on alert. Re-entry vehicle and missile mated and checked but still in ready building. This is believed to be the normal readiness condition for soft site ICBMs.

Condition 2—Launch crew at launch station. Missile with re-entry vehicle erected on launch pad. Propellant facilities (liquid) in position, attached, and ready to start propellant loading. Initial guidance alignment and sub-systems checkout complete.

Condition 1—Launch crew at launch station. Propellant loading complete. All systems ready for final check and launch sequence.

Hard Site Readiness Conditions

Condition 3—N.A.

Condition 2—Launch crew on alert. Missile with re-entry vehicle mated in place in the silo, checked and ready for propellant loading (applies to cryogenic propellant missiles only). This is believed to be the normal readiness condition for cryogenic propellant missiles.

Condition 1—Launch crew at launch stations. Propellant loaded, all systems checked and ready for launch sequence. This is believed to be normal readiness condition for storable liquid and solid propellant missiles.

TABLE 1

SOVIET ICBM SYSTEMS

ESTIMATED CHARACTERISTICS AND PERFORMANCE

	SS-6	SS-7	SS-8	SS-9	SS-10 [1]	SS-11	SS-Small [2]	SS-Very Large [3]
IOC	1960	1962	1963	1965	late-1966	1966	late-1966 early-1967	1967
Max. Range (n.m.)	6,000	6,000	6,000	6,500	6,000	6,000	5,500	6,500
Guidance	Radio Inertial	Inertial	Radio Inertial	Radio Inertial [4]	Radio Inertial	Radio Inertial	Inertial or Radio Inertial	Radio Inertial
CEP (initial) (n.m.)	2.0	1.0–2.0	1.0	0.5–1.0	about 1.0	[redacted]	[redacted]	[redacted]
(improved CEP/ year)	....	1.0/1966	0.8/1967	0.5/1967	0.8/1967			
Re-entry Vehicle Weight (lbs)	7,000–9,000	3,000–4,000	2,500–4,000	9,000–11,000 [5]	4,000–8,000 [6]	[redacted]	[redacted]	[redacted]
Warhead Weight Capacity (lbs)	5,000–7,000	2,400–3,200	2,000–3,200	7,000–9,000	3,200–6.500			
Warhead Yield [7]	[redacted]							
Gross Lift-Off Weight (lbs)	about 500,000	about 350,000	about 165,000	about 440,000	about 275,000 [8]	[redacted]	[redacted]	[redacted]
Configuration	Parallel	Tandem, 2-stage	Tandem, 2-stage	Tandem, 2-stage	Tandem, 2-stage	Tandem, 2-stage	Tandem, 3-stage	Multi-stage
Propellant	Non-stor. liquid	Stor. liquid	Non-stor. liquid	Stor. liquid	Liquid	Stor. liquid	Solid	Non-stor. liquid
Ready Missile Rate [9]	80%	80% [9]	80% [9]	85%	85%	75%	....	70%
System Reliability [9]	70%	75%	75%	65%	65%	65%	....	55%

See footnotes at end of table.

TABLE 1 (*Continued*)

SOVIET ICBM SYSTEMS

ESTIMATED CHARACTERISTICS AND PERFORMANCE

	SS-6	SS-7		SS-8		SS-9	SS-10 [1]	SS-11	SS-Small [2]	SS-Very Large [3]
		Soft	Hard	Soft	Hard					
Reaction Time from Readiness Cond. 3 [10]	about 12 hrs	1–3 hrs	....	1–3 hrs	30–45 min	....	....	....	....	unknown
2	1–2 hrs	15–30 mins	5–15 mins	30–90 mins	5–10 mins	5–15 mins	5–15 mins	5–15 mins	5–15 mins	about 2 hrs
1	5–10 mins	3–5 mins	3–5 mins	5–10 mins	5–10 mins	3–5 mins	3–5 mins	3–5 mins	3–5 mins	about 15 mins
Hold Time Cond. 1 [11]	about 1 hr	hours	days	about 1 hour		days	days	days	Indef.	about 1 hr
Refire Time (soft sites) [12]	12–16 hrs	2–4 hrs	....	2–4 hrs	....	....	....	....	....	several days

[1] We doubt that the SS–10 system will be operationally deployed.

[2] A prototype of this missile, designated Savage, was displayed in Moscow in May 1965.

[3] This system was test flown in July 1965 as the space booster for Proton I. It has never been tested as an ICBM. If developed as such it could become operational by 1967.

[4] The SS–9 probably has an additional all-inertial capability with a CEP of 1.0–1.5 n.m.

[5] A heavier re-entry vehicle of some 13,000–15,000 lbs. has been tested with the SS–9. This re-entry vehicle could carry an 11,000 lb. warhead with a yield [redacted] to a range of about 4,700 n.m.

[6] Estimate based on limited data and therefore is tentative.

[7] Based on weapon types estimated to be in stockpile.

[8] These reliability rates may be too high since they may not sufficiently take into account the effect of Soviet operational methods and troop training which are at least as important as technical characteristics in determining system reliability. We have little basis for estimating these effects.

[9] May be slightly higher in hard sites.

[10] Readiness Condition 3 is believed to be the normal readiness condition for ICBMs deployed at soft sites and Condition 2 for hard sites.

[11] An unfavorable environment could seriously degrade these hold times. Because of the protection afforded a missile in a hardened site, it is given a longer hold time than its soft counterpart. We believe the cryogenic properties of non-storable propellants probably limit these missiles to a hold time of about one hour.

[12] Refire capabilities are applicable to soft sites only. Estimated refire times are based on the assumption that the launch site was designed specifically for an efficient refire capability and that no major refurbishment of ground support equipment or launch stand is necessary.

