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NUMBER 11-8-62

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Soviet Capabilities For
Long Range Attack

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Submitted by the
DIRECTOR OF CENTRAL INTELLIGENCE

Concurred in by the
UNITED STATES INTELLIGENCE BOARD

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

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

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11 July 1962

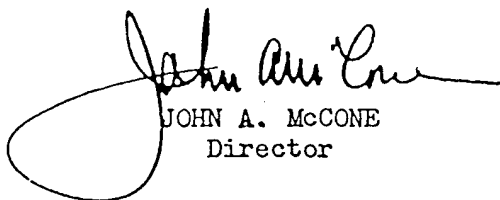
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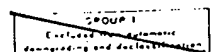
SUBJECT : Extreme Sensitivity of National Intelligence
Estimate 11-8-62, "Soviet Capabilities for
Long Range Attack"

1. In accordance with the wishes of the President, dissemination of NIE 11-8-62 has been carefully limited because of the extreme sensitivity of the information therein.

2. In this connection, I wish to stress that there be absolutely no reproduction of this Estimate, and that no revelation of the existence of this Estimate be made to unauthorized persons.


JOHN A. McCONE
Director

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SOVIET CAPABILITIES FOR LONG RANGE ATTACK

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THE PROBLEM

CIA HISTORICAL-REVIEW PROGRAM

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

CONCLUSIONS

1. Major new developments are evident in Soviet programs for long range striking forces. First, as forces for attack on Eurasia are reaching planned levels, greater emphasis is being placed on forces for intercontinental attack, especially ICBMs. Second, the Soviets are attempting to improve their capabilities for both preemptive and retaliatory action, by measures designed to shorten reaction times and increase survivability.

2. The tempo of the ICBM program has quickened. The present relatively modest force level of about 50 operational launchers will probably grow substantially, reaching some

¹The weapon systems considered are ground-launched missiles with ranges of 700 nautical miles (n.m.) or more, submarine-launched missiles, heavy and medium bombers, air-to-surface missiles, and advanced delivery and supporting systems such as orbital and suborbital vehicles. Emphasis is placed on those systems designed primarily to attack land targets in North America, and in Eurasia and its periphery.

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125-175 launchers in mid-1963 and 200-300 in mid-1964.² From 1963 onwards, an increasing proportion of the ICBM force will probably be deployed at launch sites having some degree of hardening.

3. The USSR is developing a submerged-launch ballistic missile submarine system, with medium or intermediate range missiles. This improved system will probably be incorporated into some portion of the 40 or so existing ballistic missile submarines, and into a new submarine class. Soviet submarines armed with cruise-type missiles are also capable of attacking land targets. Within the next few years, Soviet nuclear-powered missile submarines will probably be conducting regular patrols within firing range of the US.

4. For employment against Eurasia, the Soviets have built formidable missile and bomber forces, which they will continue to maintain and improve. Their limited bomber capability against North America will be tailored increasingly to conduct missions supplementary to ballistic missile attack.

5. The weight of nuclear attack which the USSR could launch will increase with the growth of long range striking forces and a general upward trend in weapon yields. Within the next few years, limited numbers of very high yield weapons in the 25-100 megaton range will be available for delivery by bombers and probably ICBMs. Ground-launched missile units are believed to have more than one missile per launcher, to provide a refire capability.

6. In the mid-1960's, the principal Soviet forces for attack on North America will be increasing numbers of ICBM launchers, supplemented by increasing numbers of nuclear-powered missile submarines and decreasing numbers of bombers. In a preemptive attack at that time, the USSR would be able to strike at the fixed bases of an important segment of the US nuclear delivery capability. Moreover,

² The Assistant Chief of Staff for Intelligence, Department of the Army, believes that the number of Soviet ICBM launchers is unlikely to exceed the low side of the ranges shown for mid-1963, and mid-1964.

³ The Assistant Chief of Staff, Intelligence, USAF, estimates the number of operational launchers as follows: mid-1962, 75-100; mid-1963, 175-250; and mid-1964, 300-450.

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it would have some prospect that a portion of its own long range striking forces could survive an initial US attack and go on to retaliate.

7. With the long range striking forces we estimate it will have in the mid-1960's, however, the USSR could not expect to destroy the hardened, airborne, seaborne, and fast reaction nuclear delivery capabilities of the US.

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DISCUSSION

SOVIET POLICY TOWARD LONG RANGE STRIKING FORCES

8. The Soviets regard forces for long range attack as essential for supporting an aggressive political posture, deterring the West from resort to military action, and fighting a war as effectively as possible should one occur. In our view, they are building forces which they regard as appropriate to these objectives rather than attempting to achieve the very high degree of superiority required to launch a deliberate attack on the West. Efforts to gear their forces better for both preemptive and retaliatory operations, along with greater emphasis upon forces capable of attacking the US, are the major new developments in the Soviet programs for long range striking forces.

9. In building these forces, the Soviets put initial stress on creating a massive capability against Eurasia and its periphery. Intercontinental capabilities were not neglected, but deployment of medium range delivery systems occurred earlier and in much larger numbers. This pattern is probably changing. We believe that deployment of medium range systems is approaching the planned level, and that major emphasis is now being given to further development of forces for intercontinental attack, primarily ICBMs.

MAJOR WEAPON PROGRAMS, 1962-1964

Intercontinental Ballistic Missiles

10. The tempo of ICBM development and deployment has quickened noticeably in the past year or two. While present force levels are relatively modest, there is good evidence that the Soviets have been conducting high priority R&D on new ICBM systems, with con-

current construction of deployment complexes. Moreover, the Soviets are probably building new sites with some degree of hardening.

