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SOVIET CAPABILITIES FOR LONG RANGE ATTACK

Submitted by the
DIRECTOR OF CENTRAL INTELLIGENCE

The following intelligence organizations participated in the preparation of this estimate: The Central Intelligence Agency and the intelligence organizations of the Departments of State, the Army, the Navy, the Air Force, and The Joint Staff.

Concurred in by the
UNITED STATES INTELLIGENCE BOARD

on 7 June 1961. Concurring were The Director of Intelligence and Research, Department of State; the Assistant Chief of Staff for Intelligence, Department of the Army; the Assistant Chief of Naval Operations (Intelligence), Department of the Navy; the Assistant Chief of Staff, Intelligence, USAF; the Director for Intelligence, Joint Staff; the Atomic Energy Commission Representative to the USIB; the Assistant to the Secretary of Defense, Special Operations; and the Director of the National Security Agency. The Assistant Director, Federal Bureau of Investigation, abstained, the subject being outside of his jurisdiction.*

*This estimate was approved by the USIB on 7 June 1961 subject to certain further action by USIB representatives, consulting as necessary with their respective principals (USIB-M-158, Item 8). This latter action was completed on 13 June 1961.

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SOVIET CAPABILITIES FOR LONG RANGE ATTACK

THE PROBLEM

To estimate probable trends in the strength and deployment of Soviet air and missile weapon systems suitable for long range attack, and in Soviet capabilities for such attack, projecting forward for about five years where possible.[1]

ASSUMPTION

For purposes of this estimate, it is assumed that during the period under consideration no US-Soviet agreement on arms control or system of mutual inspection will be in effect.

CONCLUSIONS

1. The Soviet leaders, particularly Khrushchev, have been deeply impressed by what they regard as a major improvement of their strategic position resulting from their achievements with long range missiles. Although they still hold that the Soviet military establishment must comprise a balance of varied forces, long range weapon systems are now being allotted an increased share of the Soviet military effort. Within the long range striking forces, ballistic missiles are clearly intended to become the dominant weapons. (*Paras. 10–12, 20–22*)

2. We have reviewed the direct and indirect evidence pertaining to the development and deployment of the Soviet ICBM system. We are still unable to confirm the location of any ICBM launching facilities other than those at the test range. We are able, however, to support on reasonably good evidence a minimum number of two to four operational ICBM site-complexes.[2][3] We also have tenuous evidence regarding a number of other suspected deployment locations. Moreover, we believe that the direct and indirect evidence supports the view that: (a) the USSR has been conducting a generally successful

[1] The weapon systems considered are heavy and medium bombers, related air-to-surface missiles, ground launched missiles with ranges of 700 n.m. or more, and submarine-launched missiles.

[2] The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, find the evidence supporting the existence of such sites tenuous rather than reasonably good insofar as ICBM-associated deployment activities are concerned.

[3] The Assistant Chief of Staff, Intelligence, USAF, believes there is reasonably good evidence to support the existence of 10–15 operational ICBM site-complexes.

ICBM program, at a deliberate rather than an extremely urgent pace; (b) the USSR is building toward a force of several hundred operational ICBM launchers, to be acquired within the next few years. (*Paras. 23–42*)

3. We estimate that the probable Soviet force level in mid-1961 is in the range of 50–100 operational ICBM launchers, together with the necessary operational missile inventories and trained crews. This would probably involve the present existence of 10 to 15 operational ICBM site-complexes. This estimate should be regarded as a general approximation. The major bases for it are our sense of the tempo of the program and our judgment as to the relationship between what we have detected and what we are likely to have missed. We estimate that the program will continue to be deliberately paced and will result in force levels about as follows: 100–200 operational launchers in mid-1962, 150–300 in mid-1963, and 200–400 in mid-1964. Some of the launchers activated in the 1963–1964 period will probably be for a new and improved ICBM system.[1] [2] [4] (*Paras. 42–46*)

4. Soviet force goals for the period beyond 1963–1964 will probably be affected significantly by such developments as US acquisition of numerous hardened and mobile missiles and other improved capabilities, by Soviet development of antimissile defenses, and also by intervening political developments. We are unable to predict what the Soviet judgment will be as to the responses appropriate to these developments. Indeed, it is likely that the Soviet leaders themselves have not yet come to a definite decision as to force goals for 1965–1966.[3] (*Paras. 36, 41, 47, 118*)

5. Medium range ballistic missiles (700 and 1,100 n.m.) are presently deployed in mobile units located at a few bases, convenient to areas of likely operations in Eurasia and its periphery, from which they would probably move to dispersed launch points in the event of hostilities. A force of about 250–300 medium range missiles ready for launching, together with additional missile reloads, will probably be available in the very near future. A 2,000 n.m. missile employing fixed launch sites will probably be deployed initially within the next year. Force levels will probably be

[1] The Director of Intelligence and Research, Department of State, does not concur in this estimate. He believes (a) that NIE 11–8–61 should include an estimate of the largest ICBM force which the USSR *could have* in mid-1961 and that such a force could be as large as 200 operational launchers, and (b) that the *probable* Soviet force level in mid-1961 is in the range of 75–125 operational launchers and will increase to 150–300 in mid-1962 and to 200–450 in mid-1963. For a full statement of his position, see paragraphs 48–55.

[2] The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, estimate no more than a few operational launchers deployed in mid-1961. They believe that for succeeding years it is prudent and reasonable to expect that the numbers of such ICBMs may increase generally at the rate shown above. However, the actual rate of increase will be subject to many fluctuations and will be determined by many variables, particularly the point in time when the Soviets have developed a new and less cumbersome ICBM that can be more easily deployed. Their projection of probable Soviet ICBM force levels through mid-1964 is as follows: mid-1962, 50–100; mid-1963, 100–200; mid-1964, 150–300. For a full statement of their position, see paragraphs 56–59.

[3] The Assistant Chief of Staff, Intelligence, USAF, does not concur in this estimate. In his judgment the Soviet leaders recognize that the ultimate elimination of the US, as the chief power blocking their aim of a Communist world, requires a clear preponderance in military capabilities. He believes that this consideration is the major determining factor in the continuing development of Soviet military force goals. This factor and the available evidence, considered in light of the extreme Soviet security and the great lack of intelligence coverage of large suspect deployment areas in the USSR, leads him to believe that there are at least 120, and quite possibly an even greater number of operational ICBM launchers in mid-1961. Considering extensive Soviet experience and capabilities in the missile field and the fact that our evidence points to a program of widespread introduction of simplified launch facilities, he estimates about 300 operational ICBM launchers by mid-1962 and around 550 in mid-1963. He agrees that the Soviets will introduce a new and improved ICBM in 1963–1964. Following the introduction of this new missile he estimates that the Soviet force levels would be about 850 operational ICBM launchers in mid-1964, 1,150 in 1965, and around 1,450 in 1966. For a full statement of his position, see paragraphs 60–64.

[4] See the footnote of the Assistant Chief of Staff, Intelligence, USAF, to Conclusion 3.

maintained over the next five years by building up 2,000 n.m. missile strength as medium range missile strength is phased down.* (*Paras. 65–75*)

6. The USSR now has about 20 conventionally-powered submarines which are probably capable of launching short range ballistic missiles (150 or 350 n.m.), though not while submerged. By 1963 the Soviets could probably introduce nuclear-powered submarines with a submerged launch system employing medium range ballistic missiles (500–1,000 n.m.). In the meantime, it is possible that nuclear-powered submarines with short range, surface launched missiles could be operational this year. For attack on the US, submarine-launched missiles will play a role supplementary to that of ICBMs. (*Paras. 76–82*)

7. Long Range Aviation now comprises about 1,000 medium bombers and tankers and about 150 heavy bombers and tankers.† Taking into account a complex of operational factors, but excluding combat attrition, we estimate that at present the Soviets could put about 200 bombers over North America on two-way missions in an initial attack.‡ Medium bombers of Long Range Aviation, together with several hundred such bombers in other Soviet air components, are suited primarily for missions against Eurasian and peripheral targets. A new medium bomber with supersonic "dash" capabilities is now entering service. Air-to-surface missiles are available for medium and heavy bombers. The large Soviet manned bomber forces will probably decline gradually in numerical strength, but five years hence the Soviets will probably still supplement their missile forces with medium and heavy bombers for both weapon delivery and reconnaissance. (*Paras. 83–97*)

8. Soviet long range bombers and missiles assigned to attacking major military targets and centers of national power in US and Allied territory would employ high-yield nuclear bombs and warheads. A wide range of operational equipment for electronic warfare is also available. Reconnaissance capabilities will probably be strengthened in the coming years by the use of reconnaissance satellites and aircraft fitted for post-strike reconnaissance and bombing. A long range, supersonic aerodynamic vehicle could be available in a year or two, and might be employed for weapon delivery or reconnaissance. (*Paras. 101–106*)

9. The Soviet long range striking forces thus comprise a mix of bombers, missiles, and submarines, but their development in the next five years will be paced largely by the growth of ICBM and other missile forces. We believe that with the estimated current force of 50–100 operational ICBM launchers, the USSR would already be capable of bringing major US cities under attack by a single ICBM salvo. Alternatively, the Soviets may now be able to bring all SAC operational air bases under attack by missiles alone; they almost certainly will be able to do so within the next year. In 1963–1964, they will probably be able to bring under ICBM attack those US retaliatory and defensive targets for which their ICBM system is suited. However, they would remain unable to target effective ICBM strikes against the increasing numbers of US hardened, mobile, and fast-reaction forces.§ ‖ (*Paras. 111–118*)

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*The Assistant Chief of Staff for Intelligence, Department of the Army, does not believe that this force goal will be attained in the near future, and believes that as a result of the expected absorption of initial salvo missions by the 2,000 n.m. missile in the future, Soviet planners may decide on lower force goals rather than a phase down of the 700 and 1,100 n.m. missile inventories. For his estimate of current and future force levels for medium and intermediate range missiles, see paragraph 74.

†The Assistant Chief of Staff, Intelligence, USAF, estimates that as of mid-1961, Soviet Long Range Aviation includes 175 heavy bombers and tankers.

‡The Assistant Chief of Staff, Intelligence, USAF, believes that the Soviets could put some 300 bombers over North America on two-way missions in an initial attack. For a fuller statement of his views on this matter, see his footnote to paragraphs 92–94.

§The Assistant Chief of Staff for Intelligence, Department of the Army, believes that the overall Soviet capability to attack the US with ICBMs is at present extremely limited. His estimate of the number of ICBMs now operationally deployed, when considered in light of the accepted 40–65 percent reliability, makes the number of missiles with which

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the Soviets are believed capable of reaching the US in mid-1961 very small. Manifestly, therefore, missile attacks on SAC bases would not at present be a major threat to our nuclear delivery capability. While he believes that the Soviet capability to attack one or more US urban industrial areas provides a serious deterrent, he believes Soviet capability in this regard at mid-1961 would remain limited to 4 or 5 cities as a maximum.

[14] The Assistant Chief of Naval Operations (Intelligence), Department of the Navy, does not believe that the USSR is currently capable of bringing as many as 25 major US cities under attack by a single ICBM salvo or of attacking all SAC operational air bases with missiles alone. Since he estimates only a few deployed Soviet ICBMs for mid-1961, it is his assessment that the Soviet overall capability to attack the US with ICBMs is at present extremely limited.

DISCUSSION

I. ROLE OF THE LONG RANGE STRIKING FORCES

10. The USSR's success in developing a long range striking capability has wrought a profound change in the Soviet leaders' thinking about the strategic position of their country. Even after World War II had left them the strongest conventional military power in Eurasia, a psychology of encirclement by a strong and hostile opponent remained a dominant element in their assessments. This sense of inferiority arose from the fact that the Soviet Union's bomber forces and air defense neither matched nor offset the strategic nuclear striking power of the US.

11. With the advent of their long range ballistic missiles, however, the Soviet leaders see themselves as overcoming this vital deficiency and reaching high ground hitherto inaccessible to them. For the first time in their history, they are able to bring to bear on North America the threat of immense destruction. Khrushchev now speaks of the USSR's strategic equality with the West, and even of its superiority. At the same time, he has taken pains to deny that Communists can draw from this the conclusion that general nuclear war has become a rational method of achieving their aims. Instead, he has vigorously combated those in the Communist camp, primarily the Chinese, who have seemed ready to reach this conclusion or at least to countenance assuming great risks of general war. In private discussion as well as public statement, the Soviet leaders have declared that they regard such a war as disastrous to their cause, and moreover, as folly at a time when political and economic forces are moving toward a world triumph for communism.

12. It is only in their heightened awareness of the calamitous consequences of nuclear war that the attainment of their new long range capability has sobered the Soviets; in all other respects it has exhilarated them. They see their own security, and that of the entire Bloc, as enormously enhanced. They see new opportunities to project Soviet power into areas long denied to them, and to inhibit the West from reacting forcefully in a variety of peripheral confrontations. They see many other political uses to which their new capability can be put, not the least of which are the attraction to their side of newer nations and the undermining of confidence in US commitments among America's allies.

13. The political potency of its long range striking forces is thus one of the factors affecting the USSR's decisions on the size and structure of these forces. The Soviet leaders are highly alert to the opportunities for deterrence and intimidation opened up to them by their development of an ICBM capability. They began to exploit these opportunities even before any operational capability was achieved and succeeded in impressing many in the world on the basis of an anticipated strength.

14. As long as the Soviets seek to avoid serious risks of general nuclear war, however, there are limits on the degree of intimidation they can achieve. In the absence of a clearly demonstrated preponder-

ance of offensive and defensive power, they probably regard their ability to intimidate as dependent more on political and psychological considerations than on a precise calculation, by either side, of the degree of devastation which could be inflicted or absorbed. Consequently, once a credible threat of ability to destroy millions of people has been established—and in this the Soviets have to a large extent already succeeded—it is difficult for the Soviets to establish ICBM force levels on the basis of their political utility without also relating them to potential military use.

15. The Soviet leaders evidently regard both sides as unable deliberately to initiate general nuclear war without at the same time gravely menacing their own societies. They have probably long regarded a premeditated US surprise attack as unlikely. Since their defensive and retaliatory capability has grown, they almost certainly now believe that this possibility has become very slight. They may be concerned over the possibility of the US eventually unleashing an attack in desperation over the imminent collapse of the capitalist system, but such an eventuality must appear to them to be remote.

16. We believe that the Soviet leaders will continue throughout the period of this estimate to seek to avoid general nuclear war, and that they are not planning to build up their long range striking forces to a peak for the initiation of general war at any specific time. At the same time, they recognize that their pressure tactics in foreign policy involve risks, and they must consider the possibility of war arising from miscalculation, from a local crisis in which each side became progressively committed, or from sheer accident. The Soviets consider that while the probability of general war is low, the likeliest way in which it might occur would be at a time of crisis when both sides were in a heightened state of alert.

17. Recognizing these possibilities, the Soviet leaders will wish to provide their long range striking forces with capabilities not only for purposes of deterrence and intimidation but also for actually fighting a war which might begin under a variety of circumstances. For these contingencies they would wish to possess a long range force which could either: (a) seize the initiative if war appeared unavoidable, in order to blunt an anticipated imminent US attack; or (b) survive an initial attack and go on to retaliate with great strength. These considerations, together with their desire to pursue an assertive political strategy, almost certainly cause the Soviets to desire a long range striking capability greater than the minimum necessary to threaten the massive destruction of population.[13]

18. At the same time, a variety of considerations tend to limit the effort devoted to building a long range force. Other military forces with essential missions compete for attention and funds, and so do numerous nonmilitary programs. Moreover, the pace of technological change pertaining to weapons is great, and any decision to put heavy emphasis upon a particular weapon, or mix of weapons, could rapidly be overtaken by developments. For example, the advantages possessed by the ICBM for surprise combined with heavy weight of attack offer the Soviets an opportunity to improve their initial strike capability, but the increase in US alert, mobile, and hardened forces is already beginning to offset this potential advantage.