TABLE 2

SOVIET MRBM AND IRBM SYSTEMS
ESTIMATED CHARACTERISTICS AND PERFORMANCE [1]

		SS-4		SS-5	
IOC		Late 1958		Late 1961	
Max. Range (n.m.)		1,020		2,200	
Guidance		Inertial		Inertial	
CEP (n.m.)		1.25		1.0	
Warhead Weight (lbs.)		2,200		3,000-4,000	
Warhead Yield [2]		[redacted]		[redacted]	
Gross Lift Off Wt (lbs.)		88,000		about 200,000	
Configuration		Single Stage		Single Stage	
Propellant		Storable liquid		Storable liquid	
Ready Missile Rate [4]		80%		80%	
Overall Reliability [4]		75%		75%	
		Soft	Hard	Soft	Hard
Reaction time from [5]					
Readiness Cond.	3	1-3 hrs	...	1-3 hrs	...
	2	15-30 mins	5-15 mins	15-30 mins	5-15 mins
	1	5-15 mins	3-5 mins	5-15 mins	3-5 mins
Hold Time Cond.	1	Many hours/Days		Many hours/Days	
Refire Time (Soft Sites)		2-4 hrs		2-4 hrs	

[1] We believe that the Soviets are developing a follow-on solid-fueled missile of MRBM/IRBM range which could become operational in either a fixed or mobile mode as early as 1967. We have no firm basis for estimating characteristics for this system.

[2] Based on weapon types estimated to be in stockpile.

[3] That portion of the MRBM/IRBM force intended to support theater operations would probably be provided with lower yield warheads, including weapons of nominal yield.

[4] These reliability rates may be too high, since they may not sufficiently take into account the effect of Soviet operational concepts and troop training, which are at least as important as technical characteristics in determining system reliability. We have no good basis for estimating these effects.

[5] Readiness condition 3 is believed to be the normal readiness condition for MRBM/IRBMs deployed at soft sites and condition 2 for hard sites. These times are applicable only to operations at permanent fixed sites and might be appreciably longer when operating from alternate, field type sites.

TABLE 3

SOVIET SUBMARINE-LAUNCHED MISSILE SYSTEMS
ESTIMATED CHARACTERISTICS AND PERFORMANCE

	SS-N-3 [1]		SS-N-4	SS-N-5
	SS-N-3A Flight Profile	SS-N-3B Flight Profile		
IOC	1961	1966/1967	1960	1963
MAX. Range (n.m.)	300	450	350	700
Speed	Low Supersonic	Mach 1.6	N.A.	N.A.
Cruise Alt. (Ft.)	1,000–3,000	40,000 (1,000–3,000 terminal approach)	...	...
Minimum Range (n.m.)	10–20		120	225
Type and Propulsion	Cruise, turbojet [2]		Single-stage ballistic, storable liquid.	Single-stage ballistic, storable liquid
Guidance	Inertial [3] w/active radar terminal homing; against land targets: inertial		Inertial	Inertial
Warhead Weight	1,000–2,000 lbs.		1,500–2,500 nuclear	1,500–2,500 nuclear
Warhead Yield [4]	nuclear or HE			
Circular error, probable	150 ft. against ships 1–2 n.m. against land targets		1–2 n.m.	1–2 n.m.
Launch Condition	Surfaced		Surfaced	Submerged
Reliability on Launcher [5]	80%		80%	70–90%
Reliability in flight [5]	85%		80%	80%
Salvo time [6] missiles per submarine: (time) [7] [8]	W-Conv Class 1, 2, or 4 (2–9 min) J-Class: 4 (5 min) E-I-Class: 6 (10 min) E-II-Class: 8 (15 min)		Z-Conv Class: 2 (4 min) G-Class: 3 (8 min) H-Class: 3 (8 min)	G-Conv test platform: 2 (4 min) H-II-Class: 3 (8 min)
Employment	Ship targets primarily [8] land targets secondarily.		Land targets	Land targets
Reaction time (min) [9] (Includes min on surface before launch)	20–40 (5 min)		20–40 (3 min)	15–30 (none)

[1] From an aerodynamic consideration, it is possible that other flight profiles (altitude/range combinations) may exist for the same physically configured missile.

[2] A four second boost launch is provided by two solid propellant boosters that drop off after launch.

[3] It is possible that the SS-N-3B flight profile missile may accept a course correction from the launch platform while at its 40,000 feet cruise altitude. There is some possibility that the SS-N-3 terminal homing system may involve an additional infrared homing device as a back-up system.

[4] Based on estimated weapon types in stockpile.

[5] Reliability rates may be high, since the effects on Soviet operational concepts and crew training standards are at least as important as technical characteristics in determination of system reliability. We have little reliable basis for estimating these effects.

[6] Salvo Time—The time from the launch of the first missile until all missiles are launched.

[7] The E-I and probably the E-II class SSBN's are capable of launching two cruise missiles simultaneously.

[8] The performance characteristics of the SS-N-3B indicate that it may have been designed for use against land targets and ship formations.

[9] Time required to proceed from a specified readiness condition to firing. For submarine launched missiles, time is taken to include the time from the moment of the order to fire to launch of the first missile, assuming: (a) the submarine is on alert, (b) targets have been selected, (c) the missile system includes continuous computation of firing data and (d) the missiles have been checked and are ready for countdown. For surface launched SLBM's submarine time on surface is included in reaction time; for underwater launched missiles submarine time to attain proper launch attitude is included. The actual reaction time of a cruise missile submarine against a target of opportunity would probably be somewhat longer than the time based on these assumptions.

TABLE 4

SOVIET LONG RANGE AVIATION AIR-TO-SURFACE MISSILE SYSTEMS
CHARACTERISTICS AND PERFORMANCE

	Kangaroo AS-3	Kitchen AS-4
IOC	1960-1961	1966
Max. Range (n.m.)	350	275 or 160 [2]
Guidance	Preprogrammed auto-pilot with command override, without terminal homing [1]	Inertial
Accuracy (CEP)		
Against Land Targets	1 to 3 n.m. [3]	1 to 2 n.m.
Warhead Weight (lbs)	5,000[ ]	2,200
Warhead Yield [4]	[ ]	[ ]
Speed (Mach No.)	1.5 to 2.0	5 at 90,000 or 3.5-4 at 80,000 [2 6]
Reliability [5]		
On Launcher	80%	80%
In Flight	70%	70%
Overall	55%	55%
Carrier Aircraft	BEAR B & C	BLINDER B
Number of Missiles	1	1
Launch Altitudes (ft.)	39,000	About 40,000
Launch Speed	420 Kts.	Subsonic

[1] With this guidance CEP against ships would be 5-10 n.m.; the inclusion of a seeker to provide a more effective anti-ship capability is technically feasible.