11. *Development and Deployment.* During the past 18 months, activity on the Soviet ICBM test range has intensified, with firings of three different types of ICBMs. The most urgent recent program at Tyuratam has been the development of the second generation SS-7 ICBM system, which is now being deployed. Testing of the SS-8 ICBM has proceeded at a slower pace; it could be available for operational use in 1963. Firings of the first generation SS-6 ICBM, which probably became operational in 1960, have been at a reduced pace. We believe that within the next year or so the Soviets will begin firing new ICBMs or space vehicles which are as yet unknown to US intelligence.

12. The urgency apparent in the development of the second generation ICBM almost certainly relates to a Soviet decision to deploy the first generation system in only limited numbers. The SS-6 ICBM is a very large vehicle of nearly half a million pounds gross takeoff weight, with nonstorable liquid propellants and radio-inertial guidance. Ground control and support facilities are correspondingly large and include rail service direct to launchers. The second generation SS-7 ICBM is simpler and considerably less bulky, and probably employs storable liquid propellants and all-inertial guidance. A typical SS-7 complex consists of a rail-served support area and eight or more launchers, which are deployed in pairs and are road-served.

13. *Probable Hardening.* All currently operational Soviet launchers are deployed at soft, fixed sites, but we believe the Soviets have

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probably initiated a program to construct launch sites having some degree of hardening. Considering past Soviet practices, we estimate that there will be two ICBM launchers at each site. The first of these new sites will probably be operational in early 1963. It is probable that such sites are to employ either the SS-7 ICBM with redesigned ground support equipment or the SS-8 ICBM. Our information on the SS-8 system is inadequate to determine whether the missile employed is even larger than the SS-6 or whether it is smaller than the SS-7.

14. *Estimated Force Levels to 1964.* The ICBM force will increase substantially above its present level in the next year or so. Our estimate of the growth of the force in this period is affected, on the one hand, by the increasing tempo of the Soviet program, and on the other hand, by the greater time and effort required to build hardened launch sites. Considering these factors, together with all the other evidence available to us, we estimate as follows the size and composition of the ICBM force to 1964:

OPERATIONAL SOVIET ICBM LAUNCHERS, 1962-1964			
	Mid-1962	Mid-1963	Mid-1964
Soft 1st Generation (SS-6)	6-10	6-10	6-10
Soft 1st Generation (SS-7)	40-45	110-140	150-200
Hardened		10-25	50-100
Approximate Total	50	125-175	200-300

* The Assistant Chief of Staff for Intelligence, Department of the Army, believes that the number of Soviet ICBM launchers is unlikely to exceed the low side of the ranges shown for mid-1963 and mid-1964.

* The Assistant Chief of Staff, Intelligence, USAF, estimates about 75-100 operational ICBM launchers in mid-1962. He would estimate the force levels through 1964 as follows:

TOTAL LAUNCHERS			
	Mid-1962	Mid-1963	Mid-1964
SS-6	10-25	10-25	
SS-7	65-75	145-185	250-300
Hardened		20-40	50-150
Total	75-100	175-250	300-450

Medium and Intermediate Range Ballistic Missiles

15. MRBM and IRBM sites, each with four pads, are soft, fixed, and road-served. More than 90 percent are deployed in a broad belt of Western USSR stretching from the Baltic to the Black Sea, within range of NATO targets in Norway, most of Western Europe, and Turkey. A lesser concentration of sites in the Soviet Far East is capable of bringing Japan, Korea, and Okinawa under fire. A few sites in south central USSR are within range of US and Allied military installations in Turkey and Pakistan. IRBMs could extend the target coverage from these various areas to include all of Spain, North Africa, Taiwan, and the northern Philippines.

16. We estimate that the USSR now has about 500 operational MRBM and IRBM launch pads. We do not have evidence that all of these launch pads are manned, and it is possible that some of them represent alternate firing positions. The site construction program has probably slowed but not ceased. The force will probably grow over the next year or two to a total of about 550-650 launch pads (including some 50-100 IRBMs), after which it will probably level off.

Operational Procedures of Missile Units

17. ICBM, IRBM, and MRBM units are believed to have refire capabilities. Although the evidence is not firm, we believe that an average of two missiles is provided for each launch pad. Preparation to fire initial and subsequent salvos probably requires a number of hours. Sophisticated methods of attaining a high degree of simultaneity and flexibility in operations are not believed to be employed. The USSR is working to reduce the reaction and refire times of strategic missile units, but current system designs will preclude the constant maintenance of readiness conditions approaching those of US systems.

Submarine-Launched Missiles

18. The Soviets now have operational about 40 long range ballistic missile submarines, including 7 diesel-powered "Z" class, 25 diesel-powered "G" class, and 10 nuclear-powered "H" class submarines. This force carries a total of about 120 ballistic missiles with ranges up to 350 n.m. The effectiveness of these submarines is limited by the small number of missiles each carries, the short range of the missiles, and the requirement for submarines to surface for launching. There is reliable evidence, however, that the Soviets are now developing a capability to launch ballistic missiles from submerged submarines. The range of the missiles may be either 650 or 2,000 n.m. A program to retrofit some portion of the existing force of about 35 "G" and "H" class submarines will probably begin soon. All of these submarines could be so equipped within the next two to four years. A new nuclear-powered submarine class is probably also under development to employ this new missile system; we estimate that the first such submarine could become operational in 1963-1964. The probable numbers of ballistic missile submarines in Soviet operational units through mid-1964 are estimated as follows:

SOVIET BALLISTIC MISSILE SUBMARINES, 1962-1964

	Mid-1962	Mid-1963	Mid-1964
Diesel-powered	32	32-35	32-35
Nuclear-powered	10	12-15	15-20

19. The Soviet Navy has also developed 350 n.m. submarine-launched cruise missile systems, designed primarily for low altitude, supersonic attack against Western surface ships, particularly carrier task forces. They are now carried by a few converted diesel-powered submarines and at least four nuclear-powered submarines. We believe that the Soviets are now extending their capability to attack land targets with missiles of this type.