19. In sum, we believe that the Soviet leaders will continue to accord the long range forces an extremely important place in Soviet political and military strategy. For the reasons outlined above, they wish to possess a strong and modern striking force. At the same time, we believe they recognize that there are limits to the role which such a force can play in furthering their primarily political objectives. These considerations are probably broadly controlling in shaping the role, size, and composition of the long range force.[14]

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[13] [14] See the footnote of the Assistant Chief of Staff, Intelligence, USAF, to Conclusion 3.

II. WEAPON SYSTEMS FOR LONG RANGE ATTACK

20. The USSR continues to maintain a military establishment which includes a balance of varied forces designed to meet a number of possible military contingencies, ranging from limited and local actions to general nuclear war. Soviet military doctrine, moreover, continues to envisage that a general nuclear war would extend beyond the first nuclear exchange. Long range striking forces are becoming increasingly important within the total Soviet force structure and it is clear that the Soviet leaders regard their role and the role of air defenses as crucial to the outcome of such a war. Nevertheless, the Soviets hold that the operations of other components are still essential to the achievement of final victory.

21. In accordance with this Soviet view of the proper military balance, the mission of long range attack against Eurasia and North America has come to claim an increased proportion of Soviet military expenditures in recent years. A few years ago, the share of expenditures devoted to the long range attack forces was about one-tenth of the total expenditures that can be attributed to broad military missions. It now appears to have risen to about one-fifth, a share approaching that devoted to air defense. Expenditures on other forces, particularly those on theater forces, are estimated to be declining.

22. Within the long range striking forces, ballistic missiles are clearly intended to become the dominant weapon. Historically, the Soviets have devoted more resources to weapons primarily suited for attack against the Eurasian land mass and have made a more limited investment in heavy bombers. However, their appreciation of the potential of the ICBM and of the USSR's geographic position is leading them to give greater emphasis to long range missiles suitable for intercontinental attack. In addition, the Soviets appear to display a bias in favor of missiles which may be owing to their successes in developing them, to their traditional reliance on artillery, and possibly to a personal penchant for them on the part of Khrushchev.

A. Intercontinental Ballistic Missiles

23. We have relatively firm evidence on the Soviet ICBM test range at Tyuratam and the test firing program. In the three and one-half year period since the first successful flight test in August 1957, the Soviets have launched about 35 generally successful ICBMs on the test range. On the basis of the data collected from this activity we have been able to establish the basic characteristics of the ICBM system and to estimate, with somewhat less confidence, its probable performance under operational conditions. Moreover, by relating the observable patterns in test firing to other Soviet missile programs and to the space program which has shared ICBM boosters, facilities, and experience, we have made the judgment that the USSR has been conducting, at a deliberate pace, a careful and generally successful ICBM development program.

24. The Soviet ICBM and space booster is a very large vehicle which burns nonstorable liquid fuel. Its gross takeoff weight is some 450,000–500,000 pounds and its total thrust at takeoff is about 750,000 pounds. Guidance for the missile is radio-inertial, and we estimate that under operational conditions in mid-1961, it would have a CEP of about two n.m., although the actual CEP could be considerably greater or somewhat less. Concerning its current operational reliability, we estimate that some 40–65 percent of the total number of ICBMs on launchers would get off within 15–30 minutes of scheduled times and arrive in the vicinity of assigned targets. Reliability would vary within this approximate range, depending upon how much time the Soviets had to peak their force prior to an attack.[15]

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[15] For estimated performance characteristics of the Soviet ICBM and other ballistic missiles, see Annex A, Tables 1, 4, and 5. For further details and a discussion of the evidence and analysis supporting our estimates on performance characteristics, see NIE 11-5-61, "Soviet Technical Capabilities in Guided Missiles and Space Vehicles," dated 25 April 1961 (TOP SECRET).

25. The maximum range of ICBMs tested prior to 1960 is estimated to be approximately 5,000 n.m. By about mid-1960, however, the Soviets had developed a 7,000 n.m. missile. This improvement in range is attributable to a reduction in nosecone weight made possible by advances in Soviet nuclear and missile technology. The basic configuration, propulsion, guidance, and other characteristics are identical. In order to achieve extensive coverage of US territory, 5,000 n.m. ICBMs would have to be deployed at launch sites in northwestern USSR or the Soviet Far East. The 7,000 n.m. missile can achieve full coverage of the US from deployment areas virtually anywhere in the USSR.[16]

26. The present Soviet ICBM system is extremely bulky and must be fairly cumbersome to handle. It is heavily dependent on the Soviet rail network, and launch sites would necessarily be served by rail spurs. It does not lend itself to deployment in hardened sites. The most suitable deployment site would be a large, fixed facility with considerable ground support equipment. Although the system will probably continue to be modified and improved over the next few years, it has the inherent disadvantages of a very large nonstorable liquid-fueled system, including the problems involved in achieving fast reaction and long hold times.

27. It is probable, therefore, that the Soviets are developing a new ICBM system, using either storable liquid or solid fuels and stressing increased flexibility and decreased vulnerability in deployment. We believe that such a system could become operational in about 1963 or after.

Nature of Evidence on Deployment

28. The evidence at hand is not sufficient to establish with certainty even the present strength of the Soviet ICBM force. With respect to the future, we not only lack a firm current base from which to project but the problem is further complicated by the rapidity of technological change. As the period advances, the choices open to the Soviet planners will increase and present programs will become increasingly subject to modification or drastic change. In the following paragraphs, we summarize the factors contributing to an estimate of the scale and pace of Soviet ICBM deployment.

29. Test range data continue to provide the firmest information relating to the entire program. The principal activities at Tyuratam in the past year have been an expansion in the number of launching facilities, from one to at least four, and the initiation in early 1961 of the most intensive series of ICBM test firings to date. The new launching facilities include a simplified pair of pads which probably represent the approximate configuration of an operational launching facility. The recent test firings, in which reliability has dropped sharply [redacted] suggest the introduction of redesigned system components, training firings by inexperienced personnel, or both. Some of them are possibly the initial firings of a new, liquid-fueled ICBM.

30. The test range activity itself can be interpreted as supporting either the majority view in the intelligence community, that the Soviets achieved an initial operational capability (IOC) with their 5,000 n.m. ICBM system as of about 1 January 1960, or the minority view that a complete weapon system was probably not deployed during the year 1960.[17] Within the majority view, it can be interpreted to mean either that the USSR has engaged in a steady buildup of extensive operational deployment since IOC date, or that deployment has been unevenly phased or otherwise limited. Despite these uncertainties, the test range activity indicates that at least until recently the USSR was experiencing no particular difficulties in ICBM development.

[16] See Annex B, Figure 1.

[17] See NIE 11-5-61, "Soviet Technical Capabilities in Guided Missiles and Space Vehicles," dated 25 April, paragraph 17, and the footnotes thereto. The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, do not believe that the Soviet ICBM had achieved an IOC by 1 January 1960. For their views on this question as it pertains to the deployment program, see paragraphs 56-59.

31. Information available on production activities is inconclusive. It is sufficient only to indicate that: (a) a research institute and experimental plant near Moscow developed and produced ICBM prototypes; (b) the city of Kuybyshev is the most likely site for manufacture of production ICBMs. Efficient production at a single, large plant could have turned out some 200 to 300 production ICBMs by mid-1961, but the actual number of missiles produced could be larger or smaller, depending upon the peak rate achieved at a single plant and the possible involvement of more than one facility. In any event, by about mid-1960 the Soviets had had adequate time to build up to planned production rates; hence, the manufacture of missiles has ceased to be a pace-setting factor in the deployment program.

32. With respect to operational deployment sites, we have concluded from the evidence at Tyuratam that operational launchers are probably paired, with the launchers in each pair sharing fuel storage, guidance, and missile checkout facilities. It is probable that more than one pair of launchers are grouped in a site, i.e., a launching complex which includes a base providing central support, maintenance, and communications and command control facilities. Individual pairs of launchers are probably separated by several miles, and an entire site-complex may thus cover many square miles. Taking into account our limited information on the organizational structure of other Soviet missile units and the requirements for ICBM operations, we believe that a number of launchers between four and 12 is feasible for a typical site-complex, but that four or six is the more probable number.

33. We have again reviewed all evidence pertaining to deployment sites, and we are still unable to identify positively any ICBM launching facilities other than those at the test range. Through intensive collection efforts by all available means, US intelligence has achieved partial coverage of the regions best suited to the deployment of Soviet ICBMs,[18] but there are large regions where launching sites could have been established without detection. The inadequacy of confirming evidence regarding deployment is attributable either to (a) the limitations of our coverage, combined with the success of Soviet security measures, or (b) the fact that deployment has been on a relatively small scale to date. At present, we cannot be sure which is the case.

34. Much of our evidence relates to suspected areas in the regions best suited to deployment of 5,000 n.m. missiles, where construction activity was underway in 1957–1959. Of these areas, there is considerably more information on Plesetsk and Polyarnyy Ural in northwestern USSR than on any others, and we estimate that sites were operational in these areas as of about 1 January 1960. Considering our total collection capabilities and the time lags to be expected, we believe that a minimum of two to four ICBM site-complexes are now operational in regions best suited to deployment of 5,000 n.m. missiles.[19] Other suspected areas are in regions best suited to the deployment of 7,000 n.m. missiles and our evidence on them is more recent. We can find no consistent pattern in this latter evidence, but it is probably too soon for one to appear.

35. From the foregoing examination of the direct evidence it is possible to derive a minimum number of operational ICBM complexes which can be supported on reasonably good evidence. In addition, the results of our search for operational deployment sites, taken together with the other elements of direct evidence, contribute to a sense of the current tempo of the Soviet program. The relatively small number of suspected locations is consistent with the deliberate pace of activities

[18] See Annex B, Figure 2.

[19] The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, believe that the existence of operational ICBM site-complexes at Plesetsk and Polyarnyy Ural on 1 January 1960 was unlikely. They further believe that the existence of a minimum of two to four ICBM site-complexes now operational in regions best suited to deployment of 5,000 n.m. missiles is also unlikely. For their view regarding current ICBM deployment see paragraphs 56–59.

at the test range.[20] The USSR has a greater capacity to produce and deploy ICBMs than we believe it has exercised. In sum, while the direct evidence remains insufficient to establish with certainty the present Soviet ICBM strength, it leads us to believe that the program thus far has proceeded at a deliberate rather than an extremely urgent pace.

Soviet Programming Decisions

36. In determining the scale and pace of ICBM deployment, the Soviet leaders must take into account such factors as: (a) the force structure they need to support their total strategy; (b) considerations of efficiency in the scheduling and expenditure of resources on this and other programs; and (c) likely trends in their own and Western offensive and defensive weapon systems. Given the rapidity of technological change and the heavy emphasis on research and development in both the missile and antimissile fields in the USSR, it is likely that ICBM programming for the period beyond 1963–1964 is highly tentative.

37. In planning their ICBM deployment program, the Soviets would have considered what combinations of ICBMs and other offensive and defensive forces would be adequate for deterrence and for support of their policy in any possible international crisis, as well as for military use in the various circumstances in which general war might arise. These considerations have almost certainly not enabled them to determine with confidence what force levels would be appropriate to these purposes in all circumstances, but we believe they have explored the question of numerical requirements for ICBM forces, and in so doing they have probably considered the suitability of ICBMs for performing various military tasks. The Soviets probably desire a high salvo capability for their ICBM force, in order to have a capability either to launch an initial attack or to retaliate against a Western attack. Thus the number of operational launchers they possess would be a critical factor.

38. In making our own studies of theoretical Soviet numerical requirements, we have recognized the great uncertainties attending them because of their sensitivity to varying assumptions about the performance of the weapon system, the targets to be attacked, and the way in which war might begin. In very general terms, however, these studies indicate that Soviet ICBMs are suitable primarily for attacking cities and relatively unprotected, fixed military targets such as air and naval bases, soft and semihardened ICBM sites, and soft and semihardened centers of command, control, and communications associated with US striking and defensive capabilities. With less certainty, they show that with ICBM launchers numbering in the low hundreds the USSR would have a capability, not only to devastate major US cities, but also to inflict severe damage on SAC air bases and those other military targets for which the Soviet ICBM is primarily suited. Khrushchev himself has spoken of a few hundred ICBMs as a formidable capability.

39. These studies also indicate, however, that several thousand ICBM launchers would be required to provide the Soviets with reasonable assurance of being able to inflict severe damage on the total number of hard ICBM sites planned by the US for the period beginning in 1963. Despite the uncertainties in such studies, they support a judgment that Soviet ICBMs are not well suited for counterbattery fire against large numbers of hard ICBM sites. They are, of course, not suitable for attacking mobile forces or targets of uncertain location.

40. In order to have a capability to retaliate against a Western attack, the Soviets probably desire an ICBM force which has high survivability. For the present system, this can best be achieved by dispersing and concealing operational launchers. Even with their very tight security practices, however, the Soviets probably view the protection afforded by dispersal and concealment as susceptible to deterioration with time, especially in view of the reconnaissance satellite cap-

[20] The Assistant Chief of Staff, Intelligence, USAF, does not concur in the judgment that there is only a "relatively small" number of suspected areas of ICBM deployment. For a full statement of his position, see paragraphs 60–64.

abilities they would expect the US to achieve in the next few years.

41. The period beginning in about 1963–1964 will probably being major technological changes. The new Soviet ICBM system will probably be more flexible and less vulnerable than the present system, and easier to deploy. By 1963–1964, however, the US will have achieved improved reaction times, warning, and alert capabilities, as well as large numbers of hard sites and mobile systems. The Soviets would probably decide that, in these circumstances, it would be desirable to adopt additional measures such as hardening for the protection of their own ICBM forces, and also to develop more advanced offensive techniques. Moreover, the USSR is pushing hard toward antimissile defenses, which we have estimated will probably be deployed to at least a limited degree in 1963–1966. In Soviet eyes, the early deployment of antimissile defenses would constitute a major victory over the US, perhaps even justifying the diversion of resources which would otherwise be allocated to offensive systems.

Probable Range of Soviet Force Levels[21]

42. From the direct and indirect evidence at hand, we judge that at present, the USSR is building toward a force of several hundred operational ICBM launchers, to be acquired as soon as practicable within the next few years. The commitment of resources is probably quite large, but thus far the programming has apparently been deliberate in tempo. The major pace-setting factor is probably the efficient phasing of construction and activation of a number of launching sites dispersed over a wide geographic area. The production of missiles and training of troops could be scheduled to fit into whatever site activation schedule was deemed practicable.

43. In order to achieve such a goal, a continuing and well-coordinated program of launcher activation would be required over a period of several years. In determining the activation rates which the USSR could achieve after a buildup of a year or two, we have taken into account the grouping of several pairs of launchers into complexes, the tasks and problems involved in the preparation of these complexes, and the time required to construct and activate them. We believe that launcher activation rates of 50 to 100 per year would be consistent with the sense of the current tempo of deployment activity which we have derived from the direct and indirect evidence available. Because it is impossible to pinpoint the threshold of activity which our intelligence collection resources would detect, we cannot exclude a present rate somewhat higher than 100 per year.[22]

44. Since it would require 18 to 24 months for launching complexes to be brought to operational readiness, our judgment regarding present activation rates bears most directly on ICBM deployment at present and through the next year or two. Such activation rates are not likely to remain constant; they are likely to vary considerably within this approximate range from year to year, depending on the configuration of the ICBM sites and areas of their deployment. Although we believe the Soviets have substantially passed through the initial learning period, as they gain additional experience it may be easier for them to increase the rates. However, other considerations such as a new ICBM, developments in their antimissile program, and alternative uses of the resources involved will influence their decisions as to the rate of ICBM activation. Taking these factors into account, we

[21] The Director of Intelligence and Research, Department of State, the Assistant Chief of Staff for Intelligence, Department of the Army, the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, and the Assistant Chief of Staff, Intelligence, USAF, do not concur in the range of current and future ICBM force levels estimated herein. For their positions, see their statements beginning respectively at paragraphs 48, 56, and 60.