[2] The AS-4 has been under flight test since 1962. We are unable to determine whether the missile is a boost-glide or a boost cruise-vehicle. It is possible that two missiles have been tested, or that the tests have involved one missile with two modes of operation. The first figures in these entries are for a boost-glide vehicle against land targets and the second for a boost-cruise vehicle against ship targets.

[3] CEP increases with launch range. 3 n.m. assumes launch from a maximum range of 350 n.m.

[4] Based on estimated weapon types in stockpile.

[5] These reliability rates may be high because the effects of Soviet operational concepts and troop training standards are at least as important as technical characteristics in determination of system reliability. We have no reliable basis for estimating these effects.

[6] The terminal phase of the AS-4 flight profile would be at low supersonic speed.

TABLE 5

SOVIET STRATEGIC BOMBER WEAPON SYSTEMS
PERFORMANCE UNDER AN OPTIMUM MISSION PROFILE

(Calculated in accordance with US Mil-C-5011A Spec except that fuel reserves are reduced to permit a maximum of 30 minutes loiter at sea level, and aircraft operate at altitudes permitting maximum radius/range)

	BADGER A	BISON	BEAR [3]	BLINDER [3]
Gross Weight (lbs)	167,000	400,000	365,000	185,000
Empty Weight (lbs)	77,150	153,000	151,000	84,900
Combat Radius/Range (NM) [1]				
a. 25,000 lb. bombload		2800/5200	4150/7800	
one refuel		3950/7300		
b. 10,000 lb. bombload	1550/2950	3050/5950	4500/8800	1700/3250
one refuel	2200/4150	4150/7900		2350/4500
c. 6,600 lb. bombload	1650/3200			1800/3450
one refuel	2300/4400			2400/4650
d. 3,300 lb. bombload	1750/3400	3150/6150	4700/9300	1850/3650
one refuel	2400/4600	4250/8250		2500/4800
e. With ASM				
i. 1xAS-3 (BEAR B)			3950/7150	
one refuel (BEAR B)			5050/9200	
ii. 1xAS-4 (BLINDER B)				1500/2800
one refuel (BLINDER B)				2150/4000
f. With 6,600 lb. bombload (Supersonic Dash)				1300/2850
one refuel				1950/4100
With 3,300 lb bombload (Supersonic Dash)				1400/3050
one refuel				2050/4300
With 1xAS-4 (Supersonic Dash) (BLINDER B)				1000/2100
one refuel				1600/3300
Speed Altitude (kts/ft)				
a. Maximum speed at optimum altitude	540/22,000	540/18,800	500/25,000	975/36,000
b. Target speed/target altitude (Subsonic)	475/41,000	465/42,800	435/41,600	560/37,100
c. Target speed/target altitude (Supersonic)				860/46,300
d. Launch speed/launch altitude with ASM			430/39,000	860/42,500
Combat Ceiling (ft) [4]	44,800	46,100	40,300	52,700
System Accuracy (CEP)				
a. Bombing Accuracy [5]				
i. From 40,000 ft.	2,000 ft.	2,000 ft.	2,000 ft.	2,000 ft.
ii. From 20,000 ft.	1,200 ft.	1,200 ft.	1,200 ft.	1,200 ft.
b. ASM Accuracy				
i. AS-3			1-2NM vs. land targets	1-2NM vs. land targets

See footnotes at end of table.

TABLE 5 (*Continued*)

SOVIET STRATEGIC BOMBER WEAPON SYSTEMS
PERFORMANCE UNDER AN OPTIMUM MISSION PROFILE
(Calculated in accordance with US Mil-C-5011A Spec except that fuel reserves are reduced to permit a maximum of 30 minutes loiter at sea level, and aircraft operate at altitudes permitting maximum radius/range)

	BADGER A	BISON	BEAR [2]	BLINDER [3]
System Reliability (percent) [4]				
a. Aircraft reaching target areas in North America unrefueled/refueled [7]	73/69	73/69	73/77	73/69
b. ASM reliability on launcher/in flight/overall			80/70/56	80/70/56
c. Aircraft and ASM overall unrefueled/refueled			41/43	41/39

[1] 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 or 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 at optimum altitude will be decreased about 1.6 to 2 miles for every mile flown at sea level.

[2] BEAR A is a bomber. BEAR B and BEAR C are missile carriers equipped with one AS-3/KANGAROO missile. BEAR C has slightly reduced performance data from that of BEAR B due to different basic weight of aircraft.

[3] BLINDER A is a bomber. BLINDER B is a missile carrier equipped with one AS-4/KITCHEN missile; it is probably not yet operational. BLINDER aircraft missions are based on a Mach 1.5, 100 NM dash in and out of target area on radius mission and 100 NM dash in only on range mission. There is no direct evidence of an operational refuel capability for these aircraft at present.

[4] Associated combat load is 10,000 lbs for BISON and BEAR A: 6,600 lbs for BADGER A and BLINDER A; one AS-3 for BEAR B and C; and one AS-4 for BLINDER B.

[5] 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, which would be much less accurate.

[6] These reliability 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 system reliability, and we have no reliable basis for estimating these effects.