Long Range Aviation

20. Soviet Long Range Aviation, by reason of its equipment, basing, and deployment, is much better suited to Eurasian operations than to intercontinental attack. We estimate that as of mid-1962 Long Range Aviation comprises some 165 heavy bombers and 950 jet medium bombers.⁶ Virtually all of the medium bombers are BADGERS, but a few supersonic BLINDERS have probably now been delivered to units. It is unlikely that a new heavy bomber will be developed for operational use.⁷ Recent trends indicate little change in total aircraft strength over the next two years.

ESTIMATED STRENGTH OF LONG RANGE AVIATION, 1962-1964

BOMBERS AND TANKERS	Mid-1962	Mid-1963	Mid-1964
Heavy ^a			
BISON	110	110	100
BEAR	55	55	50
Total	165	165	150
Medium			
BADGER	950	900	800
BLINDER	a few	50	100
Total	950	950	900

^aThe Assistant Chief of Staff, Intelligence, USAF, believes that the heavy bomber force will have the composition included in the following table:

BOMBERS AND TANKERS	Mid-1962	Mid-1963	Mid-1964
Heavy			
BISON	120	120	115
BEAR	80	80	75
Follow-on	10
Total	200	200	200

⁷The Assistant Chief of Staff, Intelligence, USAF, believes that a follow-on heavy bomber will be introduced in 1964. The continued research and development of large supersonic aircraft substantiates the Soviets' interest in large supersonic vehicles and indicates their intent to increase their strategic attack capabilities by such means.

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21. In attempting to overcome the range limitations of Long Range Aviation for inter-continental attack, the Soviets have given considerable emphasis to aerial refueling and Arctic training in BADGER and BISON units. Most of the BEARs have been modified to deliver 350 n.m. air-to-surface missiles. We believe that the Soviets might plan to commit as many as 400-500 aircraft to initial attacks on North America. Considering a variety of operational factors, but excluding combat attrition, we estimate that the Soviets could now put about 200 bombers over North America on two-way missions in initial attacks; of these nearly half could be heavy bombers. The patterns of Arctic training and base utilization indicate that aircraft would probably be staged through a few bases in successive waves over a number of hours.*

Nuclear Weapons

22. The present Soviet stockpile consists almost entirely of weapons developed from nuclear tests conducted prior to the 1961 test series. Most of the weapons allotted to Long Range Aviation are probably high-yield types ranging from about 100 KT to 8 MT. Ballistic missiles now in service could deliver warheads with maximum yields in the megaton range. MRBMs are probably also equipped with lower yield warheads. Naval cruise-type missiles and air-to-surface missiles are probably armed with warheads of low or medium yield for use against ships, but could deliver warheads in the low megaton range against land or coastal targets. The general trend in the yields of weapons allotted to long range attack will probably be upwards. A few very high-

* The Assistant Chief of Staff, Intelligence, USAF, believes that the Soviets would use a number of bases for staging and would not be restricted in their mode of attack. He further believes that the Soviets could commit about 750 aircraft to initial two-way attacks on North America. Considering operational factors and allowing for noncombat attrition, about 300 bombers could reach North American targets.

yield bombs of 25 MT, or even 100 MT, could now be available. It is possible that a few ICBMs capable of delivering these very high yield weapons could be available within the next two years.†

TRENDS IN LONG RANGE STRIKING FORCES, 1965-1967

23. In the middle 1960's the USSR will continue to strengthen and modernize its long range striking forces, with emphasis on those systems capable of attacking the US. The effort devoted to long range attack forces will be affected by the competing demands of other essential military and nonmilitary programs. We cannot estimate with confidence the decisions the Soviet leaders will make or the success they are likely to achieve in various weapons programs. However, we believe that while a mixed striking capability will be retained, the ICBM will be the dominant weapon.

ICBM Forces

24. The Soviet ICBM program will be influenced by a variety of factors: Soviet strategic concepts, technical improvements, other Soviet weapons programs, the nature and size of Western forces, and the international situation. These factors place broad limits on the future Soviet ICBM force but do not lead us to a particular program. For this reason we can only estimate the Soviet force level within a broad range. All things considered, we believe the Soviet force level in mid-1967 will be within the range of 300-600 operational launchers. The majority of launchers will probably have a degree of hardening, including some fully hardened. To achieve the high side of the range, the USSR would need to commit resources throughout this period at rates at least as high as those now evident in the ICBM program. Many of the launchers will probably have more than one

† For a detailed discussion of Soviet nuclear weapon characteristics, see NIE 11-2-62, "The Soviet Atomic Energy Program," dated 18 May 1962, TOP SECRET (Limited Distribution).