[22] The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, do not concur that a launcher activation rate of 50 to 100 a year can be supported "by the sense of the current tempo of deployment activity" and therefore they believe that a present rate somewhat higher than 100 per year can be excluded. They would, in the light of evidence, be able to say only that a launcher activation rate of 50 to 100 per year is within Soviet gross capabilities.

believe it reasonable to project an average launcher activation rate of approximately 50 to 100 per year during the period to 1963-1964.

45. *Force levels in mid-1961.* We estimate that the probable Soviet force level in mid-1961 is in the range of 50–100 operational ICBM launchers, together with the necessary operational missile inventories and trained crews. This would probably involve the present existence of 10 to 15 operational ICBM site-complexes. This estimate should be regarded as a general approximation. The major bases for it are our sense of the tempo of the program and our judgment as to the relationship between what we have detected and what we are likely to have missed. Such a force level could have been acquired through either the smooth or phased deployment programs which can be derived from interpretation of the test range data.

46. *Force levels to 1963–1964.* While deployment to date has probably been deliberate in scale and pace, we believe that the USSR is now building a substantial ICBM capability. Soviet planning for the next few years probably anticipates the advent in about 1963 or after of a new ICBM system, and deployment of the present system will probably taper off and then cease as a buildup with the new system begins. This transition might affect the overall rate at which deployment occurs; for example, the Soviets might decrease the rate for the present system before the new one comes in, and then accelerate it thereafter when the new system becomes ready for deployment. Over the next few years, however, we believe that the launcher activation rate will probably average some 50–100 per year, which would result in force levels about as follows: 100–200 operational launchers in mid-1962, 150–300 in mid-1963, and 200–400 in mid-1964.

47. *Trends in 1965–1966.* The deployment program for this period will probably be significantly affected by such developments as US acquisition of numerous hardened and mobile missiles and other improved capabilities, and by Soviet development of antimissile defenses. Soviet ICBM force goals for 1965–1966 could be enlarged considerably over the 1964 level in view of these anticipated developments. On the other hand, these anticipated changes in the attack-defense relationship may appear to the Soviet leaders to warrant no increase in force goals or, more likely, only a moderate increase. We are unable to predict what the Soviet judgment will be regarding the interplay of these military factors, and there is a good chance that the Soviet leaders themselves have not yet come to a definite decision.

Position on the ICBM Program of the Director of Intelligence and Research, Department of State

48. The Director of Intelligence and Research, Department of State, does not concur in this estimate. He believes (a) that NIE 11–8–61 should include an estimate of the largest ICBM force which the USSR *could have* in mid-1961 and that such a force could be as large as 200 operational launchers, and (b) that the *probable* Soviet force level in mid-1961 is in the range of 75–125 operational launchers and will increase to 150–300 in mid-1962 and to 200–450 in mid-1963.

49. *Possible force levels.* In his opinion, an NIE on Soviet long range attack capabilities should provide policymakers with an estimate of the largest ICBM force which the USSR could have deployed to date, base on an IOC of 1 January 1960 and assuming a vigorous deployment program. He regards such an estimate of the *possible* mid-1961 force level as just as important as the estimate of the *probable* current force level. Indeed, by making no explicit judgment about the *possible* current force level, the Estimate renders a disservice to the policymaker by encouraging him to consider only force levels within the probable range and, at the same time, advising him (para. 35) that "the USSR has a greater capacity to produce and deploy ICBMs than we believe it has exercised." The policymaker would not know, on the basis of the NIE, whether he can exclude all force levels for mid-1961 beyond those slightly above the probable range or whether he cannot exclude a force level substantially higher than the probable range. Yet it is precisely this *possible*

Soviet ICBM strength which he needs to take into account in making decisions bearing directly on US national security.

50. The Director of Intelligence and Research realizes that an estimate of possible Soviet strength in any weapon system is less essential when there is sufficient evidence to narrow the range of our quantitative judgments. However, in the case of the ICBM, the available evidence is not sufficient to establish current Soviet strength within reasonably narrow limits. The NIE discussion and annexes acknowledge that the evidence relating to ICBM deployment can be interpreted in a variety of ways, that there are many uncertainties in the analyses of such factors as Soviet force goals and programming decisions, and that vast areas of the USSR are not covered or only poorly covered by US collection efforts. Under such circumstances, it is essential to estimate the highest force level that can be reconciled with the evidence and thereby indicate the range of possibilities which cannot be excluded.

51. The view of the Director of Intelligence and Research is that the USSR could have as many as 200 operational launchers in mid-1961. He emphasizes that an ICBM force of this size is definitely less likely than one half as large, but he believes that the chances are sufficiently good to include this estimate of *possible* current strength in an NIE on Soviet long range attack capabilities. By the same token, he would exclude mid-1961 force levels exceeding 200 operational launchers. He bases his estimate on the following considerations:

a. The available evidence on the Soviet ICBM development program can be interpreted to allow for a steady buildup of operational sites concurrent with ICBM testing activities. While the inferred tempo of the Soviet program suggests that the *probable* size of the mid-1961 ICBM force is substantially less than 200 operational launchers, it does not preclude a *possible* force level of about 200 launchers.

b. Missile production is not a limiting factor. Site activation rates in excess of 100 launchers per year are within Soviet technical and economic capabilities. In order to have 200 operational launchers by mid-1961, it is not necessary to begin construction of operational sites for the 5,000 n.m. missile before late 1957 or construction of sites with more simplified launch pads before early 1960. Moreover, construction times need not be shorter than 18-24 months and site activation rates in excess of 100 launchers per year do not have to be achieved in less than the time allowed for the initial buildup period. In short, a deployment program resulting in 200 operational launchers in mid-1961 can be carried out within the limits set by the factors judged to be most critical.

c. Because of the limitations of our intelligence coverage, together with the high degree of Soviet security, substantial ICBM deployment could have occurred without being detected by US collection efforts. In any case, the chances of detecting Soviet deployment activity depend on the number of sites under construction or completed. There is sufficient uncertainty in the number of launchers per site to allow for a considerable increase in aggregate ICBM strength without a corresponding increase in the number of sites.

d. On the other hand, it is very unlikely that construction of the first operational sites began before initiation of test firing or that high rates of site activation were achieved early in the deployment program. A rate of site construction in excess of that required to reach a force level of about 200 launchers in mid-1961 probably would have created severe organizational problems and possibly would have strained Soviet resources. Consequently, an ICBM force of about 200 operational launchers is believed to be the maximum practicable level which the USSR could have achieved by mid-1961.

52. During the next year or so the USSR could increase its ICBM force much more rapidly than in the past, since more simplified launch pads would be constructed at new sites. With several years experience behind them, the Soviets could achieve an activation rate of about 200 launchers per year by early 1962 and an operational force of roughly 400 ICBMs might be deployed by mid-1962.

Thereafter deployment could be accelerated if Soviet planners decide on a high ICBM force goal.

53. *Probable force levels.* The Director of Intelligence and Research, Department of State, believes that the *probable* size of the current Soviet ICBM force is in the 75–125 range and that this force is likely to be 150–300 operational launchers in mid-1962 and 200–450 in mid-1963. The higher figures for current strength reflects his judgment that the pace of the Soviet ICBM program is in fact more rapid than the NIE implies; the higher figures for future strength are based on his judgment that a site activation rate of 150–175 launchers per year should be used in projecting the upper limit of the *probable* program. Underlying both judgments is his estimate that Soviet leaders seek to acquire a force of several hundred operational ICBM launchers before the US has a large number of hardened sites and mobile long range missiles. The Soviet deployment program, consequently, is likely to be pursued at a fairly rapid pace in the next year or two.

54. It is recognized that the additional ICBMs estimated for mid-1961 would not materially increase current Soviet long range attack capabilities. However, a force of about 300 ICBMs around mid-1962 would enable the USSR to bring all SAC operational air bases and soft ICBM sites under attack by missiles alone or, alternatively, to have moderate assurance of inflicting severe damage to command-control centers, air defense bases, and missile-launching submarine bases, as well as SAC operational installations. This capability would be achieved approximately one year sooner than is possible with the maximum ICBM force as estimated in the NIE text. In particular, it would be achieved before the number of hard ICBM sites planned by the US begins to increase sharply.

55. Whether deployment thereafter will continue at a rapid rate or level off depends on such factors as Soviet success in developing a new ICBM system and antimissile defenses, their assessment of US retaliatory capabilities in the post-1963 period, and the extent to which Soviet leaders become convinced that very high ICBM force goals are necessary or desirable. If Soviet leaders decide to build toward an effective ICBM capability against large numbers of US missiles in hardened sites or to achieve a substantial ICBM retaliatory capability by the middle of the decade, then the Soviet deployment program would be accelerated. However, there is at least an equal chance that ICBM deployment will taper off sometime in 1963 since Soviet planners might consider it more advantageous to accelerate their antimissile defense program. In that case, an ICBM force of 300–500 operational launchers would be maintained in the 1964–1966 period.

Position on the ICBM Program of the Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy

56. The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, have entered several specific footnotes in the body of this estimate expressing their differing opinion. The basis for these footnotes, and the only fundamental difference with judgments in the estimate, is their estimate of current force levels of Soviet operational ICBM launchers. A basic difference affecting current force levels is their judgment concerning the date when the Soviets first achieved an operational capability with deployed ICBMs. They do not believe that this occurred in January of 1960. The following factors, well supported by evidence, weigh heavily in their judgment against the Soviets having attained or even sought a deployed operational capability by that time with their existing ICBM:

a. The size of the existing Soviet ICBM (450,000–500,000 pounds and about twice the size of ATLAS), the difficulties involved in the use of nonstorable liquid fuel, and heavy dependence on a rail network are factors which combine to make launcher construction a major undertaking which they believe would have been detected by US intelligence if any substantial program had been undertaken.

b. Despite large and representative collections of evidence, our intensive search has failed to identify even probable operational ICBM site-complexes.

c. [redacted]

d. It has been characteristic of other Soviet missile programs that prototype or trial launch sites were constructed at the test range before or, at the latest, concurrently with the construction of an operational facility. Indications of construction of such a prototype site for the ICBM did not appear at the test range until 1960 and it was probably not completed until late 1960 or early 1961.

e. Recent test firings of ICBMs, in which reliability has dropped sharply [redacted] suggest the introduction of redesigned system components, training firings by inexperienced personnel, or both.

57. The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, believe that the appearance of the probable prototype launching site, the increased pace of firings, and the recent changes in telemetry support the view that the Soviets may now be about to deploy some ICBMs of the existing cumbersome type and clearly strengthen their judgment that the Soviets did not have a deployed ICBM capability by 1 January 1960. This judgment, in turn, influences their view of the possibility of ICBM deployment in the inhospitable northwest portion of the USSR. While information is not yet firm enough to rule out the possibility of ICBM deployment at Plesetsk and Polyarnyy Ural, as well as at two other locations, they believe it unlikely that sites for ICBMs of the type described above were constructed in those areas in the time period 1957–1959, which would have required site design and decision to deploy prior to the first Soviet firing of an ICBM.

58. The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, believe that the evidence available on the Soviet ICBM development program is sufficiently complete and valid to support the conclusion that little, if any, ICBM deployment has occurred, and that the near absence of evidence of deployment strengthens that conclusion.

59. On the basis of all the evidence and the reasoning outlined above, the Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, estimate "a few" operational Soviet ICBM launchers for mid-1961. Although they do not consider the evidence sufficient to project a precise estimate of the Soviet planning for future ICBM strength, they accept the reasoning in the text as a generally valid measure of the scale and pace of a build-up. Therefore, on the basis of making a prudent and reasonable projection of Soviet deployed ICBM launcher strength they estimate as follows:

Mid-1962	50–100
Mid-1963	100–200
Mid-1964	150–300

Position on the ICBM Program of the Assistant Chief of Staff, Intelligence, USAF

60. The Assistant Chief of Staff, Intelligence, USAF, does not concur with the judgments reached herein on the nature of the current and future Soviet force goals or the strategic considerations which determine their magnitude. In his view the estimate of current force levels does not accurately represent the scope of deployment indicated by the nature and quality of the evidence thus far accumulated, but reflects instead the impact of the extreme security measures which have obscured the broad scope of the Soviet ICBM program from its inception. In addition, he believes that proper allowance has not been made in the estimate for the lack of intelligence coverage of the many areas in the USSR in which ICBM deployment may have been carried out.

61. The Assistant Chief of Staff, Intelligence, USAF, believes that Soviet determination to achieve world domination has fostered recognition of the fact that the ultimate elimination of the US, as the chief obstacle to the achievement of their objective, cannot be accomplished without a clear preponderance of military capability. Moreover, Soviet doctrine and deeds suggest to him that the Soviet hierarchy are mindful of the fact that few, if any, lasting major political victories in history have been achieved without the supporting bulwark of superior military power.

62. The history of their ballistic missile program testifies to an early recognition by the Soviets of the unprecedented potential offered by such weapons and reflects their determination to exploit that potential by making ballistic missiles the dominant system in their strategic strike force. Their highly successful ICBM testing record reflects the qualitative achievement of their well-planned, well-organized program which would facilitate the realization of predetermined force goals of any reasonable magnitude. Soviet efforts to mask their program in secrecy indicate the importance which they attach to their growing missile capability. Moreover, evidence developed in spite of their security measures reveals programming for troop training, production and deployment concurrent with the testing phase of their program. This concurrency is a further indication of Soviet determination to maximize their operational capability at the earliest practicable time. In this connection, the evidence on deployment is consistent with the estimate that the Soviets achieved their initial operational capability by 1 January 1960, and in the intervening period of a year and a half, to mid-1961, brought to operational readiness at least 120 and possibly an even greater number of operational ICBM launchers.

63. Considering the emphasis which the Soviets place on secrecy, and the absence of other than partial intelligence coverage on most of the areas most suitable for ICBM deployment, we could not expect to identify more than a small portion of the Soviet ICBM deployment program. Nevertheless the Assistant Chief of Staff, Intelligence, USAF, has identified at least six areas on which there is reasonably good evidence of ICBM deployment. Within these areas he believes there are between 10 and 15 operational ICBM site-complexes. Further, he has about 20 additional areas under active consideration on which evidence indicates the possibility of ICBM launch site construction. Considering the economics of logistic support and specialized maintenance and control problems, the siting of several site complexes in a deployment area is highly probable and should be expected. Therefore, deployment—whether actual or planned—represented by the 20 additional areas—reflects the existence of a program of considerable magnitude. Even though identification of some of the suspect areas should later prove erroneous, undoubtedly others will be identified to replace them as the delay in intelligence reporting catches up with the actual situation.

64. In view of the above, the Assistant Chief of Staff, Intelligence, USAF, estimates the operational ICBM launcher availability as follows:

Mid-1961	at least 120
Mid-1962	300
Mid-1963	550
Mid-1964	850
Mid-1965	1,150
Mid-1966	1,450

B. Medium and Intermediate Range Ballistic Missiles [23]

65. The Soviets have ballistic missiles of 700 and 1,100 n.m. ranges, capable of delivering 3,000 pound nuclear payloads with CEPs of about 1 n.m. and 1½ n.m., respectively. These missiles are operationally deployed. Over the past year or so we have acquired much evidence on the method of deployment and on probable deployment areas.

[23] The USSR's medium range ballistic missiles are those with maximum ranges of 700 and 1,100 n.m.; intermediate range ballistic missiles are those with a maximum range of about 2,000 n.m.