[7] Includes the following operational attrition rates, excluding combat attrition: (a) 90% of aircraft at home bases would be in commission after 5–10 day maintenance standdown prior to initial operations; (b) 90% of aircraft in commission at home bases would be launched from staging bases; (c) 90% of aircraft launched from staging bases or directly from home bases or unrefueled missions would arrive in target areas; (d) 85% of aircraft launched on refueled missions would arrive in target areas. Calculations for BEAR and ASM are based on refueled flights direct from home bases. All others assume arctic staging, and refueling of BADGER and BISON aircraft. It should be noted that without prior maintenance standdown, the in-commission rate of heavy bombers at home bases would be about 70% and for medium bombers about 60%.

TABLE 6

SOVIET MISSILE SUBMARINES
ESTIMATED CHARACTERISTICS AND PERFORMANCE

	DIMENSIONS			DEPTH		SPEED			ARMAMENT		PATROL CAPABILITIES [c] [d]			
	Length Beam (Feet)	Displacement (tons) Surfaced/ Submerged		Normal Operating Depth Limit (Feet) [a]	Collapse Depth (Feet)	Surfaced	Snorkel	Submerged Speed Endurance (N.M.)	Torpedoes [b]	Missiles	Days on Station	Radius (N.M.)	Patrol Duration (Days)	Endurance Factors
Ballistic Missile														
Nuclear Power SSBN														
"H-I"	365/32	5,400	6,200	800	1,270	Max 20	..	18-20/NA	20	3	20	5,300	60	Sea
						Cruise 12-14	..	12-14/NA			10	6,600		
											1	7,800		
"H-II"	390/32	5,700	6,600	800	1,270	Max 20	..	18-20/NA	20	3	20	5,300	60	Sea
						Cruise 12-14	..	12-14/NA			10	6,600		
											1	7,800		
Diesel Power SSB														
"G"	320/28	2,300	2,800	900	1,440	Max 18.0	10.5	16/12	24	3 [e]	20	4,400	60	Sea
						Cruise 8.3	6.0	4/200			10	4,700	53	Fuel
											1	4,850	46	Fuel
"Z-Conversion"	295/27	2,000	2,400	735	1,170	Max 18.4	7.0	15/15	24	2	20	4,300	60	Sea
						Cruise 8.5	7.0	2.5/125			10	5,450	60	Sea
											1	6,150	58	Fuel
Cruise Missile														
Nuclear Power SSGN														
"E-I"	385/30	4,900	5,900	845	1,350	Max 20	..	18-20/NA	20	6	20	5,300	60	Sea
						Cruise 12-14	..	12-14/NA			10	6,600		
											1	7,800		
"E-II"	400/30	5,200	6,200	1,000	1,600	Max 20	..	18-20/NA	20	8	20	5,300	60	Sea
						Cruise 12-14	..	12-14/NA			10	6,600		
											1	7,800		

TABLE 6 (*Continued*

	DIMENSIONS		DEPTH		SPEED			ARMAMENT		PATROL CAPABILITIES [c]			
	Length Beam (Feet)	Displacement (tons) Surfaced/ Submerged	Normal Operating Depth Limit (Feet) [a]	Collapse Depth (Feet)	Surfaced	Snorkel	Submerged Speed Endurance (N.M.)	Torpedoes [b]	Missiles	Days on Station	Radius (N.M.)	Patrol Duration (Days)	Endurance Factors
Cruise Missile (Continued)													
Diesel Power SSG													
"J"	280/33	2,700	3,500	900	1,440	....	..	....	..	4	..	....	60	Sea
"W-Conversion" (LONG BIN).	275/21	1,200	1,500	675	1,080	Max 18	5.8	12/12	10	4 [f]	20	1,700	40	Sea
						Cruise 10	5.5	2/100			10	2,550	40	Sea
											1	3,000	40	Sea
TWIN CYLINDER	250/21	1,100	1,400	675	1,080	Max 18.5	6.8	13.5/13.5	12	2 [f]	..	....	..	..
						Cruise 10	6.8	2/100	..	..	20	1,800	40	Sea
											10	2,600	39	Fuel
											1	3,000	34	Fuel

[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] Torpedo capacities are the maximum numbers which can be carried. A combination of torpedoes/mines could be carried.

[c] The time on station and radius (distance to station) have been computed on the basis of various operational factors, principally, those relating to "Sea endurance" and "Fuel endurance."

"Sea endurance" is defined as the total length of time that a submarine can remain at sea without replenishment under combat conditions and is estimated on the basis of personnel endurance, general habitability, food, spare parts, and consumables other than fuel. The "H-I", "H-II", "E-I", and "E-II" classes of nuclear propelled submarines are estimated to have a "Sea endurance" of 60 days. The "G" and "Z-conversion" classes of diesel powered submarines are estimated to have a "Sea endurance" of 60 days while the "W-conversion" classes are estimated to have a "Sea endurance" of 40 days.

"Fuel endurance" is defined as the total length of time that a submarine can remain on patrol under combat operational conditions without refueling. For diesel powered submarines, it is computed on the basis of fuel consumption resulting from an arbitrarily assumed average transit routine of 8 hours surface,8 hours snorkel, and 8 hours submerged operations daily; fuel consumption on station is computed on the basis of a few hours of snorkel operations daily, sufficient only to maintain the state of charge of the main storage battery for submerged operations daily, sufficient only to maintain the state of charge of the main storage battery for submerged operation the remainder of the day.

The endurance and maximum operating radius of nuclear powered submarines are limited by factors other than fuel. For the purposes of this table, it has been arbitrarily assumed that Soviet nuclear powered submarines would transit to station using the following criteria:

Speed of 7 kts in area where ASW opposition is anticipated (assumed to be about 1/5 of the time).

Speed of 13 kts in area where ASW opposition is not expected (about 3/5 of the transit time).

[d] Selected distances from Soviet ports:

From-To	Iceland	Iceland-UK Gap	Halifax	Bermuda or New York	Norfolk	Gibraltar	Panama
Kola Inlet	1,500	1,600	3,400	3,800	4,100	3,000	5,400
From-To	Seattle	Honolulu	Manila	Los Angeles	San Francisco	Singapore	Panama
Petropavlovsk	3,000	2,800	3,100	3,600	3,300	4,200	6,500
Vladivostok	4,300	3,800	1,900	4,900	4,600	3,000	7,800

[e] One unit of the "G" class has been modified to fire two missiles and is probably the test platform for the advanced SS-N-5 system; we believe that future conversions will carry three missiles.