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missile available, to provide a refire capability. Our estimate, reflecting the considerable range of uncertainty in any figures for this period, is as follows:

OPERATIONAL SOVIET ICBM LAUNCHERS,
1965-1967 " " "

	Mid-1965	Mid-1966	Mid-1967
Soft	150-250	150-250	150-250
Hardened	100-175	125-250	125-250
Fully Hard	0-a few	a few-25	25-100
Approx. Total	250-425	275-525	300-600

25. The smaller force would give the Soviets high assurance in an initial attack of destroying US soft fixed nuclear bases, semihardened ICBM sites, communication and control facilities, and the principal US metropolitan areas. The larger force would provide an additional attack capability against some hardened targets, control centers, and other elements contributing to US striking and defensive strength, and would increase the Soviet retaliatory capability. We believe that the programmed buildup in US intercontinental attack forces makes it increasingly unlikely that the Soviets would judge that they could launch an attack on US nuclear forces and inflict sufficient damage to assure that resulting damage to the USSR was acceptable.

26. The accuracy, reliability, and reaction time of the ICBM force will improve. Better command, communications, and other equipment will increase its flexibility and capability for simultaneous attack. The bulk of the force will probably be equipped with warheads

" The Assistant Chief of Staff for Intelligence, Department of the Army, believes that the force level is likely to be towards the low side of the estimate presented in the table above.

" The Assistant Chief of Staff, Intelligence, USAF, believes the operational Soviet ICBM launchers for the period 1965-1967 will be as follows:

	Mid-1965	Mid-1966	Mid-1967
Soft	250-300	250-300	250-300
Hardened	150-200	150-200	150-200
Fully Hard	About 50	About 150	About 300
Total	450-550	550-650	700-800

in the [] range, but a number of [] missiles and [] missiles will probably be available. To improve the survivability of the force, the Soviets will probably continue to deploy ICBMs at launchers which are dispersed and have some degree of hardening. They will also probably develop a fully hardened system which we believe could become operational in 1965 or 1966.

MRBM and IRBM Forces

27. Soviet strength in these systems will probably have been stabilized before 1965 at approximately 550-650 operational launch pads. To improve the survivability of the MRBM force, the Soviets may also develop road mobile or hardened systems.

Submarine-Launched Forces

28. Soviet planners will probably look upon submarine missile forces as an important supplement to their ICBM strength because of their relative invulnerability and their capability for varying the direction and nature of attacks on the US. We believe that the number of nuclear-powered submarines capable of launching ballistic missiles will be on the order of 25-30 in mid-1967. The Soviets will probably also have about two dozen nuclear submarines equipped with cruise-type missiles. In addition, diesel-powered missile submarines will remain in operation. The ranges of submarine-launched missiles may be extended to as much as 2,000 n.m. for ballistic missiles, and to 650 n.m. for cruise missiles. By the mid-1960's, some Soviet nuclear-powered missile submarines will probably be conducting regular patrols within missile range of US coasts.

Bomber Forces

29. With the growth and improvement of missile capabilities, the Soviets would probably plan to employ bomber forces in follow-on attacks after initial missile strikes had been delivered or to supplement the retaliatory blow if the USSR were attacked first. Aircraft

equipped with improved penetration aids and nuclear weapons would probably be used for increasingly specialized missions, such as armed reconnaissance and attacks on hard targets. By mid-1967, Long Range Aviation will probably include some 750 medium bombers, about one-third of them supersonic BLINDERS. Heavy bomber strength will probably have been reduced to about 100 aircraft. We estimate as follows the strength of Long Range Aviation in the mid-1960's:

BOMBERS AND TANKERS	Mid-1965	Mid-1966	Mid-1967
Heavy ¹²			
BISON	90	80	70
BEAR	45	40	35
Total	135	120	105
Medium			
BADGER	700	600	500
BLINDER	150	200	250
Total	850	800	750

SPACE SYSTEMS

30. We have no evidence of Soviet plans or programs for the military use of space. We think it highly unlikely, however, that the USSR would omit this field in its vigorous search for qualitative improvements in its military posture and for achievements with which to support claims of superiority. We believe that the Soviets could launch reconnaissance, communications, meteorological, navigation, or geodetic satellites at any time. There is

¹² The Assistant Chief of Staff, Intelligence, USAF, believes that the heavy bomber force will have the composition included in the following table (see footnotes 6 and 7):

BOMBERS AND TANKERS	Mid-1965	Mid-1966	Mid-1967
Heavy			
BISON	110	100	90
BEAR	70	60	50
Follow-on	20	40	60
Total	200	200	200

no evidence that the Soviets are working to develop offensive space weapon systems, but the course of the Soviet space program to date suggests that any effort in this field would be directed toward an orbital bombardment vehicle. It would be technically feasible for the Soviets to launch weapons of limited capability into orbit in the mid-1960's, but we do not believe they could achieve an effective offensive capability by the end of the decade.¹³

IMPLICATIONS OF CAPABILITIES

31. The capabilities of Soviet long range striking forces will be only in part a function of the numbers of weapons available, their performance, and the adequacy of supporting elements. Equally critical will be the way in which the Soviets employ their striking forces, their ability to maximize the effects of these forces under the various circumstances in which war could begin, and their assessment of Western capabilities and plans.

32. The current Soviet targeting concept reflects the view that even a general nuclear war is likely to be protracted and that victory requires the reduction of all elements of the Western warmaking potential. These elements include: the bases of strategic delivery systems; nuclear weapons facilities; communication and governmental centers; military and war supporting industry. We have no evidence that avoidance of heavy civilian casualties is among the objectives underlying Soviet targeting.