66. The 700 n.m. missile (SHYSTER) and the 1,100 n.m. missile (SANDAL) are about the same in diameter and similar in appearance, except that the latter is somewhat longer. The airframes for these two missiles could easily be produced with the same tooling. Because volume production of 700 n.m. missiles began as long ago as 1956 and because the 1,100 n.m. missile system provides better target coverage, we believe that production of the 700 n.m. missile has probably ceased. A somewhat larger program for production of 1,100 n.m. missiles has probably been underway since 1958. [

]

67. We believe that these two missiles systems have a common deployment concept, that much of the ground support equipment is similar if not identical for the two systems, and that they possess a high degree of flexibility in launch site selection because all equipment is mounted on wheeled vehicles. The missiles, together with the associated support equipment and operational personnel, are apparently stationed at bases convenient to areas of likely operations. These bases probably provide administrative, command, and logistic support to the launching units, which are deployed to actual launch sites only for training purposes or for actual hostilities. The launch positions may consist only of presurveyed launch points, accessible by good roads.

68. An IRBM of about 2,000 n.m. range, now under development, will increase Soviet coverage of more distant peripheral targets and will permit a wider area for deployment within the USSR. This IRBM, which we believe will be operationally deployed beginning in late 1961 or early 1962, will probably be capable of delivering a 4,000 pound nuclear payload with a CEP of 1½ n.m. or better. The system will probably employ fixed launch sites. On the basis of Soviet developmental progress with the 2,000 n.m. missile, derived largely from evidence on test firings, it is probable that the manufacture of production missiles is now beginning.

69. Accumulating evidence, including observations of missiles, missile equipment, and shipments of liquid oxygen, together with an 1,100 n.m. firing in the Soviet Far East, leads us to believe that medium range missiles are now deployed at a few bases located near the Soviet borders in Europe, the Far East, and the Transcaucasus. There are also indications that 700 n.m. and shorter range missiles have been deployed to East Germany, possibly for several years. On the basis of this evidence, the potential target coverage of the missiles, and the areas most suitable for their deployment, we believe that the 700 n.m. and 1,100 n.m. systems provide overlapping coverage of targets. The 2,000 n.m. system probably will be assigned the limited number of targets outside the range of the 1,100 n.m. missile and will provide additional coverage of nearer targets from more secure launching areas within the USSR.

70. Factors of timing and security, as well as programmed improvement in Western air defenses, make it increasingly desirable that an initial Soviet attack against the bases of Western nuclear striking forces near Soviet borders be delivered primarily with ballistic missiles. Even from within the USSR, 700, 1,100, and 2,000 n.m. missiles have sufficient range to reach such bases in Eurasia and its periphery. Numerous missiles with maximum ranges of 150 to 350 n.m. will also be available during the 1961–1966 period. Although these shorter range missiles are not considered in detail in this estimate, it should be noted that a portion of them may be equipped with nuclear warheads and, if deployed forward, could contribute to an initital attack on critical Western targets. A substantial but decreasing force of manned bombers will be available throughout the period for follow-on attack and other related missions.

71. In order to estimate the probable Soviet force goals for these weapon systems, we have considered the major targets within their range, the evidence on development and deployment, the availability of nuclear war-

heads, and the availability of other Soviet delivery systems. On the basis of all these considerations, a continuing total force of about 250 to 300 ready missiles of medium and intermediate ranges seems to be a reasonable and attainable goal for Soviet strategic planning.

72. As in the case of the ICBM, the provision of ground support facilities for medium and intermediate range missiles is a critical factor in the deployment program. For the mobile 700 and 1,100 n.m. missiles, the Soviets are believed to employ firing units with more than one missile but with a single set of ground support equipment—a firing unit, together with its equipment and crew, is therefore the equivalent of an operational launcher. On the basis of fragmentary evidence and estimated Soviet requirements for an initial salvo as well as for subsequent use in a general war, we estimate Soviet operational missile inventories for medium range missiles at three times the number of operational launchers. We have no evidence on the planned structure of intermediate range missile units. Considering the greater size and complexity of the IRBM and the probability that it will be deployed in fixed sites for use primarily against strategic targets, it is probable that IRBM units will have fewer missile reloads than medium range units. We believe that two 2,000 n.m. missiles in operational inventory for each operational launcher is a reasonable assumption, but it is possible that the ratio of missiles to launchers will be lower, as with the ICBM units.

73. It is likely that the Soviet force goal for the 700 n.m. missile, which was ready for operational deployment as long as five years ago, has already been attained. The 1,100 n.m. missile has been operational for more than two years, and we believe that the force goal for this missile system will probably be attained within the next year. As to future inventories of missiles and launchers, we believe that in the absence of continued production the 700 and 1,100 n.m. missiles will be permitted to phase down through normal attrition after five to seven years of service use, but that the USSR's capability against peripheral areas will be maintained and improved by a buildup in 2,000 n.m. missiles.[24]

74. Our estimate of Soviet medium and intermediate missiles and launchers, based on the available evidence and general considerations summarized in the preceding paragraphs, is shown in the table below:[24]

Operational Inventories	Mid-1961	Mid-1962	Mid-1963	Mid-1964	Mid-1965	Mid-1966
SS-3 (700 n.m.)						
Launchers	100	100	100	75–100	50–75	50–75
Missiles	300	300	300	200–300	150–225	150–225
SS-4 (1,100 n.m.)						
Launchers	125	150	150	150	150	125–150
Missiles	400	450	450	450	450	375–450
SS-5 (2,000 n.m.)						
Launchers	0	25	50	50–75	50–100	50–100
Missiles	0	50	100	100–150	100–200	100–200
Approximate Total Launchers	225	275	300	300	275–300	275–300

[24] The Assistant Chief of Staff for Intelligence, Department of the Army, believes that although the production goals for the 700 and 1,100 n.m. missiles may have already been met or will be met within the near future, evidence of training and deployment does not support a conclusion that force goals for operational units have been met. He believes that [redacted] provide a reasonable firm basis for estimating current force levels of operational missile and launchers. On this basis, and his belief that as a result of the expected absorption of initial salvo missions by the 2,000 n.m. missile in the future, Soviet planners may decide on lower force goals rather than a phase down of the 700 and 1,100 n.m. missile inventories, he estimates operational inventories on following page.

Footnote continued from preceding page.

Operational Inventories	Mid-1961	Mid-1962	Mid-1963	Mid-1964	Mid-1965	Mid-1966
SS-3 (700 n.m.)						
Launchers	30-60	60-100	60-100	60-100	60-100	60-100
Missiles	100-200	200-300	200-300	200-300	200-300	200-300
SS-4 (1,100 n.m.)						
Launchers	20-40	40-80	80-100	100	100	100
Missiles	100-150	200	300	300	300	300
SS-5 (2,000 n.m.)						
Launchers	0	20	50	75	100	100
Missiles	0	50	100	150	200	200
Approximate Total Launchers	50-100	100-200	200-250	200-275	250-300	250-300

75. Of the foregoing missiles, those intended for an initial salvo would probably be equipped with high-yield nuclear warheads, while the remainder of the medium range missiles would probably have various yields in order to provide Soviet forces with operational flexibility. Should the USSR require larger numbers of missiles or launchers, their production and deployment over the next five years would not present serious difficulties.

C. Submarine-Launched Missiles

76. Soviet planners almost certainly would wish to assign land targets to missile launching submarines in any contemplated attack on the US. The number of submarines which could be deployed in launching positions without compromising surprise would depend upon the pattern of operations previously established. At present, the number which could be so deployed is probably very small, but an increase in out-of-area operations by long range submarines over the coming years would serve to raise the warning threshold. However, such preparations would be useful primarily if the Soviets planned to use missile submarines in an initial surprise attack. It is possible that they would prefer to hold such submarines in reserve as part of a second strike or retaliatory force. In any event, Soviet planning does not appear to contemplate delivery of the main weight of an attack by means of submarine-launched missiles.

77. We believe that the USSR now has a limited capability to launch missiles from long range, conventionally-powered submarines. Operating directly from home bases, these submarines can conduct operations within missile range of US targets, but we believe that few have engaged in extended out-of-area training. As of mid-1961, we estimate that the Soviets have about 20 missile submarines in operational units. Six of these are long range "Z" class submarines, which were converted in 1956-1957 by enlarging the sail and installing two hatches and vertical tubes, probably to accommodate ballistic missiles. The remainder are long range submarines of the "G" class, the first of which was sighted in 1958. Although the possibility of cruise-type missiles cannot be excluded, we estimate that the "G" class is armed with three ballistic missiles of the type carried by the converted "Z" class. Considering the size and configuration of the submarines and evidence from the Soviet missile development program, we believe that this missile has a maximum range of either 150 or 350 n.m.[25] For missile launching, both the converted "Z" and the "G" class submarines would need to be surfaced, or more likely in sail awash condition.

78. In 1955-56, a few "W" class submarines probably were converted to topside stowage of cruise-type missiles, but we no longer consider them operational. We believe, however, that the Soviets are developing a supersonic cruise missile with a range of about 300 n.m.

[25] For estimated performance characteristics of Soviet submarine-launched missiles, see Annex A, Tables 2, 4, and 5. For potential coverage of US target areas, see Annex B, Figure 3.

for launching from surfaced submarines. The submarine for which this missile was designed has not yet been identified, nor are we yet able to determine the ultimate use of such a weapon system. However, we believe that this system could be operational this year.

79. We estimate that the USSR will develop a system capable of delivering ballistic missiles against land targets from a submerged nuclear-powered submarine. A system of this type, with a missile range of at least 500 n.m., would substantially improve the Soviet naval contribution to the long range attack capability against US or other distant targets. Operating from home bases, a considerable portion of the total number of such submarines—perhaps as much as one-third—could be maintained on station off US coasts, provided that the Soviets developed proper operating procedures and trained alternate crews.

80. Nuclear-powered submarines have been under development in the USSR for a number of years, and about five to seven are probably now in service. There is no firm evidence on their armament, but we believe that the first Soviet nuclear-powered class is likely to have been of the torpedo attack type. Current production of nuclear submarines is estimated at four to six per year. On the basis of general progress to date, we believe that the nuclear-powered submarine program is sufficiently far advanced so that by this time the Soviets could have developed such submarines for missile-launching use.

81. We do not as yet have evidence of the development of a missile designed for a submerged launch ballistic missile system. We would expect that such a missile would first be tested at Kapustin Yar, that we would be able to identify it as a new missile, and that approximately 18 months would be required before it could become operational. However, taking into account the contribution such a system could make to the Soviet long range attack capability and the Soviet state-of-the-art, we have estimated that the USSR could have available for operational use by 1963 a submerged launch missile system capable of delivering a 1,000 pound payload to a range of 500–1,000 n.m., with a CEP of 1–3 n.m. A Soviet nuclear-powered submarine might carry 6–12 such missiles. It is possible that the Soviets have elected to equip nuclear submarines with surfaced-launched ballistic missiles of the type attributed to the converted "Z" and the "G" classes. If this is the case, a few Soviet nuclear-powered missile submarines could be operational this year.

82. The "Z" class conversion was probably an early developmental effort, and we believe that additional conversions are unlikely. The "G" class program will probably continue for another year or so, until the Soviets have attained a more effective missile-launching type. Soviet capacity to build nuclear-powered submarines, in programs with high but not overriding priority, is estimated at about eight per year. In the absence of direct evidence, we believe it reasonable to assume that about half of the nuclear submarines constructed will be missile launching types. On the basis of the foregoing considerations, we estimate as follows the probable numbers of missile submarines, and their missiles, in Soviet operational units through mid-1966:

	Mid-1961	Mid-1962	Mid-1963	Mid-1964	Mid-1965	Mid-1966
Nuclear-Powered Missile Submarines	..	..	4	8	12	16
500–1,000 n.m. missiles	..	..	24–48	48–96	72–144	96–192
"G" Class Submarines	15	18	18	18	18	18
150 or 350 n.m. missiles	45	54	54	54	54	54
Converted "Z" Class Submarines	6	6	6	6	6	6
150 or 350 n.m. missiles	12	12	12	12	12	12

D. Long Range Bombers

83. The current reduction and reorganization of the Soviet armed forces has brought drastic cuts in naval and tactical air units, probably reflecting in part the growing Soviet missile capabilities. By comparison, the reduction in long range bomber forces has been much less. We believe that even after the Soviets have achieved a formidable capability with ICBMs and other ballistic missiles, they will continue to require manned bombers, though in lesser numbers, for a variety of purposes, including attacks on small or hardened targets, damage assessment, reconnaissance, and attacks on targets of uncertain location. Operating in conjunction with a powerful missile force, bombers will provide the Soviets with diversification and flexibility in their offensive capabilities.

84. The employment of the Soviet long range bomber force in the event of general war would depend upon a variety of factors, including the circumstances under which hostilities commenced. Moreover, Soviet plans for the use of this force will be modified as Soviet missile strength increases and as the target system to be attacked changes. Initial Soviet attacks early in the period probably would rely heavily on bomber operations, with the missile launchings timed so as to minimize advance warning of the Soviet attack. Later in the period, manned weapon systems would be used primarily in a reconnaissance and reattack role.

Long Range Aviation

85. There has been comparatively little change in the strength, status, and deployment of Long Range Aviation in recent months. We estimate that as of mid-1961 it comprises some 150 heavy bombers [26] of the BISON jet and BEAR turboprop types, about two-thirds of them BISONs, and about 1,000 BADGER jet medium bombers. A few supersonic "dash" medium bombers, nicknamed BLINDER, probably have now entered service. The USSR has not developed an aircraft designed specifically as a tanker; instead, BISONs and BADGERs are converted for use as tankers with their bomber counterparts. We have no evidence regarding refueling for the BLINDER.[27]

86. Two of these bomber types, BISON and BLINDER, are in current production. Production of the BLINDER probably has been underway for more than a year. We estimate that about 30 have been produced to date and that this aircraft is now being produced at the rate of about two per month. BISON production has been underway for about six years, with a total of about 150 produced to date. BISON production continued through 1960 at a rate of about two per month, and there has been evidence of a decline in recent months. The BISON was designed about 10 years ago, and has since been considerably modified. The modifications, however, have not overcome the range and altitude limitations which probably make it, from the Soviet point of view, a marginal system for intercontinental attack. We doubt that further attempts at improvement will be made and believe that BISON production will terminate in the relatively near future.

87. We have no firm evidence that any more advanced Soviet heavy bomber is now under development or in production. A large bomber prototype, nicknamed BOUNDER, was observed in Moscow in 1958, and another prototype, similar in appearance to BOUNDER, was observed at the same plant this year. These bombers are comparable to the BISON in size and weight, but they appear to have considerably less range. It is unlikely that either will be produced for operational use without major changes in configuration, the

[26] The Assistant Chief of Staff, Intelligence, USAF, estimates that as of mid-1961, Soviet Long Range Aviation includes 175 heavy bombers and tankers.

[27] For estimated performance characteristics of Soviet medium and heavy bombers, and factors which would affect their operational employment, see Annex A, Tables 6-8. For current deployment and potential target coverage of North America and other portions of the Northern Hemisphere, see Annex B, Figures 4-7.

incorporation of improved power plants, or both. Nevertheless, their continuing experimentation leads us to believe that the Soviets may see a requirement for an advanced aircraft of intercontinental range, to be used for weapon delivery and reconnaissance missions in conjunction with ballistic missile attacks. Despite the absence of confirming evidence, we therefore regard it as possible that a new heavy bomber will enter operational service within the next few years.

88. There are indications that the Soviets have been engaged in an effort to produce some sort of aircraft nuclear propulsion (ANP) system. We estimate that in 1960 the Soviets were capable of flying a nuclear testbed with at least one nuclear power unit providing useful thrust during a phase of the flight, but there is no evidence that testbeds or protypes have actually been built. By 1962–1963, such a program could lead to an ANP system for a subsonic aircraft of marginal performance; an alternate program could result in the development of a subsonic nuclear-powered aircraft with considerably better performance in 1964–1965. Thus, if active development is pursued and the foregoing dates are met, the Soviets could have a few operational nuclear-powered aircraft late in the period of this estimate. A subsonic nuclear-powered aircraft might be used for weapons delivery or long range reconnaissance.