[f] Three different conversions have been observed in "W-conversion" class cruise missile launching submarines, enabling 7 (LONG BIN) to carry 4 missiles each, 5 (TWIN CYLINDER) to carry 2 each, and 1 (SINGLE CYLINDER) to carry 1 missile.

ANNEX B

MAPS SHOWING RANGE CAPABILITIES OF SELECTED WEAPON SYSTEMS

MRBM/IRBM CAPABILITIES AGAINST THE NORTHERN HEMISPHERE

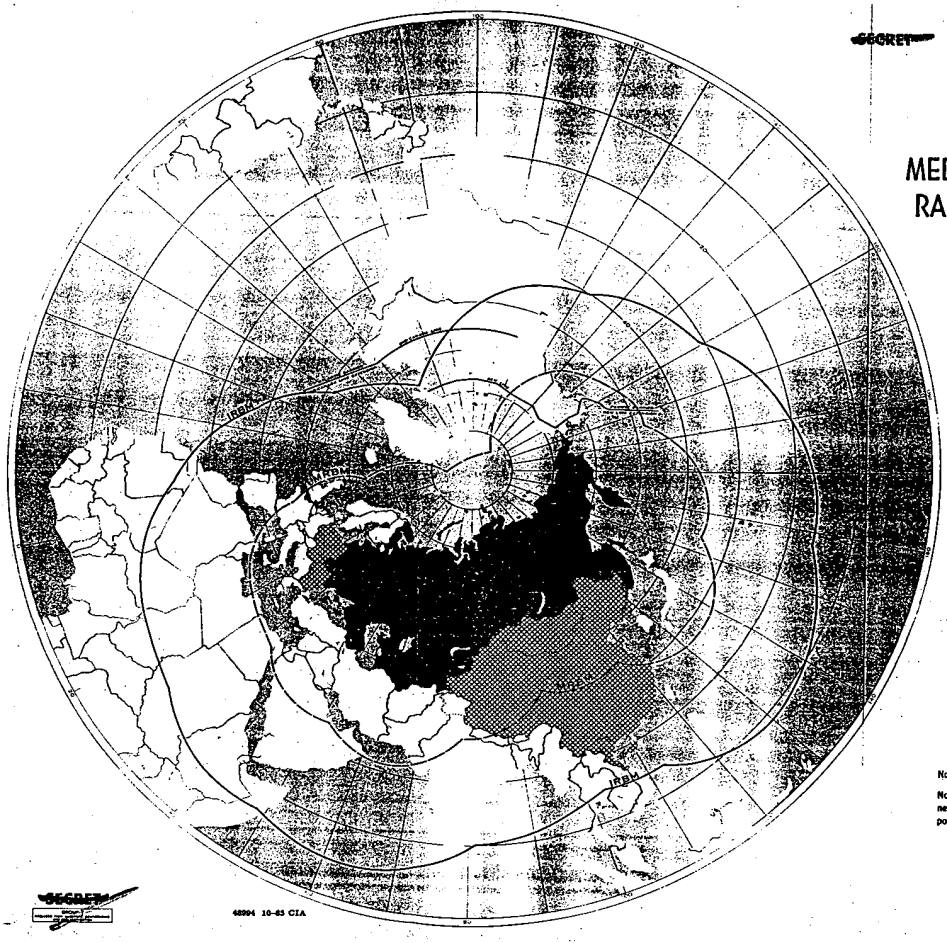
SUBMARINE-LAUNCHED MISSILE CAPABILITIES AGAINST THE US

RANGES OF BISON

RANGES OF BEAR

RANGES OF BADGER

RANGES OF BLINDER



Soviet Missile Capabilities
against Northern Hemisphere

MEDIUM AND INTERMEDIATE RANGE BALLISTIC MISSILES

—— 1020 NM MRBM

——— 2200 NM IRBM

Note 1: Range coverage takes into account the earth's rotation.

Note 2: MRBM and IRBM range lines are measured from points near all borders of the USSR, regardless of suitability of these points for deployment.