¹³ The Assistant Chief of Staff, Intelligence, USAF, believes that a Soviet orbital bombardment capability could be achieved prior to the end of the decade. Based on technical considerations and using a (large) SS-8 booster and techniques known to exist today or to be within Soviet capability, he believes that such a system could be developed as early as 1965. This system could be composed of orbital vehicles of 30,000 pounds gross weight, which could deorbit a very high yield weapon to a CEP of 4 n.m. initially and later to 1.8 n.m.

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33. Should the Soviets conclude that the West was irrevocably committed to an imminent nuclear attack on the USSR, they would launch their available ready forces in a preemptive attack designed to blunt the expected Western blow. The mixed force which they have available for such operations would permit flexibility of tactics and complicate Western defensive problems, but would pose severe difficulties of coordination. Initial missile and bomber attacks against the US would probably extend over a period of many hours, and those against Eurasia over at least a few hours. We believe that at present the Soviets would plan to employ few if any missile submarines in initial attacks against the US; initiation of routine submarine patrols within missile range of the US could change this situation.

34. By the mid-1960's, the USSR will have acquired a substantial missile capability to deliver nuclear weapons against the US, in addition to its already formidable forces for strikes in Eurasia. Significant portions of this force will be relatively invulnerable to attack. The Soviets will be in a position to strike preemptively at the fixed bases of an important segment of the US nuclear delivery force, and they will have some prospect that a portion of their own force could survive an initial US attack and retaliate with high yield nuclear weapons. With the long range striking forces we estimate that they will have in the mid-1960's, however, the Soviets could still not expect to destroy the growing numbers of US hardened, airborne, seaborne, and fast reaction nuclear delivery vehicles.

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TABLES

SOVIET WEAPON SYSTEMS FOR LONG RANGE ATTACK

Glossary of Missile Terms

Table 1—Ground-Launched Ballistic Missiles

Table 2—Submarine-Launched Missiles

Table 3—Air-to-Surface Missiles

Table 4—Medium and Heavy Bomber Weapon Systems

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GLOSSARY OF MISSILE TERMS

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

Circular Error Probable (CEP) - 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 tables, which take into consideration average operational factors. The accuracies specified for naval systems include the error in the location of the launching ship.

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

Nosecone/ Re-Entry Vehicle - The housing of the warhead plus the warhead.

Ready Missile Rate - 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. Ready missile rate is the percentage of missiles on launcher which are "ready missiles".

Reliability, on Launcher - The percentage of ready missiles which will successfully complete countdowns and leave their launchers at scheduled times or within 15-30 minutes thereafter.

Reliability, in Flight - The percentage of missiles launched which detonate as planned in the target area (i.e. within three CEPs of the aiming point).

Maximum Operational Range (n.m.) - Maximum range under operational conditions with warhead weight indicated. For long range ballistic missiles, the maximum range figures disregard the effect of the earth's rotation. The maximum effective range of such missiles fired on easterly trajectories would be greater than that indicated; those on westerly trajectories would be less. In general, ballistic missiles can be fired to ranges of as short as 1/3 of maximum figures listed without degradation in accuracy.

Readiness Conditions:

Condition 4: Launch crews not on alert. Nosecone and missile not checked out and not mated. Missile guidance system not adjusted for particular target. Missile not erected or fueled.

Condition 3: Launch crews in launch area and on alert. Missile and nosecone in pre-launch storage building, mated and checked out.

Condition 2: Launch crews on station. Missile with nosecone erected on launch pad. Propellant facilities in position, attached, and ready to start propellant loading. Guidance system set.

Condition 1: Missile propellant loading completed. Guidance system checked.

Reaction Time - Time required to proceed from a readiness condition to firing.

Refire Time - Time required to refire from the same pad.

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TABLE 1
GROUND-LAUNCHED BALLISTIC MISSILES
Estimated Characteristics and Performance

Designation	Shyster SS-3	Sandal SS-4	SS-5	Cat A SS-6	Cat B SS-7	Cat C SS-8
Initial Operational Capability	1956	late 1958	late 1961- early 1962	1960	first half 1962	1963
Max. Operational Range (n.m.)	700	1,100	2,200	6,000	6,000	at least 6,000
Guidance	Radio- inertial	All- inertial	All- inertial	Radio- inertial	All- inertial	Radio- inertial
Accuracy (CEP) n.m.	1	1.0-1.5	1.5	2	1-2	Less than 2
Warhead Weight (lbs)	3,000	3,000	?	6,000	3,000	?
Gross Takeoff Weight (lbs)	66,000	75,000	?	500,000	300,000	?
Configuration	Single stage	Single stage	Single stage	Partial or parallel	Tandem	Tandem
Propellants	Non-stor. liquid	Stor. or non-stor. liquid	Stor. liquid	Non-stor. liquid	Stor. liquid	Non-stor. liquid
Ready Missile Rate	80%	80%	80%	85%	80%	?
Reliability, on Launcher	90%	90%	80%	85%	80%	?
Reliability, in Flight	80%	85%	85%	85%	85%	?
Reaction Time	4: 8 hrs.	8 hrs.	8 hrs.	16 hrs.	10 hrs.	?
From	3: 2½-5 hrs.	2½-5 hrs.	2½-5 hrs.	12 hrs.	6-10 hrs.	?
Readiness	2: 3/4-2 hrs.	3/4-2 hrs.	½-1 hrs.	1-2 hrs.	½-1 hrs.	?
Condition	1: 20-40 min.	20-40 min.	5-15 min.	5-15 min.	5-15 min.	?
Hold Time, Condition	1: 1-2 hrs.	?	many hrs.	1 hr.	many hrs.	?
Refire Time	4-6 hrs.	4-6 hrs.	6-8 hrs.	16 hrs.	10 hrs.	?