89. We estimate that Long Range Aviation will decline in strength over the next five years as the Soviets place increasing reliance on missiles. Whether or not a new type of heavy bomber is introduced, the heavy bomber force probably will decline gradually from its mid-1961 strength of approximately 150 as BISON production ceases and BEARs are retired. In view of the force reductions announced in January 1960, we have estimated a sharper cut in the medium bomber force for the near term, and then a relatively stable force for the remainder of the period. The estimated buildup to perhaps 100 supersonic "dash" BLINDERs by 1963 or 1964 would tend to offset normal attrition of BADGERs. In sum, we estimate as follows the probable strength of Long Range Aviation during the next five years:

Bombers and Tankers	Mid-1961	Mid-1962	Mid-1963	Mid-1964	Mid-1965	Mid-1966
Heavy	150	140	130	120	110	100
Medium*	1,000	850	800	800	750	700

* This predominantly BADGER force includes a few BLINDERs in 1961, building up to perhaps 100 by 1963–1964.

90. Thus, we believe that Soviet Long Range Aviation will continue to consist largely of medium bombers, best suited for operations in Eurasia and capable of attacking targets in the continental US only through extensive use of one-way missions. With aerial refueling, BADGERs would be able to reach targets in the extreme northwestern portion of continental US on two-way missions from Arctic bases, but they would be operating at extreme ranges and would have little flexibility of routing and tactics. However, BADGERs on two-way missions could provide extensive coverage of many targets in Alaska, Canada, and Greenland, which have been assuming increased importance to defense of the continental US. The existence of Cuban airfields offers the Soviets a possible option of sending BADGERs on refueled missions over most of the US with a high expectancy of recovery.

91. The BISON would require both Arctic staging and inflight refueling for extensive coverage of US targets on two-way missions, and missions against many such targets would be at extreme ranges. From Arctic bases, BEARs could cover virtually all US targets on two-way missions, and they could reach many targets in the northeastern US directly from their home bases.

* The Assistant Chief of Staff, Intelligence, USAF, estimates the probable strength of Long Range Aviation during the next five years as follows:

Bombers and Tankers	Mid-1961	Mid-1962	Mid-1963	Mid-1964	Mid-1965	Mid-1966
Heavy	175	200	200	200	200	200
Medium*	1,000	950	900	800	800	750

* This predominantly BADGER force includes a few BLINDERs in 1961 building up to some 300 by 1966.

92. The necessity for inflight refueling and use of Arctic staging bases imposes serious limitations on the numbers of Soviet bombers which can be employed in an attack on the US. All Soviet BISON regiments probably have been trained in Arctic operations and inflight refueling. We believe that some aircraft in about half of the BADGER regiments have an inflight refueling capability, and that some aircraft from about an equal number of regiments, although not in all cases the same units, have engaged in Arctic training exercises. We estimate that approximately 25 percent of the BADGER crews in Long Range Aviation have received training of a sort appropriate to attack on the US.[29]

93. On this basis, we believe that the Soviets have conducted the operational training necessary to commit up to about 400 bombers and tankers on two-way missions in an initial attack against the US at present, using refueling and Arctic staging as required. Considering the requirement for tankers, in-commission rates, and operational attrition, but excluding combat attrition, we therefore estimate that at present the Soviets could probably put about 200 bombers over North America on two-way missions in an initial attack, of which about 80 would be heavy bombers. The Soviets have a considerably larger gross capability for attacking the US itself, but to exercise it they would need to employ BADGERs on one-way missions and to use less well-trained crews. With the advent of missile capabilities, we regard this use of the medium bomber force as an increasingly unlikely course of Soviet action.[29]

94. There are four to five Arctic airfields which the Soviets probably would consider suitable for heavy bomber staging and another 10–12 (including ice strips) which appear suitable for staging BADGERs. However, the facilities available at these airfields, together with the adverse operational conditions in the Arctic, impose limitations on the number of aircraft which can be launched for simultaneous attack.[29]

Medium Bombers of Other Components

95. About 450 BADGERs are assigned to components other than Long Range Aviation. Of these, about 375 are assigned to Naval Aviation and about 75 to Tactical Aviation. It is possible that supersonic "dash" medium bombers will be introduced into these forces in the next few years. Naval BADGER units are specially trained and equipped to attack such targets as carrier task forces at sea, while tactical units are intended primarily to support ground force operations. These units, in addition to the Long Range Aviation BADGERs not assigned to operations against North America, would presumably be employed in attacks on Eurasian and peripheral targets.

Air-to-Surface Missiles

96. The first Soviet air-to-surface missile (AS–1) became operational in 1956–1957, and is now standard equipment in about two-thirds of the naval BADGER units. The few Long Range Aviation BADGER units which were equipped with this missile have since been transferred to Naval Aviation. The AS–1 has a maximum range of about 55 n.m., and was designed primarily for antishipping use, although it probably has some limited application against coastal targets. The severe limitations in range and launching altitude which it imposes on the launching aircraft

[29] The Assistant Chief of Staff, Intelligence, USAF, does not concur in paragraphs 92–94 as they refer to the limitations of the Soviet Long Range Aviation in training, refueling, and the availability of staging bases.

He believes that the available evidence clearly establishes that a high percentage of the crews assigned to Long Range Aviation have received training which qualifies them to conduct attacks against the US. Further, this evidence indicates that at least 60 percent of the long range BADGER force is equipped and trained for inflight refueling.

In addition to the airfields mentioned, he has identified 25 other airfields which are capable of supporting long range staging operations.

In view of the above and considering tanker requirements, in commission rates and operational attrition but excluding combat attrition, he estimates that the Soviets Long Range Aviation could put about 300 bombers over North America on two-way missions in an initial attack. In a maximum effort, employing one and two-way missions, he believes that about 500 Soviet long range bombers could reach targets in North America.

have probably led the Soviets to develop a follow-on system. This new missile (AS-2), which has a range of about 100 n.m., probably became operational in late 1960 or early 1961.[30] We estimate that the combined Soviet inventory of these two antiship weapons will remain fairly stable at around 500 missiles over the next few years. Some portion of the inventory will probably be equipped with nuclear warheads of low and medium yields, the remainder employing HE.

97. We believe that improvements in Western air defenses have led the USSR to provide its bombers with a more extended standoff missile capability. A longer range system (AS-3), is probably now operational. The AS-3, a supersonic missile with a maximum range of about 350 n.m., probably was designed primarily for use against land targets. We estimate that this missile is compatible with the BEAR heavy bomber; it may also be compatible with the BISON, but we have no evidence that it is intended for use with this aircraft. If this missile is designed solely for use by the BEAR, an operational inventory of about 100 AS-3 missiles is likely to be achieved within the next year or two. Because of the estimated 1-2 n.m. CEP of these missiles and their mission against land targets, they probably will be armed with high-yield nuclear warheads.

Long Range Aerodynamic Vehicles

98. There are indications of current Soviet interest in long range, cruise-type vehicles. We believe that the Soviets are developing, and could have available for operational use by 1962-1963, a ground-launched, ramjet propelled, unmanned vehicle, with a speed of about Mach 3, flight altitude of approximately 70,000 feet, and range in excess of 4,000 n.m. This system could be employed in a research role to investigate structures and propulsion systems in the Mach 3 region. If employed for weapon delivery or reconnaissance, it would complicate Western air defense problems, but it is impossible at present to predict the degree of reliance the USSR would place upon such a system.

E. Space Systems

99. Soviet space experiments provide indications that the USSR has the technical capability to develop space systems for military purposes and has acquired information useful to such a program. Systems developed in the near term would probably be designed for military support roles, such as reconnaissance, communications, electronic countermeasures (ECM), navigation, and warning. Based on our knowledge of recent earth satellites and the Venus probes, we believe it would be technically feasible for the Soviets to launch weapons of limited capability into orbit during the next five years. Considerable improvement in accuracy and reliability would be required to direct such weapons against specific targets in the West.

100. Soviet programming decisions concerning space weapons will depend in part on their success in solving problems relating to reliability, accuracy, and comparative cost-effectiveness. However, Soviet assessment of the psychological impact of such weapons may lead them to orbit a few vehicles during the period of this estimate, even though their military utility would be considerably less than their political effectiveness. These weapons could constitute the prototypes necessary for the development of improved space weapon systems later in the decade.

III. MAJOR SUPPORTING ELEMENTS

Bombs and Warheads

101. Soviet long range bombers and missiles assigned to attacking major military targets and centers of national power in US and Allied territory would employ high-yield nuclear bombs and warheads. These weapons are most compatible with the accuracies of Soviet ground-launched ballistic missiles having ranges of 700 n.m. and more, and with submarine-launched missiles of all ranges.

[30] For estimated performance characteristics of Soviet air-to-surface missiles, see Annex A, Tables 3-5. For potential coverage of maritime areas by medium bombers equipped with antiship missiles, see Annex B, Figure 5.

The Soviets have developed high-yield nuclear weapons suited to employment in warheads for these missiles, and there is extensive evidence on the provision of nuclear weapons storage and handling facilities at or near medium and heavy bomber bases.[31]

102. The USSR could adapt BW and CW munitions to its long range bombers and missiles, and it is possible that RW munitions could be employed in missile warheads. The technical and especially the operational problems involved would be severe, however. Further, Soviet planners would probably consider such weapons as useful primarily for certain specialized tasks, and best suited for medium range missiles where rapid exploitation could be achieved after employment of the weapon.

Long Range Reconnaissance Capabilities

103. In addition to information obtained through open sources, a primary Soviet means of preattack reconnaissance is communications intercept, from which the USSR almost certainly can obtain some information on the posture and movement of Western forces. These capabilities can be supported by the large Soviet direction-finding effort, which permits rapid search and location of Western communications circuits. Preattack reconnaissance could be further improved by the use of the satellites employing electronic and optical sensors; the Soviets are probably capable of launching such satellites at any time.

104. In conducting any long range attack, the Soviets would desire to learn as rapidly as possible which targets had survived their initial strikes. We have no direct evidence on the Soviet approach to this problem. One means available to them is the high-frequency backscatter technique, employing equipment with which they have long experience in other uses. In theory, existing antennas located within the USSR could rapidly determine the approximate locations and general yields of large nuclear explosions in the US. However, the Soviets could probably not be sure in advance whether this remote detection technique would be able to distinguish the exact location and yields of a large number of nuclear warheads detonating over the US within a short period of time. In any event, the information obtained would probably not be precise enough to be used for retargeting ICBMs, but it might assist in programming postattack reconnaissance more effectively.

105. More comprehensive damage assessment could potentially be achieved by employing reconnaissance satellites, the development and orbiting of which are now within Soviet capabilities. For more precise postattack reconnaissance, the USSR would probably use manned aircraft, which would have the advantage of being able to seek out and strike at targets missed in the first phase, or targets of uncertain location, without having to relay information to other attack components. There are no indications that the Soviets have developed special vehicles for this role, but some of their bombers could be so employed. Unmanned reconnaissance might be performed by the long range, surface-to-surface aerodynamic vehicle which we estimate could become operational in 1962–1963. Toward the end of the period of this estimate, increasing sophistication and effectiveness might be achieved by a combination of reconnaissance satellites, reconnaissance bombers, and perhaps communications satellites as well.

Electronic Warfare and Other Countermeasures

106. A wide range of active and passive equipment for ECM use is now operational in Soviet air and naval units. The devices, designed to counter Western electronic systems at all the widely used frequencies, include improved chaff, radar, and communications jammers, and various deception devices. Soviet military ECM capabilities are complemented by the unique Soviet experience in extensive, centrally controlled, selective jamming of Western broadcasts. At present, the USSR has an appreciable capability for jamming Western radars at most of the commonly-used frequencies

[31] For an estimate of current and future Soviet nuclear weapons capabilities, see the forthcoming NIE 11-2-61, "The Soviet Atomic Energy Program" (Limited Distribution). For details on the nuclear weapons suited to employment in specific Soviet missiles, see NIE 11-5-61, "Soviet Technical Capabilities in Guided Missiles and Space Vehicles," dated 25 April 1961, Annex E (Limited Distribution).

(up to 10,000 mc/s and possibly higher), and especially for jamming at those frequencies normally used in Western long range radio communications. Within the period of this estimate, we believe that it will have in operational use equipment capable of jamming all frequencies likely to be employed by Western communications, radar, and navigation equipment.

107. *Airborne systems.* All units of Long Range Aviation are probably equipped and trained in the use of both mechanical and electronic ECM. Although the Soviets might employ some bombers purely in an ECM role, all Soviet bombers can be equipped to carry chaff, and they have demonstrated capabilities for its employment under a wide variety of operational conditions. Air-to-surface missiles designed to home on radar transmitters, air-launched decoys to simulate bomber radar returns, and infrared decoy flares to counter heat-seeking air-to-air missiles may also be available. Soviet aircraft can be equipped with electronic jammers for use against early warning and GCI radars, missile control radars, airborne intercept radars, and air defense communications. Future improvements in Soviet airborne electronic jamming could include broader band jammers, higher powered equipment, more automatic operation, increased use of deception techniques, and advances in miniaturization.

108. *Countermeasures for naval use.* In recent years, the Soviets have given increased emphasis to development of shipboard ECM equipment, but such equipment is of only limited value to the long range striking forces. Because of the security risk, we doubt that Soviet submarines would employ active jamming, but passive intercept gear might be used to provide warning of enemy radar search activity. Soviet missile submarines are equipped to detect active sonars operated against them.

109. *Missile and satellite applications.* The Soviets probably are continuing research on the reduction of radar cross-sections of missile nosecones, and may achieve significant results within the next five years. They have probably experimented with various techniques for confusing radar, such as tankage vectoring and decoys to simulate missile nosecones. They may also develop active ECM for inclusion in ballistic missile nosecones.

110. *Massive disruption capabilities.* Soviet capabilities to disrupt Western strategic and tactical communications at the time of attack appear formidable. The Soviets have an excellent ground-based jamming capability, which is most effective within about 500 miles of Soviet territory. In addition, the cutting of trans-Atlantic cables by Soviet trawlers has demonstrated the vulnerability of this communications system. The Soviets probably are aware of the operational effects of high-altitude nuclear bursts on radar and communications, but we believe that they would consider this to be a relatively low priority utilization for high-yield weapons.

IV. IMPLICATIONS OF SOVIET CAPABILITIES

111. The Soviet long range striking forces presently comprise a mix of bombers, missiles, and submarines, and we believe that they will continue to include several types of weapon systems, though in changing proportions. At the present time, there is not so far as we know a unified command for those forces—Long Range Aviation is a major air command, missile-launching submarines and some medium bombers are assigned to the Soviet Fleet, and the newly-developed Rocket Forces have been designated a separate main component of the armed forces. For operational purposes, however, these elements, like all Soviet combat forces, are probably very closely controlled by the headquarters of the Minister of Defense.

112. Certain advantages and disadvantages arise from the existence of mixed forces. A mixed force permits flexibility in tactics and complicates the defensive problems of the US and its Allies. However, such a force poses problems of coordinating the operations of delivery systems with disparate characteristics against varied and widely dispersed Western nuclear delivery forces. The acquisition of large ballistic missile forces would tend to alleviate some of these problems but does not eliminate them.

113. The further development of Soviet long range striking capabilities will be placed largely by the growth of ICBM and other missile forces. Within the next few years intercontinental bombers will come to have increasingly specialized roles, including reconnaissance, reattack, and attack on very difficult targets. Reconnaissance functions could also be performed by satellites, and long range, unmanned aerodynamic vehicles could become available for special purpose use. Missile-launching submarine forces will gradually increase and will play a supplementary role to ICBM forces for attack on the US.