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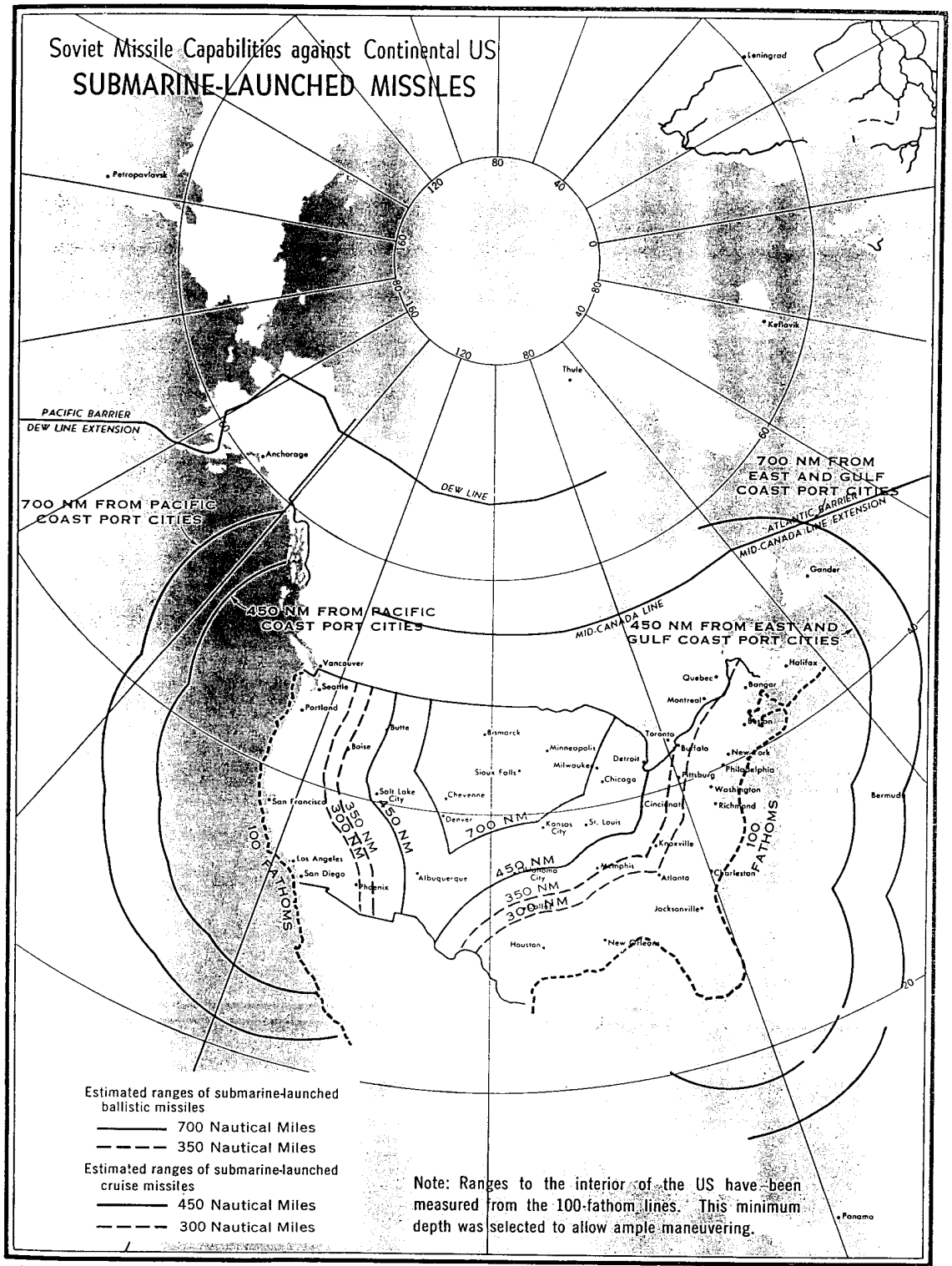

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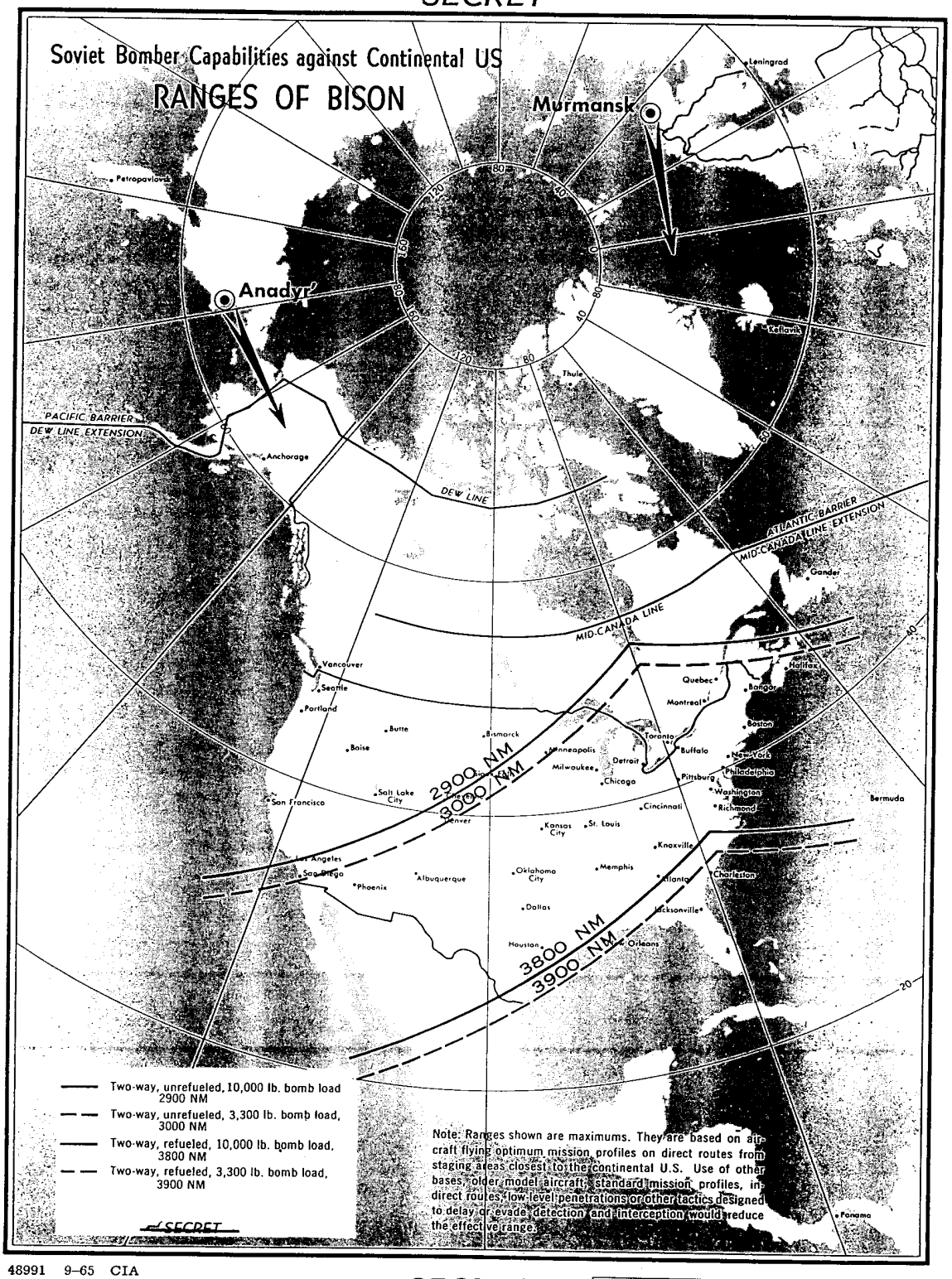