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TABLE 2
SUBMARINE-LAUNCHED MISSILES
Estimated Characteristics and Performance

	SS-N-3	SS-N-4
IOC	1961	1958-Z conversion 1959-G 1960-H
Maximum Operational Range (n.m.)	350	350
Type	Cruise	Ballistic
Cruise Altitude and Speed	1,000-3,000 ft., low supersonic	Not applicable
Guidance	Programmed auto-pilot with active terminal homing	Inertial
Accuracy (CEP)	150 ft. against ships	1-2 n.m. against land targets
Propulsion	Turbojet	Storable liquid
Warhead Wt. (lbs)	1,000-2,000 nuclear	3,000-3,500 nuclear
Launch Condition	Surfaced	Surfaced
Reliability on Launcher	75%	90%
Reliability in Flight	80%	80%
Reaction Time	5-10 minutes per missile	5 minutes per missile
Refire Time	No reload	No reload
Missiles per Submarine	W class:1-4 E class:6	Z class:2 H class:3 G class:3
Employment	Primarily antiship	Land targets

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TABLE 3
AIR-TO-SURFACE MISSILES
Estimated Characteristics and Performance

	KENNEL AS-1	KIPPER AS-2	KANGAROO AS-3	KITCHEN AS-4
IOC	1956-57	1960-61	1960-61	A new air-to-surface missile, carried by a BLINDER "B" medium bomber, was displayed in the 1961 Soviet air show. We believe that this was a prototype of a missile which could become operational in 1964.
Maximum Range (n.m.)	55	100	350	
Guidance				
Against ships:	Beam riding with semi-active homing	Midcourse inertial with active radar terminal homing	Not applicable	
Against well-defined targets on land:	Beam riding	Midcourse only	Inertial	
Accuracy (CEP at maximum range)				
Against ships	150 ft.	150 ft.	Not applicable	
Against land targets	1 n.m.	1-2 n.m.	1-2 n.m.	
Warhead Wt. (lbs)	3,000 HE or nuclear	2,200 HE or nuclear	5,000 nuclear	
Speed (Mach)	0.8 to 0.9	1.6	1.5 to 2.0	
Reliability on Launcher	90%	80%	80%	
Reliability in Flight	80%	70%	70%	
Employment --	Primarily antiship; could be used against land targets		Land targets	
	BADGER: 2 missiles	BADGER: 1 missile	BEAR: 1 missile	
Carrier				
Altitude at launch	10,000-20,000 feet	No restriction	No restriction	
Speed at launch	Greatly reduced	No restriction	No restriction	

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TABLE 4
MEDIUM AND HEAVY BOMBER WEAPON SYSTEMS
Estimated Performance Under an Optimum Mission Profile

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

	BADGER ²	BISON	BEAR ³	BLINDER ⁴
Combat Radius/range (nm) ¹				
a. 25,000-lb bombload, one refuel	--	2700/5100	4150/7800	--
b. 10,000-lb bombload, one refuel	1800/3450	3650/6900	--	--
c. 3,300-lb bombload, one refuel	2500/4750	2900/5700	4500/8800	1350/2750
d. With ASM	2000/3900	3800/7500	--	1850/3750
i. 2 x AS-1	2650/5200	3900/7800	4700/9300	1550/3300
one refuel	1400/2500	--	--	2150/4400
ii. 1 x AS-2	1950/3400	--	--	--
one refuel	1600/2950	--	--	--
iii. 1 x AS-3	2250/4100	--	--	--
one refuel	--	--	3900/7300	--
iv. 1 x AS-4	--	--	--	--
one refuel	--	--	--	1200/2450
				1800/3600
Speed/Altitude (kts/ft)				
a. Maximum speed at optimum altitude, 10,000-lb bombload	555/14000	535/19000	500/25000	825/36000
b. Target speed/target altitude, 10,000-lb bombload	475/42000	460/43000	435/41500	690/42000
c. Launch speed/launch altitude with ASM				
i. 2 x AS-1	250/300/ 10000/20000	--	--	--
ii. 1 x AS-2	425-475/39000	--	--	--
iii. 1 x AS-3	--	--	420/39000	--
iv. 1 x AS-4	--	--	--	630/41000
Combat Ceiling (ft)				
a. 10,000-lb bombload or ASM(s)	47,000	46,000	41,000	52,500
System Accuracy (CEP)				
a. Bombing accuracy ⁵				
i. From 40,000 ft	2000-2100 ft.	2000-2100 ft.	2000-2100 ft.	2000-2100 ft.
ii. From 20,000 ft	900-1400 ft.	900-1400 ft.	900-1400 ft.	900-1400 ft.
b. ASM accuracy				
i. AS-1	150 ft. vs. ships; 1 n.m. vs. coastal targets	--	--	--
ii. AS-2	150 ft. vs. ships; 1-2 n.m. vs. coastal targets	--	--	--
iii. AS-3	--	--	1-2 n.m. vs. land targets	--
iv. AS-4	--	--	--	?
System Reliability (%)				
a. Aircraft reaching target areas in US unrefueled/refueled	60/55	60/55	60/NA	60/55
b. AMS reliability onlauncher/inflight				
i. AS-1	90/80	--	--	--
ii. AS-2	80/70	--	--	--
iii. AS-3	--	--	80/70	--
iv. AS-4	--	--	--	?