114. In initial attacks at present, the Soviets could direct combined missile and bomber attacks against the fixed bases associated with US retaliatory capabilities. Depending on the actual size of their ICBM forces at present, they may already be able to bring all SAC operational air bases under attack by missiles alone, and they almost certainly will be able to do so within the next year. With a force of several hundred ICBMs in 1963–1964, they will probably be able to reserve bombers for subsequent strikes and thus maximize the chances of surprise in their initial ICBM attacks. However, they would remain unable to target effective strikes against US hardened, mobile, and fast-reaction forces. Finally, Soviet long range striking forces are already capable of devastating major US metropolitan areas by direct attack or by fallout from attacks against retaliatory forces. The extent to which initial Soviet attacks would actually blunt US retaliatory capabilities, and the extent to which the Soviet defenses could cope with remaining US strengths, depend on factors which are outside the purview of an intelligence estimate.[33]

115. Soviet capabilities to retaliate against the US have been greatly improved by the growth of missile forces, and we believe that the USSR is already capable of delivering massive ICBM attacks on US population centers. Missile forces have much faster reaction times than Soviet bomber forces have had, and Soviet ICBM sites are afforded protection by concealment and secrecy. The Soviets will seek strenuously to maintain this protection for their ICBMs, and will probably deploy a new system whose survivability does not rest so heavily on successful concealment. A force of several hundred ICBMs, protected by concealment, dispersal, and later perhaps by hardening, would give the Soviets high assurance of a massive retaliatory capability.[33]

116. For operations against US and Allied forces in the Eurasian periphery, the growth of ballistic missile forces improves the Soviet capability to attack bases and fixed facilities with little if any tactical warning. Medium bombers equipped with antiship missiles are capable of seeking out and attacking US carrier task forces at sea within their range, but they would have difficulty in accomplishing timely and coordinated attacks against these targets of uncertain location. The long range striking forces would remain unable to target strikes against Polaris submarines at sea.

117. Thus, from the Soviet point of view, the achievement of ballistic missile forces has given rise to radically improved capabilities to attack the US and more efficient capabilities against peripheral areas. While there is no indication that the Soviets expect their long range striking forces to be able to deliver a decisive blow at the outset of a war, they clearly regard these forces, together with their other capabilities, as providing an umbrella under which they can pursue a highly assertive foreign policy.

118. For both political and military purposes, the Soviets probably believe that their best chance to acquire capabilities which would further alter the military equation sharply in their favor would arise from their development of new weapon systems. Specifically, such an opportunity could arise from the achievement of antimissile defenses in the 1963–1966 period. They may also look to the development of even more advanced offensive weapon systems later in the decade.

[33] The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, do not concur in paragraphs 114 and 115. They do not believe that the Soviets currently have a capability to bring all SAC operational air bases under attack by missiles alone or to deliver massive attacks on US population centers. For their estimate of current Soviet ICBM strength, see paragraphs 56–59.

ANNEX A

OPERATIONAL CHARACTERISTICS OF SOVIET WEAPON SYSTEMS

TABLE 1: CHARACTERISTICS OF GROUND-LAUNCHED BALLISTIC MISSILES BASED ON NIE 11-5-61

Summary Table IV

PROBABLE SOVIET DEVELOPMENT PROGRAM FOR GROUND-LAUNCHED SURFACE-TO-SURFACE MISSILE SYSTEMS [a]

Arbitrary Reference Designation	Initial Operational Capability Date [b]	Maximum Operational Range (n.m.) [c] [e]	Guidance	Operational Accuracy (CEP) [d]	Maximum Warhead [e] (lbs. and type)	REMARKS
SS-3 (SHYSTER)	1956	700	Radio/inertial	1 n.m.	3,000 Nuclear	Road mobile.
SS-4	Late 1958 Early 1959.	1,100	Radio/inertial	1½ n.m.	3,000 Nuclear	Road mobile.
SS-5	Late 1961 or 1st half 1962.	2,000	Radio/inertial	1½ n.m. or better.	4,000 Nuclear	Probably fixed sites.
SS-6	1 Jan 1960 [b] Mid-1960 [b]	5,000 7,000	Radio/inertial	1961-2 n.m. [f].	6,000-10,000 6,000 Nuclear	Heavy nosecone version. Lighter nosecone version.

Footnotes for Summary Table IV.

We believe that the Soviets are developing and could have available for operational use by 1962-1963, a ground-launched ram-jet propelled vehicle with a speed of about Mach 3, a flight altitude of about 70,000 feet, and a range in excess of 4,000 n.m.

In the time period 1961-1970 the Soviets will probably have under development follow-on ballistic missile systems. Desirable characteristics for such systems might include fast reaction times, storable liquid or solid propellants, improved guidance systems and greater flexibility. We would expect the Soviets to follow established development patterns by depending on proven components, simplicity, and high reliability.

[a] We evaluate this program as "probable" with varying degrees of confidence, concerning detailed characteristics. Each missile listed will probably go through various stages of development which are not necessarily reflected in this table.

[b] The date when the first operational unit is trained and equipped with a few missiles and launchers.

[c] Generally a ballistic missile can be fired to ranges as short as approximately one-third the maximum operational range without serious increase in CEP and to even shorter ranges with degraded accuracy.

[d] CEP is the radius of a circle within which, statistically, one-half of the impacts will occur. Inherent missile accuracies are somewhat better than the accuracies specified in the table which take into consideration average degradation factors. The accuracies specified are approximate figures which we apply to all ranges to which the missiles are likely to be fired.

[e] The type of warhead employed with Soviet ballistic missiles will vary with the specific mission of the missile. In general, however, we believe that for missiles with maximum ranges of 350 n.m. or less, high explosive (HE), nuclear, or chemical warfare (CW) warheads will be employed in accordance with Soviet military doctrine, depending upon nuclear stockpiles, missile accuracy, character of the target, and results desired. We estimate that for missiles with ranges of 700 n.m. and over, only nuclear warheads will be employed, although we do not exclude the possibility of CW use in 700 n.m. missiles for certain limited purposes. We believe that the USSR is capable of developing techniques for missile dissemination of biological warfare (BW) agents, although we have no specific evidence relating BW and missile research and development. In view of operational considerations we consider BW use in the ballistic missiles unlikely, although possible for certain special purposes.

[f] Should the Soviets so desire, ICBM accuracy could be improved to 1 n.m. as early as 1963, but we regard 1965 as a more likely date for such an achievement.

[g] It is pointed out that the rotation of the earth, the latitudes of the launch point and target affect the maximum range of a ballistic missile, with the influence becoming significant at the longer ranges. For the SS-5 and SS-6 maximum range indicated is nominal, for a nonrotating earth and in some cases, should be adjusted.

[h] For the views of the Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, see their footnotes to the Discussion.

TOP SECRET

TABLE 2: CHARACTERISTICS OF SUBMARINE-LAUNCHED MISSILES BASED ON NIE 11-5-61

Summary Table V

PROBABLE SOVIET DEVELOPMENT PROGRAM FOR NAVAL-LAUNCHED SURFACE-TO-SURFACE MISSILES SYSTEMS [a]

Arbitrary Reference Designation	Initial Operational Capability Date [b]	Maximum Operational Range (n.m.)	Guidance	Operational Accuracy (CEP) [c]	Maximum Warhead [d] (lbs. and type)	Configuration	REMARKS
SS-N-3.....	1961.....	300.....	A supersonic cruise missile designed for launching from surfaced submarines.				
SS-N-4.....	1958-Z class sub. 1959-G class sub.	150 or 350.....	Radio/inertial.....	1-2 n.m.....	1,500-2,000 Nuclear.	Ballistic....	Not launched submerged. Modified "Z" class carries 2. "G" class can carry 3.
SS-N-5.....	1962-1963...	500-1,000.....	Inertial.....	1-3 n.m.....	1,000 Nuclear.....	Ballistic....	6-12 missiles per sub. Launched submerged or surfaced.

[a] We evaluate this program as "probable" with varying degrees of confidence concerning detailed characteristics. Each missile listed will probably go through various stages of development which are not necessarily reflected in this table.

[b] The date when the first operational unit is trained and equipped with a few missiles and launchers.

[c] CEP is the radius of a circle in which, statistically, one-half of the impacts will occur. Inherent missile accuracies are somewhat better than the accuracies specified in the table which take into consideration average degradation factors, and for naval systems include the error in the location of the launching ship.

[d] Warhead includes the explosive device and its associated fusing and firing mechanism.

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TABLE 3: CHARACTERISTICS OF AIR-TO-SURFACE MISSILES
BASED ON NIE 11-5-61

Summary Table III

PROBABLE SOVIET DEVELOPMENT PROGRAM FOR AIR-TO-SURFACE MISSILE SYSTEMS [a]

Arbitrary Reference Designation	Initial Operational Capability Date [b]	Maximum Range (n.m.)	Operational Accuracy (CEP)	Maximum Warhead [c] (lbs. and type)	Cruise Speed (Mach No.)	Guidance	REMARKS
AS-1 [d] [e]	1956–1957	55	150 feet against ships	3,000 HE or Nuclear	0.8	Beam riding with semi-active homing.	Targets are primarily ships at sea with limited application with degraded accuracy against coastal targets. Carried by BADGER.
AS-2	Late 1960 Early 1961.	100	150 feet against ships; 1 n.m. against coastal targets.	3,000 HE or Nuclear	Low supersonic.	Radar terminal homing against ships.	Same targets as above. Imposes little if any restriction on launch aircraft (BADGER).
AS-3 [f]	Late 1960 Early 1961.	350	1–2 n.m. against land targets; 150 ft. against ships.	3,000 HE or Nuclear	1.5 to 2.0	All inertial against land. Terminal homing required against ships.	Probably carried by heavy bombers (BEAR and BISON).

OTHER: It is possible that the Soviets may develop ASM of 500–1,000 n.m. range and higher survival potential than the AS-3.

[a] We evaluate this program as "probable" with varying degrees of confidence concerning detailed characteristics. Each missile listed will probably go through various stages of development which are not necessarily reflected in this table.

[b] The date when the first operational unit is trained and equipped with a few missiles and launchers.

[c] Warhead includes the explosive device and its associated fusing and firing mechanism.

[d] System restricts the aircraft during launch to about 15,000 feet altitude with greatly reduced speed. The BADGER's radius is 1,250 n.m. when carrying one missile, 1,000 n.m. with two. This radius can be increased by about 35 percent by a single aerial refueling.

[e] The Assistant Chief of Staff Intelligence, USAF, believes that the BADGER's radius is 1,600 n.m. when carrying one air-to-surface missile, and 1,350 n.m. with two air-to-surface missiles.

[f] The AS-3 probably weighs 9,000 to 10,000 pounds; two could be carried by the BEAR or the BISON. A range degradation of 8–10 percent for these aircraft when carrying one missile, and 15–20 percent when carrying two is estimated.

TABLE 4: MISSILE RELIABILITY FACTORS BASED ON NIE 11-5-61

We have little information on which to base an estimate of the operational reliability of Soviet missiles. The following are considered as possible reliabilities. For several years after an IOC, the reliability of a missile system will probably improve, and then level off. Except where noted the following reliabilities are for the *current period*, and reflect improvements from the IOC date. In those cases where the IOC has been recent, or is in the future, improvements are generally specified.

US Designation	INITIAL OPERATIONAL CAPABILITY	Ready Missile Rate [a]	Reliability		REMARKS
			On Launcher [b]	In Flight [c]	
Air-to-Surface Systems: [d] [e]					
AS-1	1956–1957	*na*	90	80	55 n.m.
AS-2	Late 1960	*na*	80	70	100 n.m.
			(90)	(80)	(1963).
AS-3	Late 1960	*na*	80	70	350 n.m.
			(85)	(80)	(1963).
Surface-to-Surface (Ground Launched):					
SS-3	1956	85	90	80	700 n.m.
SS-4	Late 1958 or early 1959.	85	95	80	1,100 n.m.
SS-5	Late 1961 or early 1962.	75	80	75	2,000 n.m.
		(85)	(95)	(80)	(Late 1964–1st half 1965.)
SS-6	1 Jan 1960 [e]	70–85	85–90	70–85	As of mid-1961.
		(85–90)	(90)	(80–90)	(1963).
Surface-to-Surface (Naval-Launched): [d] [f]					
SS-N-4	1958/1959	*na*	95	80	"Z" and "G," 150 n.m./350 n.m.
SS-N-5	1962/1963	*na*	85	80 with subsequent improvement	500–1,000 n.m. Launched from nuclear sub.

[a] That percentage of missiles on launcher which are "ready missiles." A ready missile is an in-commission missile with warhead mated, mounted on an in-commission launcher in a trained unit which is considered ready to be committed to launch.

[b] The percentage of ready missiles which will successfully complete the countdown and leave the launcher within the required time limits.

[c] The percentage of missiles launched, the warheads of which actually detonate as planned in the target area (i.e., within three CEPs of the aiming point).

[d] In these categories, only those missiles considered good enough to try to launch will be loaded on ships and aircraft.

[e] The assumptions made for air-to-surface missiles do not include losses due to aircraft aborts which are caused by factors not related to missiles.

[f] Reliability figures are not available for the SS-N-3, a 300 n.m. cruise-type missile.

[g] For the views of the Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations (Intelligence), Department of the Navy, see their footnotes to the Discussion.

TABLE 5: MISSILE REACTION AND RELOAD TIMES BASED ON NIE 11-5-61

Surface-to-Surface Missiles

We have no good evidence on the reaction times of Soviet surface-to-surface missile units. However, based on our analysis of the characteristics of these systems and general Soviet capabilities, we estimate the following reaction times as of mid-1961:

a. SS-3 and SS-4: Although these systems are capable of varying degrees of mobility we estimate that they would be deployed to simple presurveyed sites when hostilities become imminent. The reaction times for units already deployed will vary with the degree of alert and will be approximately the same as discussed under SS-5 and SS-6 (ICBM) below. For units in transit at the time of alert, 2-4 hours will be required to launch the first missile after the unit has arrived at the presurveyed or prepared site.

b. SS-5 and SS-6 (ICBM): We estimate the SS-6, and probably the SS-5, will utilize fixed sites. The Soviet design philosophy, particularly in the respect to the fueling techniques employed at operational launch sites, will critically affect ICBM reaction times. Assuming that rapid reaction time has been a Soviet objective, we estimate the following minimum reaction times for ready missiles under the three alert conditions indicated:

Condition I: Crews on routine standby, electrical equipment cold, missiles not fueled. Reaction time 1-3 hours.

Condition II: Crews on alert, electrical equipment warmed up, missiles not fueled. Reaction time 15-30 minutes.

Condition III: Crews on alert, electrical equipment warmed up, missiles fueled and occasionally topped. This condition probably could not be maintained for more than an hour or so. Reaction time 5-10 minutes.

Air-to-Surface Missiles

ASMs have a short enough reaction and reload time that they are not the delaying factor in the takeoff of the aircraft.

Naval Missile Systems*

The reaction times in minutes for naval systems are estimated as follows:

	Alert	Routine	Reload Time	Remarks
SS-N-4	10	15	No reload	"Z" Class Sub
SS-N-5	5	15	No reload	Advanced Sub

* No estimates of reaction and reload times are available for SS-N-3, a 300 n.m. supersonic cruise missile designed to be fired from a surfaced submarine.