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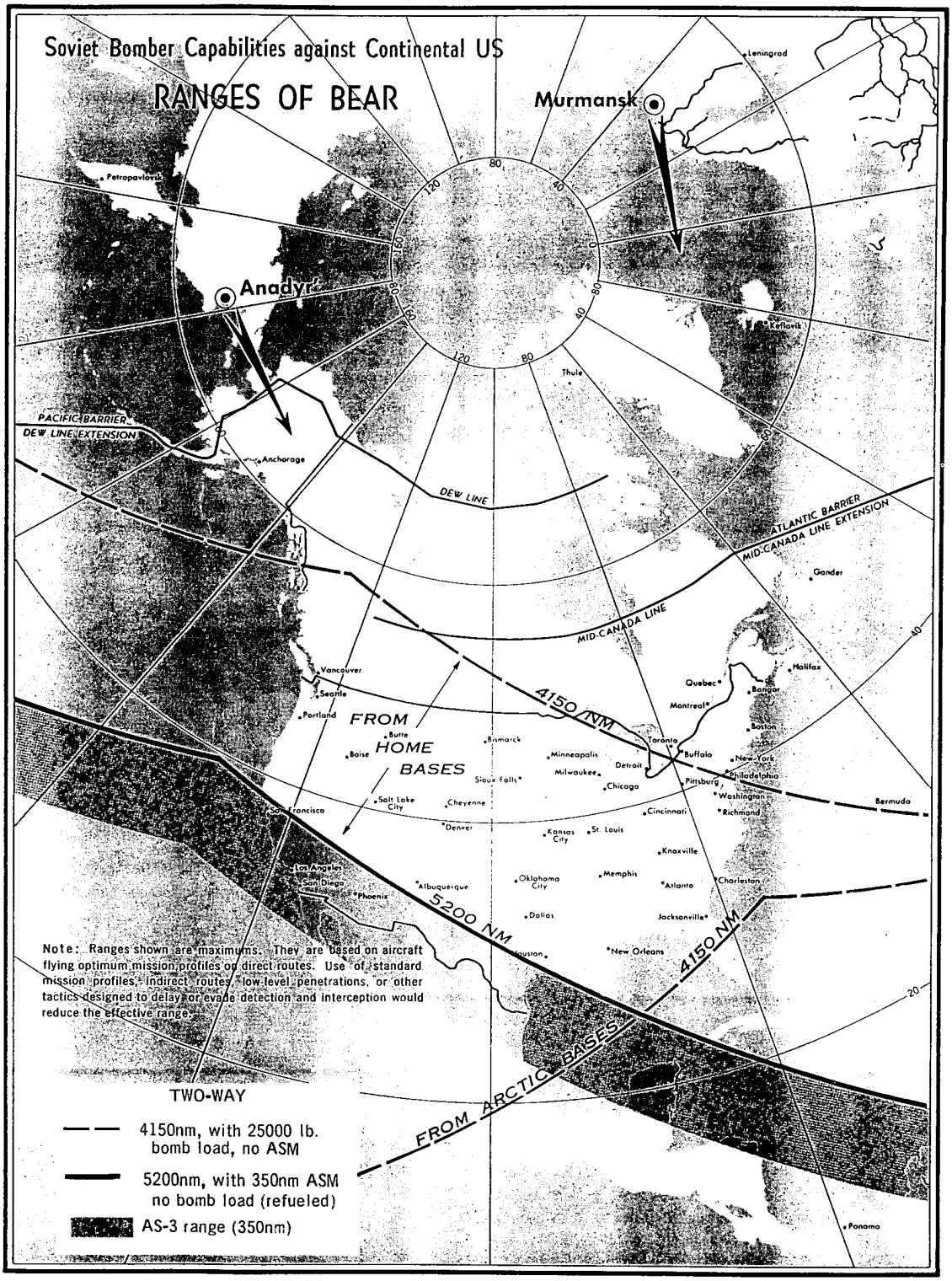

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GROUP 1
EXCLUDED FROM AUTOMATIC DOWNGRADING AND DECLASSIFICATION

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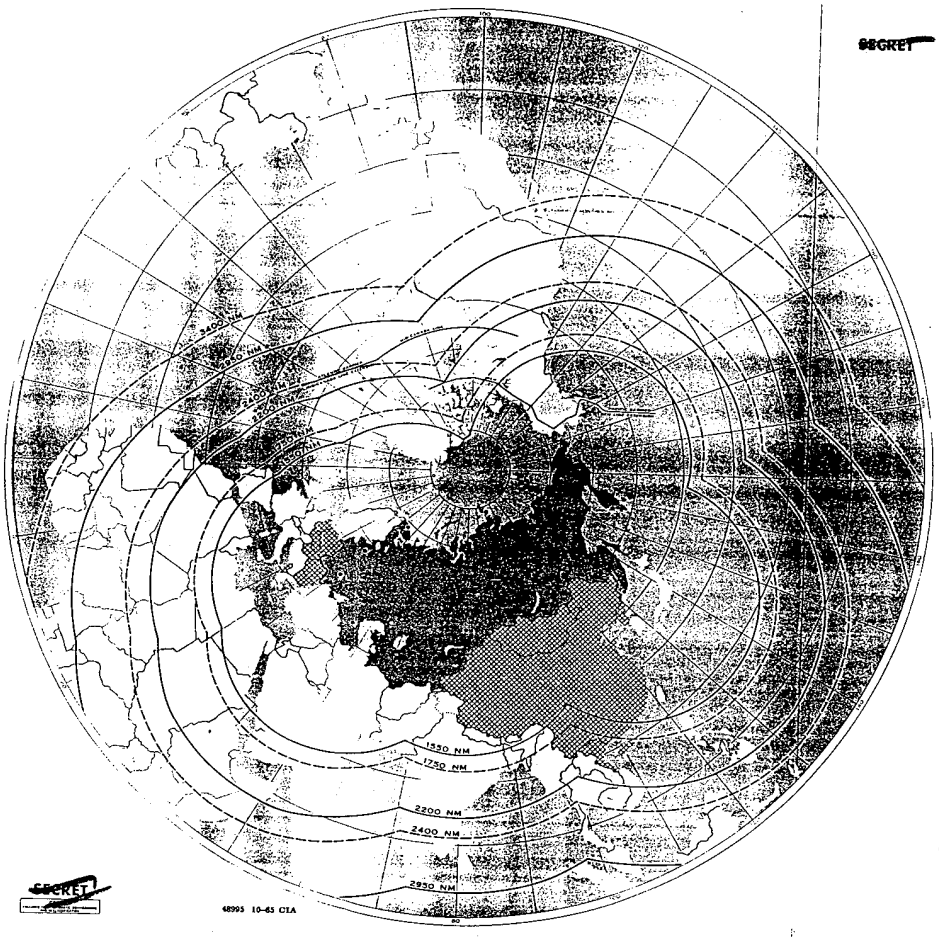