See footnotes top of following page

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Footnotes for Table 4

¹The 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 for low-level operations of heavy bombers, the radius at optimum altitude will be decreased about 1.6 to 2 miles for every mile flown at sea level.

²BADGERs have been observed with 2 AS-1 missiles (55-n.m. range), KOMET, or with 1 AS-2 missile (100-n.m. range.), KIPPER.

³Most BEARs now carry one AS-3 missile (350 n.m. range), KANGAROO, rather than a bombload. The AS-3 missile is estimated to weigh about 20,000 lbs.

⁴BLINDER A is a bomb carrier, which was observed without refueling probe; range and radius estimates assume a dash of 200 n.m. at M 1.2. A refueling capability could be developed for BLINDER A at any time.

BLINDER B has aerial refueling equipment and carries one AS-4, KITCHEN; range and radius missions include 100-n.m. dash at M 1.1. Radius estimates for both versions include supersonic dash into and out of target area, while ranges include dash into area only.

⁵Bombing accuracies indicates are for visual bombing or radar bombing against well-defined targets with free-fall bombs. These figures are not applicable to drogue-retarded bombs, which would be much less accurate.

⁶Includes the following operational attrition rates, excluding combat attrition: (a) 90% of aircraft at home bases would be in commission after 5-10 day maintenance standdown prior to initial operations; (b) 85% of aircraft in commission at home bases would be launched from staging bases; (c) 80% of aircraft launched from staging bases or directly from home bases on unrefueled missions would arrive in target areas; (d) 75% of aircraft launched on refueled missions would arrive in target areas. Calculations for BEAR are based on probable Arctic staging of ASM equipped aircraft. It should be noted that without prior maintenance standdown, the in-commission rate for heavy bombers at home bases would be about 70%, and for medium bombers about 60%.

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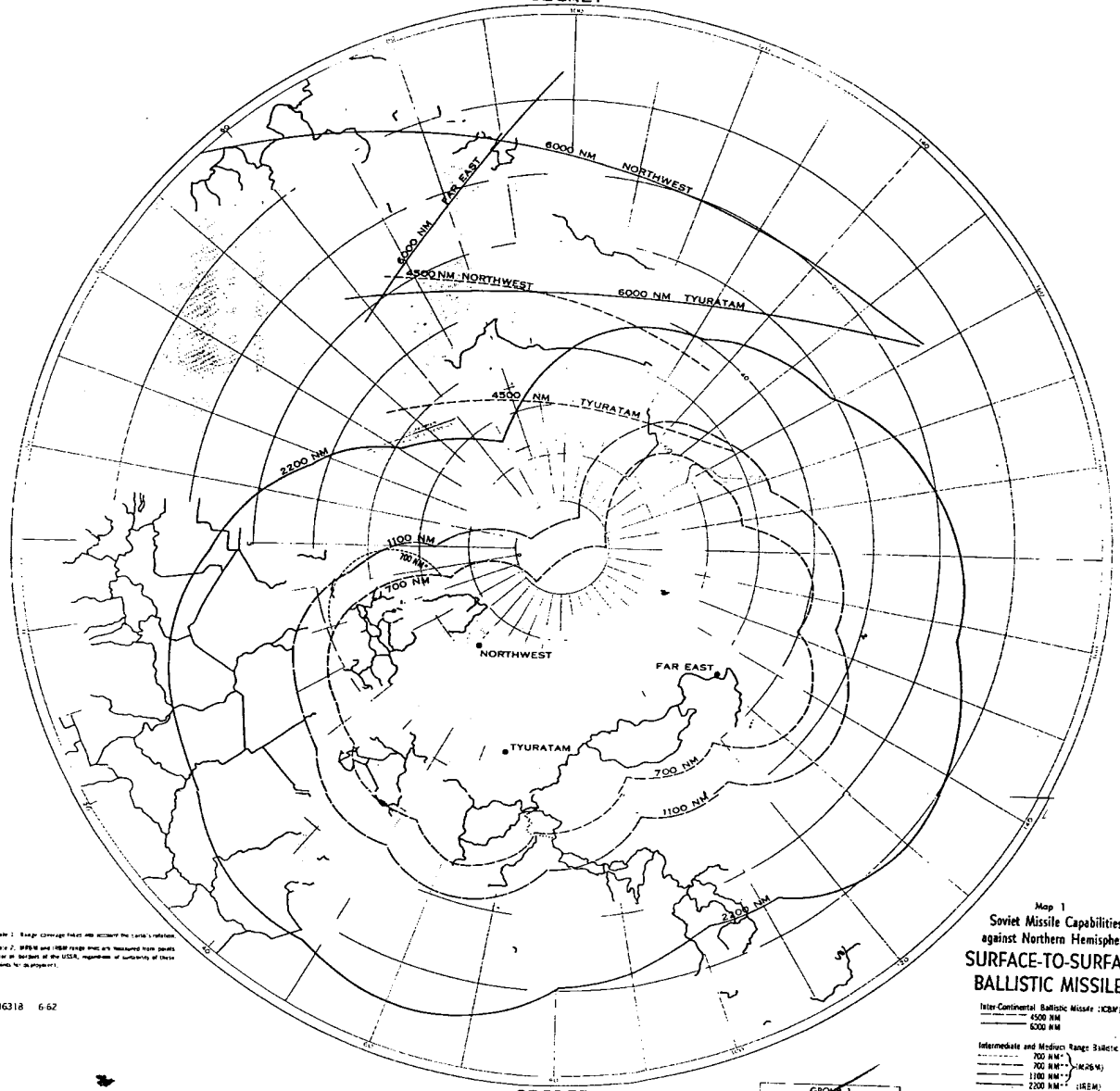
MAPS