TABLE 6

ESTIMATED SOVIET LONG RANGE AIRCRAFT 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)

Combat Radius/Range (NM)[a]	BADGER	BISON	BEAR	BLINDER[e]
a. 25,000 lb. bombload	...	2,700/5,100	4,150/7,800	...
one refuel[b]	...	3,650/6,900	...	...
b. 10,000 lb. bombload	1,800/3,450	2,900/5,700	4,500/8,800	1,650/3,300
one refuel[b]	2,500/4,750	3,800/7,500	...	[f] 2,200/4,400
c. 3,300 lb. bombload	2,000/3,900	3,000/6,000	4,700/9,300	1,850/3,700
one refuel[b]	2,650/5,200	3,900/7,800	...	[f] 2,500/5,000
Speed Altitude (kts./ft.)				
a. Maximum Speed at optimum altitude (kts./ft.)[c]	555/14,200	535/18,800	500/25,000	1,035/36,000
b. Target Speed/Target altitude (kts./ft.)[c]	475/42,300	460/42,700	435/41,600	860/44,000
Combat Ceiling (ft.)[d]	46,700	45,900	40,300	55,000
Terminal Target Altitude (ft.)[c]				
a. 25,000 lb. bombload	...	53,900	47,200	...
b. 10,000 lb. bombload	52,500	55,400	48,000	59,300
c. 3,300 lb. bombload	54,300	56,100	48,700	60,000

[a] 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 on direct routes. The use of older model aircraft, standard mission profiles, indirect routes, low-level penetrations or other tactics designed to delay or evade detection and interception would reduce the effective range. The calculation of degradation in range and radius resulting from sophisticated penetration tactics is a complex process which can best be accomplished for individual missions.

As a rule-of-thumb measure however, for *low-level operations* by heavy bombers, the radius at optimum altitude will be decreased about 1.6 to 2 miles for every mile flown at sea level.

For missions with *air-to-surface* missiles carried externally, rule-of-thumb figures for combat radius are given in Table 3 of this Annex.

[b] Refueling estimates based upon use of compatible tankers which provide approximately 35 percent increase in radius/range.

[c] For 10,000 lb. bombload.

[d] Service ceiling at maximum power with one hour fuel reserves plus bombload aboard. No range figure is associated with this altitude.

[e] Jet medium bomber with supersonic "dash" capability of about Mach 1.5. Estimates of range and radius assume a "dash" of 200 n.m. at this speed.

[f] We have no evidence regarding refueling for the BLINDER.

TABLE 7

BOMBER SERVICEABILITY AND OPERATIONAL ATTRITION RATES

(Excluding Combat Attrition)

A. Aircraft in Commission

The following table is applicable to current types of Soviet bombers in operational units at home bases. Advanced types of aircraft or unusually complex airborne equipment would increase servicing and maintenance requirements and would probably result in lower in-commission rates for at least six months to a year after introduction. The higher in-commission rates shown in the table assume a 5–10 day maintenance standdown prior to initial operations, as well as intensive maintenance during operations. It should be noted, however, that in those geographic areas where climatic conditions are adverse, an additional 3–5 days of maintenance standdown might be required to achieve the percentages listed.

	Percentage Without Prior Standdown	Percentage With Prior Standdown	
		1st 7 days	2nd 7 days
Medium bombers ..	70	90	80
Heavy bombers	60	90	80

B. Aircraft Abort Rates

Attrition factors which should be applied to a total force in order to determine the number of aircraft that would arrive in the target area, exclusive of combat attrition, are based on Soviet maintenance practices, supply and operational activities, as well as US experience in comparable aircraft. The factors currently believed to be valid for planning purposes are as follows:

(a) 90 percent of aircraft at home bases would be in commission after standdown (See Table 7A, above).

(b) 85 percent of those aircraft in commission at home bases would be launched from staging bases (includes attrition enroute to and while at staging bases).

(c) 80 percent of those launched from staging bases and conducting unrefueled missions would arrive in target areas.

(d) 75 percent of those launched from staging bases and conducting refueled missions would arrive in target areas.

TABLE 8

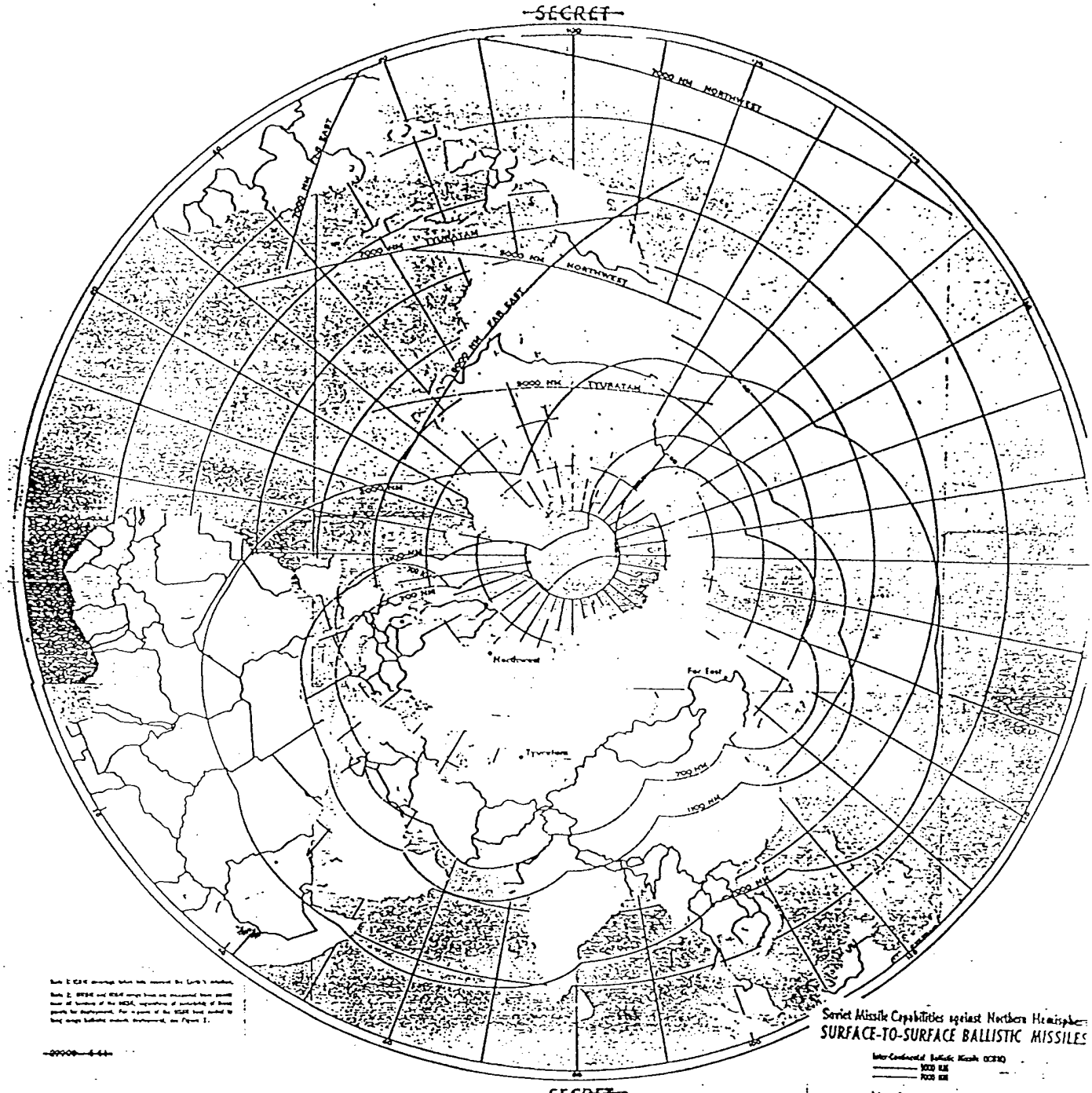
VISUAL AND RADAR BOMBING ACCURACIES

We consider that the proficiency of Long Range Aviation crews is such that they can, in training but under adverse conditions, navigate to an assigned target and bomb with the accuracies shown in the table below. The figures given would be degraded under combat conditions, and would also be degraded by the use of certain techniques for delivery of high-yield nuclear weapons, such as parachute drops.

Altitude	Visual Bombing	Radar Bombing	
		Well-defined Target	Poorly-defined Target
ft.	ft. CEP	ft. CEP	ft. CEP
50,000	2,900	2,400	3,100
40,000	2,100	2,000	2,700
30,000	1,400	1,700	2,300
20,000	900	1,400	2,100
10,000	400	900	1,600

ANNEX B

DEPLOYMENT AND TARGET COVERAGE OF SOVIET WEAPON SYSTEMS



Soviet Missile Capabilities against Northern Hemisphere
SURFACE-TO-SURFACE BALLISTIC MISSILES