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Soviet Bomber Capabilities against Northern Hemisphere

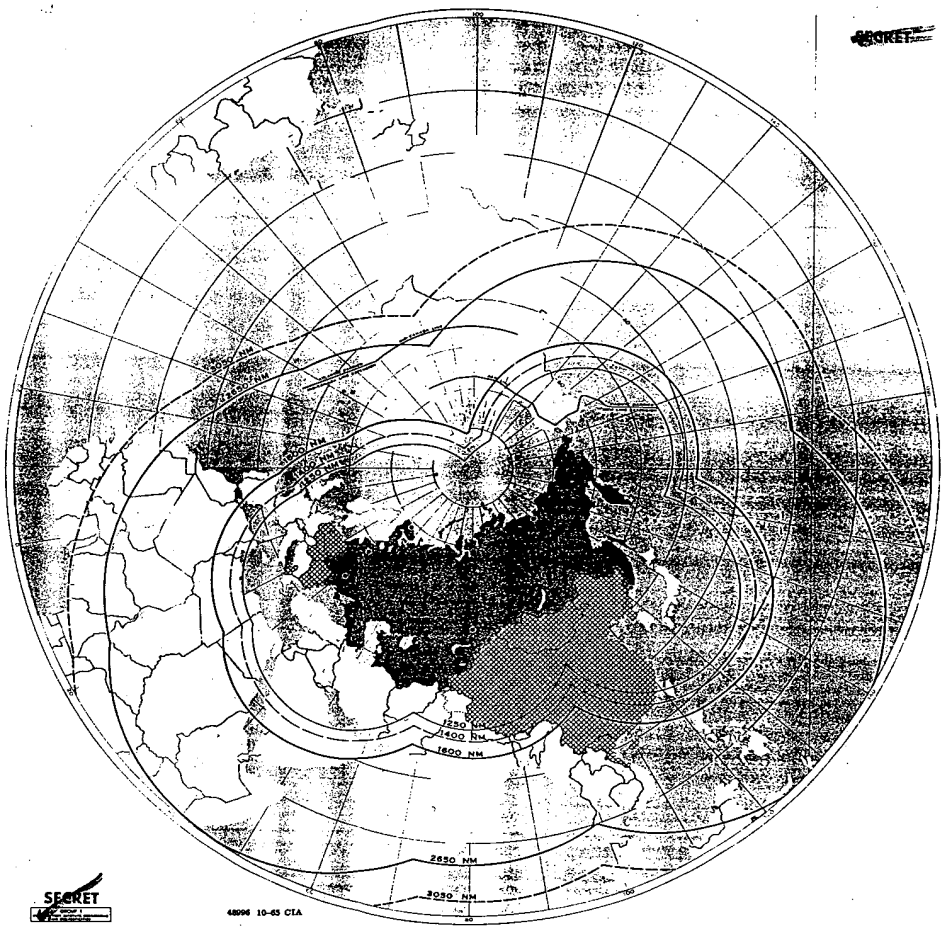
RANGES OF BADGER

Two-way unrefueled
- —— 10,000 lb. bomb load 1550 NM
- – – – 3,300 lb. bomb load 1750 NM

Two-way refueled
- —— 10,000 lb. bomb load 2200 NM
- – – – 3,300 lb. bomb load 2400 NM

One-way unrefueled
- —— 10,000 lb. bomb load 2950 NM
- – – – 3,300 lb. bomb load 3400 NM

Note: Ranges shown are based on aircraft flying optimum mission profiles on direct routes. Use of other profiles, indirect routes, low-level penetrations, or other tactics designed to delay or evade detection and interception would reduce the effective range.



Soviet Bomber Capabilities against Northern Hemisphere

RANGES OF BLINDER

BLINDER A
Two-way unrefueled
—— 10,000 lb. bomb load 1250 NM
— — 3,300 lb. bomb load 1400 NM
One-way unrefueled
—— 10,000 lb. bomb load 2650 NM
– – – 3,300 lb. bomb load 3050 NM

BLINDER B
Two-way refueled
—— With ASM 1600 NM

Note 1: We believe BLINDER was designed for a supersonic-dash mission. Therefore, ranges shown, based on aircraft flying optimum mission profiles on direct routes, include a 200 NM dash at Mach 1.5 in the target area. If BLINDER were flown subsonic all the way, combat radius would be increased by some 450-500 NM. On the other hand, the effective range would be reduced by use of other bases, older model aircraft, standard mission profiles, indirect routes, low-level penetrations, or other tactics designed to delay or evade detection and interception.

NOTE 2: BLINDER A is a bomber not known to be equipped for in-flight refueling. The other version, BLINDER B, is equipped for in-flight refueling and ASM delivery; this weapon system could become operational in 1965.

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