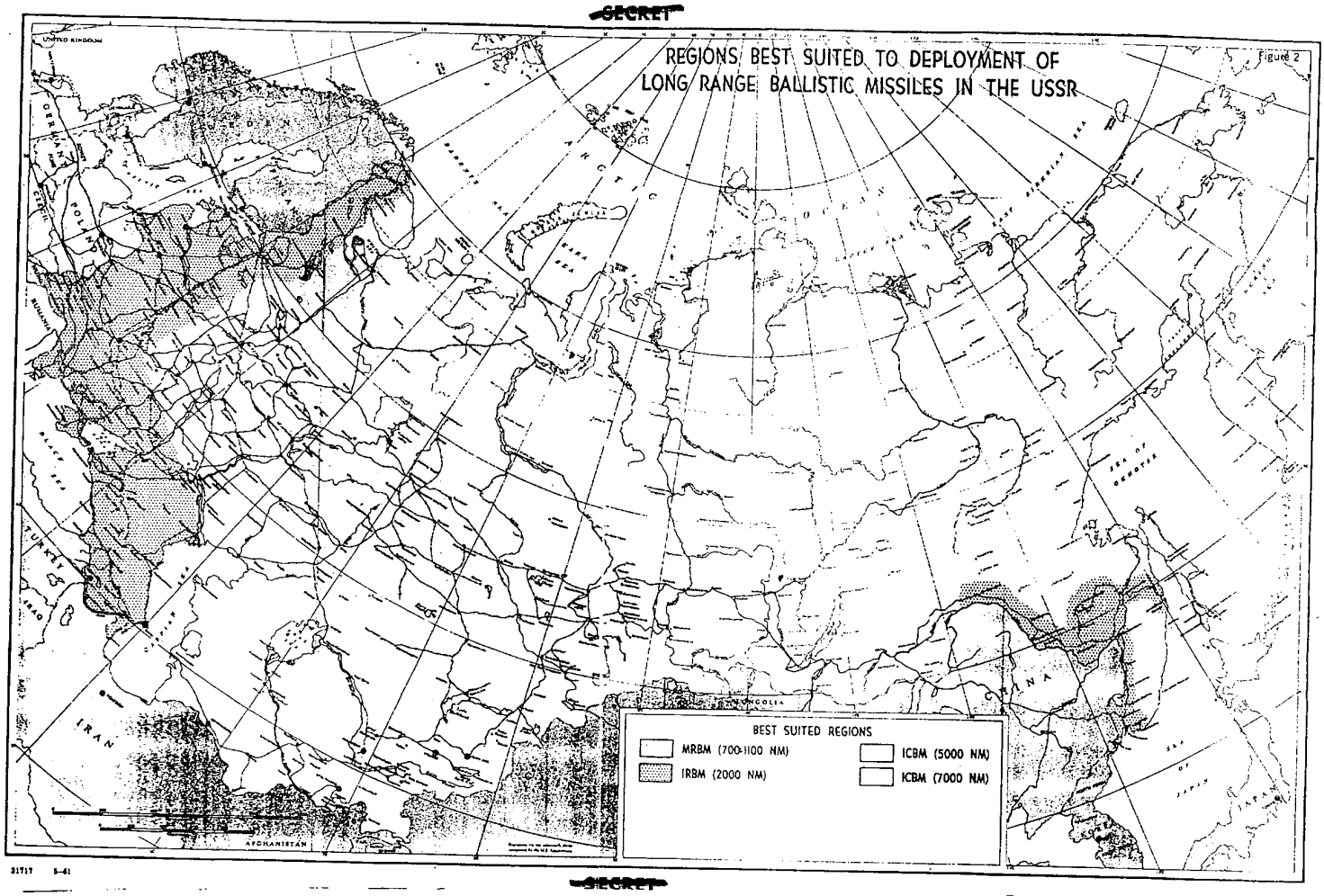


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Figure 3

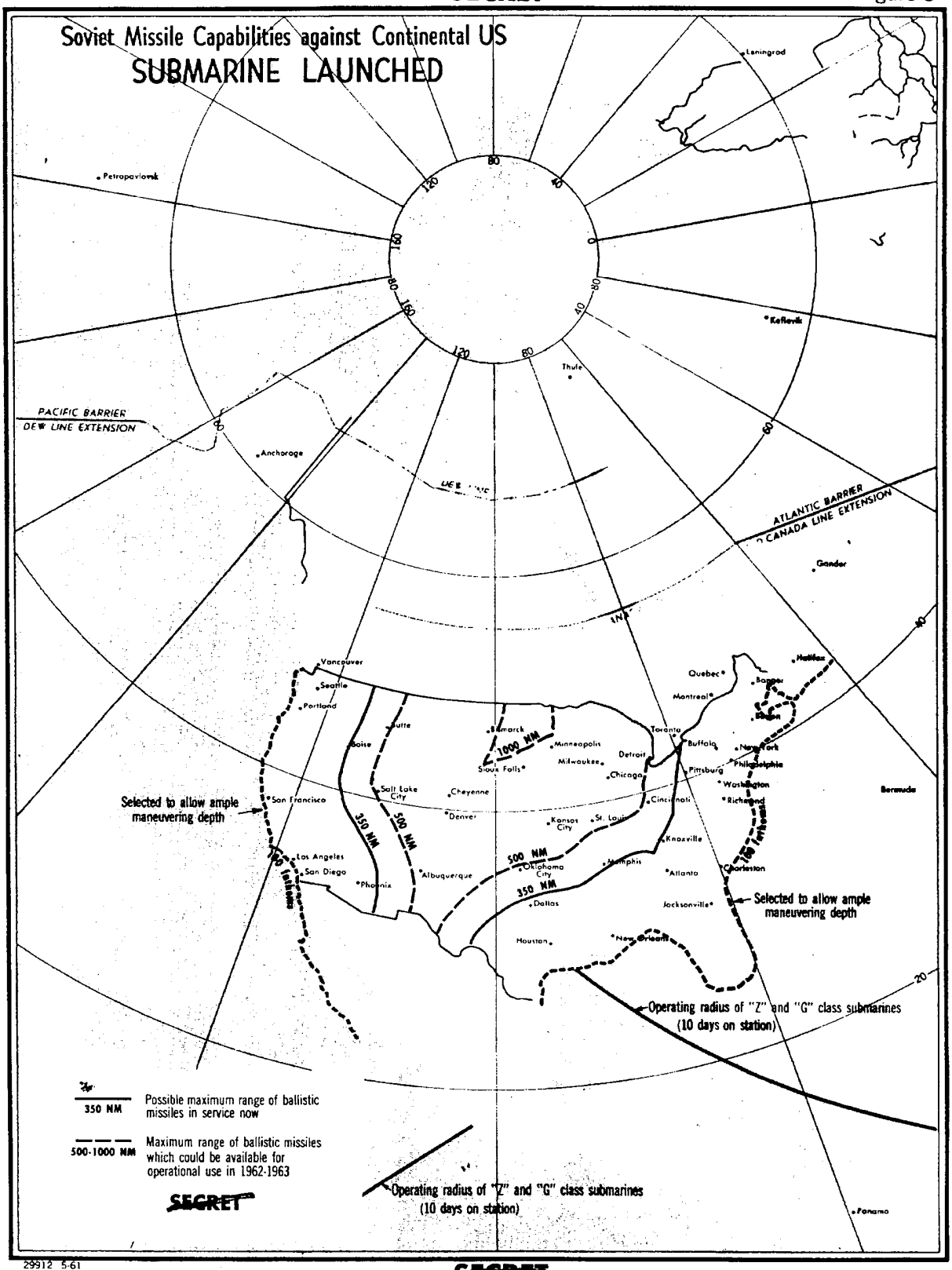

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Figure 4

Deployment of Soviet Medium and Heavy Bombers, Mid-1961

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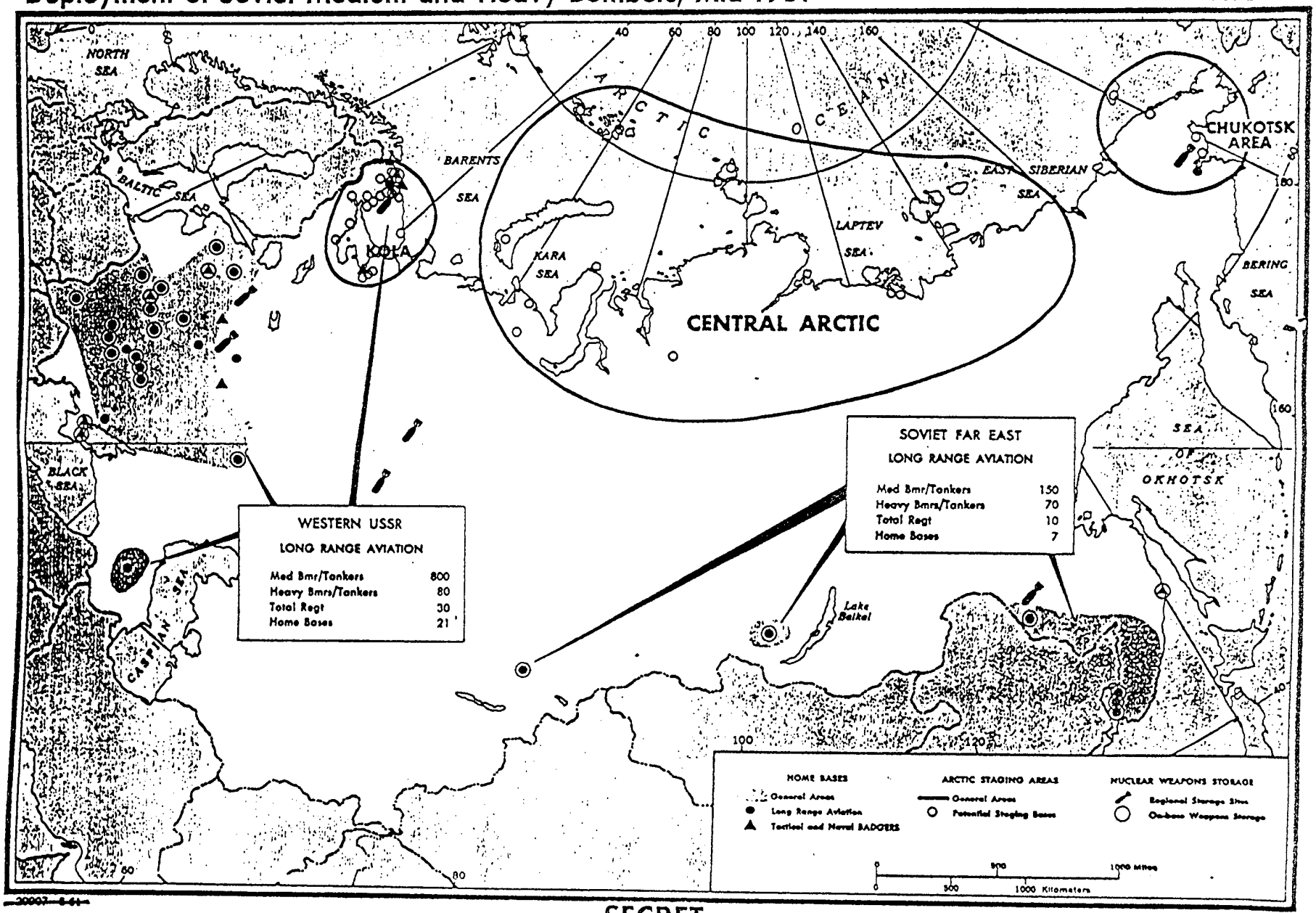

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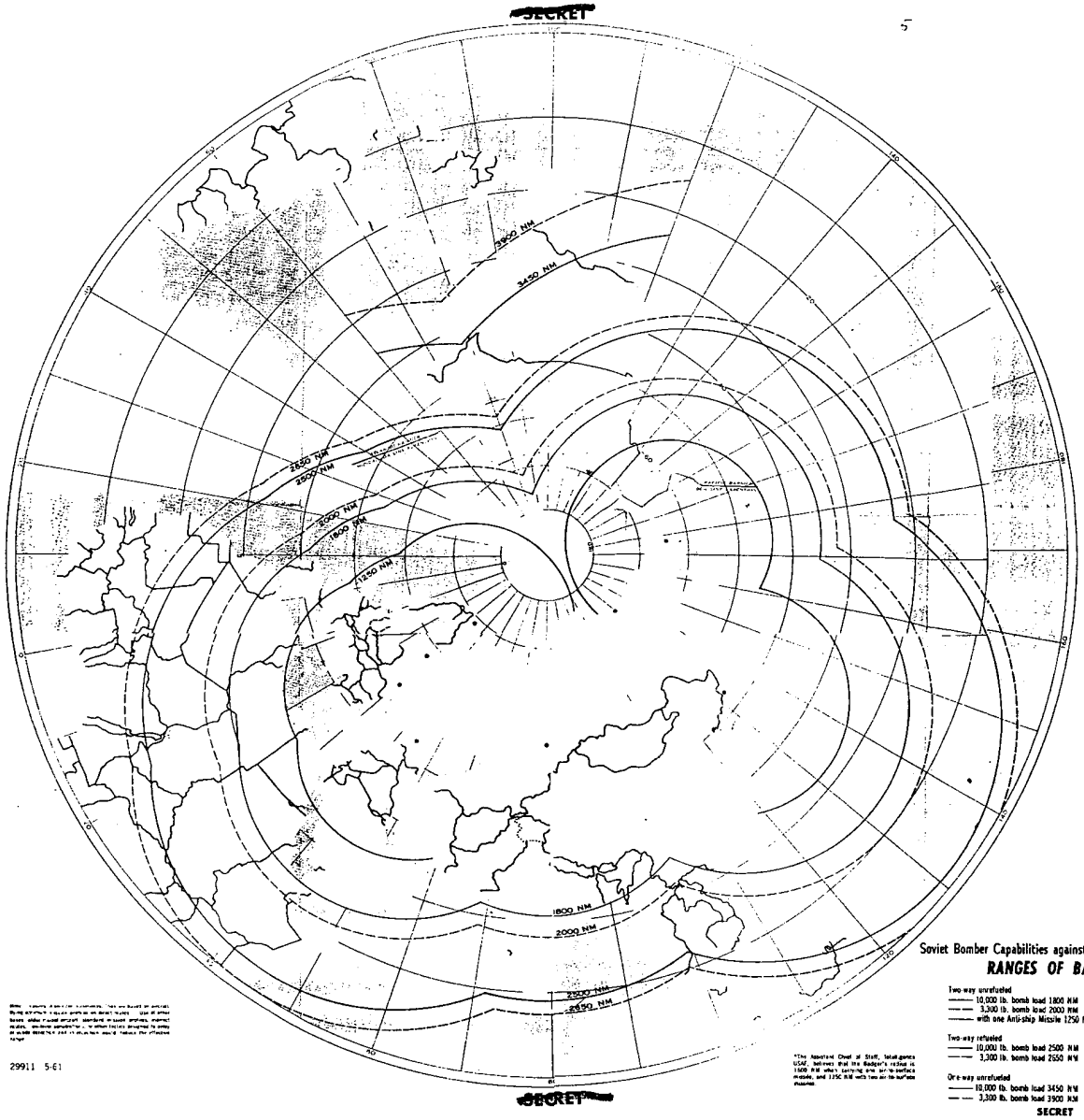

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Soviet Bomber Capabilities against Northern Hemisphere

RANGES OF BADGER

Two-way unrefueled
- 10,000 lb. bomb load 1800 NM
- 3,300 lb. bomb load 2000 NM
- with one Anti-ship Missile 1250 NM (Naval Badger only)*

Two-way refueled
- 10,000 lb. bomb load 2500 NM
- 3,300 lb. bomb load 2650 NM

One-way unrefueled
- 10,000 lb. bomb load 3450 NM
- 3,300 lb. bomb load 3900 NM

*The Assistant Chief of Staff, Intelligence, USAF, believes that the Badger's radius is 1600 NM when carrying one air-to-surface missile, and 1250 NM with two air-to-surface missiles.

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Figure 6

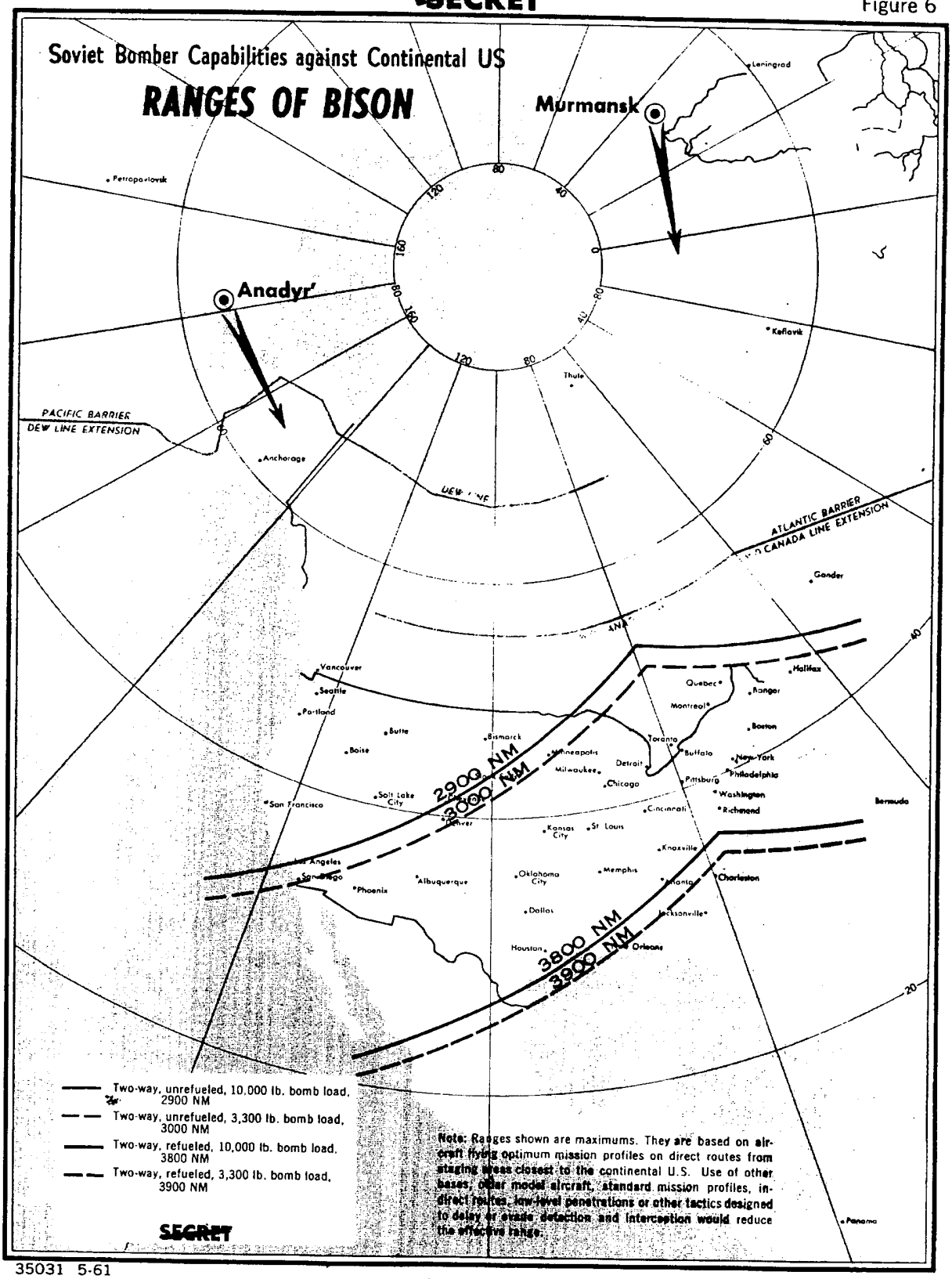

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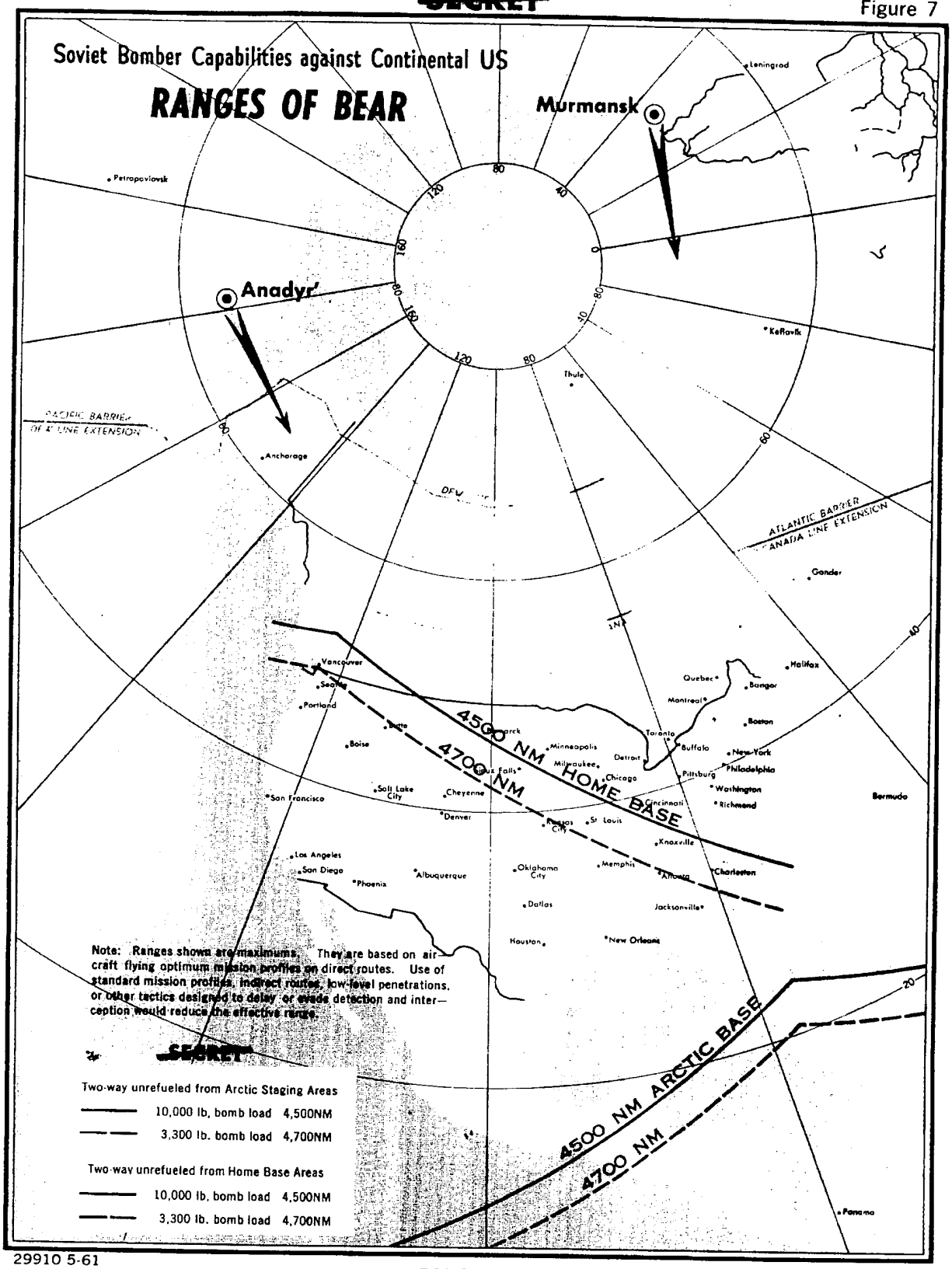
Figure 7



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