1. Soviet Missile Capabilities against Northern Hemisphere—Surface-to-Surface Ballistic Missiles
2. Soviet Missile Capabilities against Continental US—Submarine-Launched
3. Soviet Bomber Capabilities against Northern Hemisphere—Ranges of BADGER
4. Soviet Bomber Capabilities against Northern Hemisphere—Ranges of BLINDER "A"
5. Soviet Bomber Capabilities against Continental US—Ranges of BISON
6. Soviet Bomber Capabilities against Continental US—Ranges of BEAR

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Note: Range coverage does not account for the Earth's rotation.
Note: 6000 NM and 1100 NM range circles are based on 100°W launch site as located at the USSR, regardless of longitude of these sites at the present.

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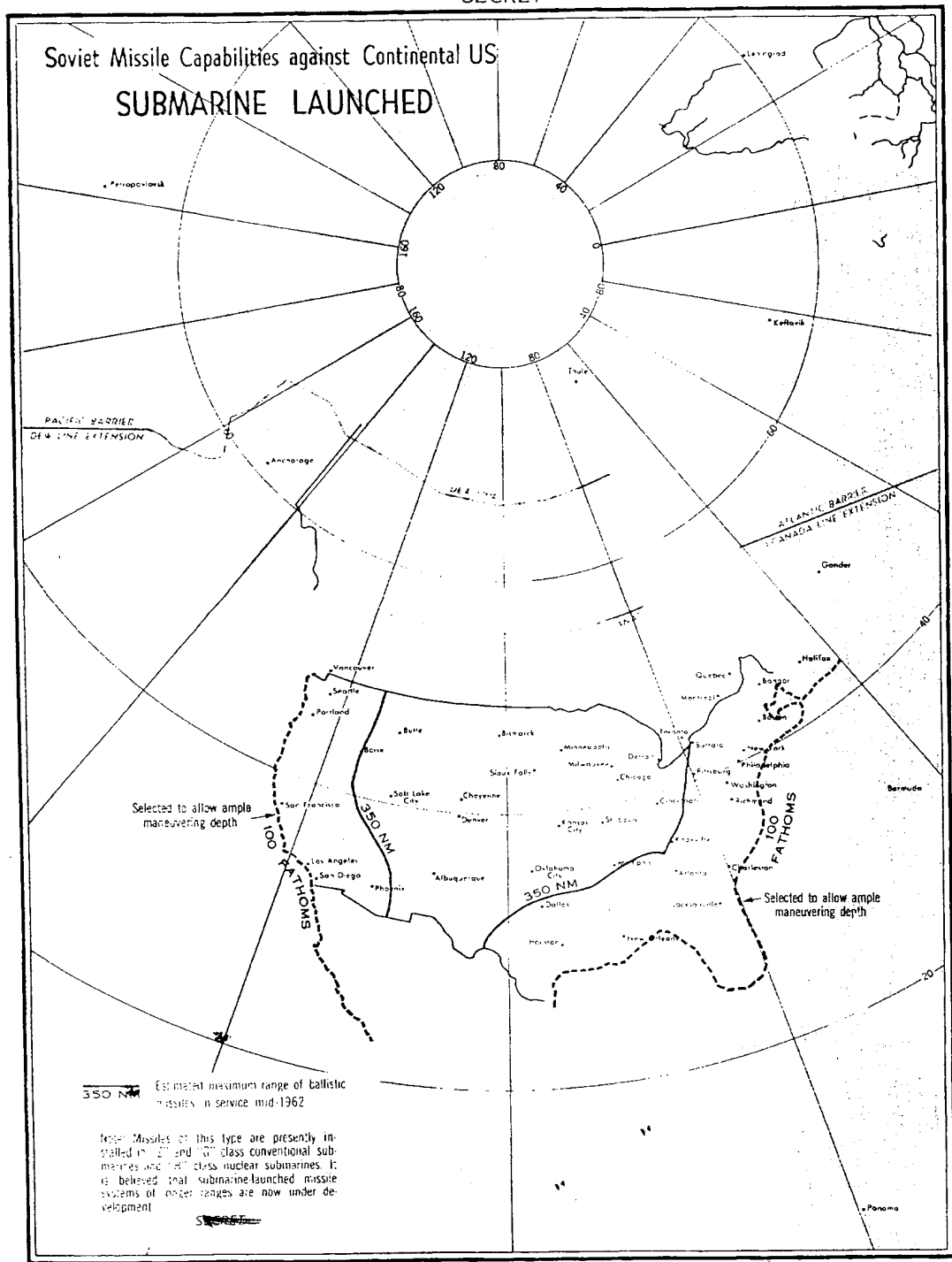
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**Soviet Missile Capabilities against Continental US
SUBMARINE LAUNCHED**



350 NM Estimated maximum range of ballistic missiles in service mid-1962

Note: Missiles of this type are presently installed in 21 and 31 class conventional submarines and 14 class nuclear submarines. It is believed that submarine-launched missile systems of longer ranges are now under development.

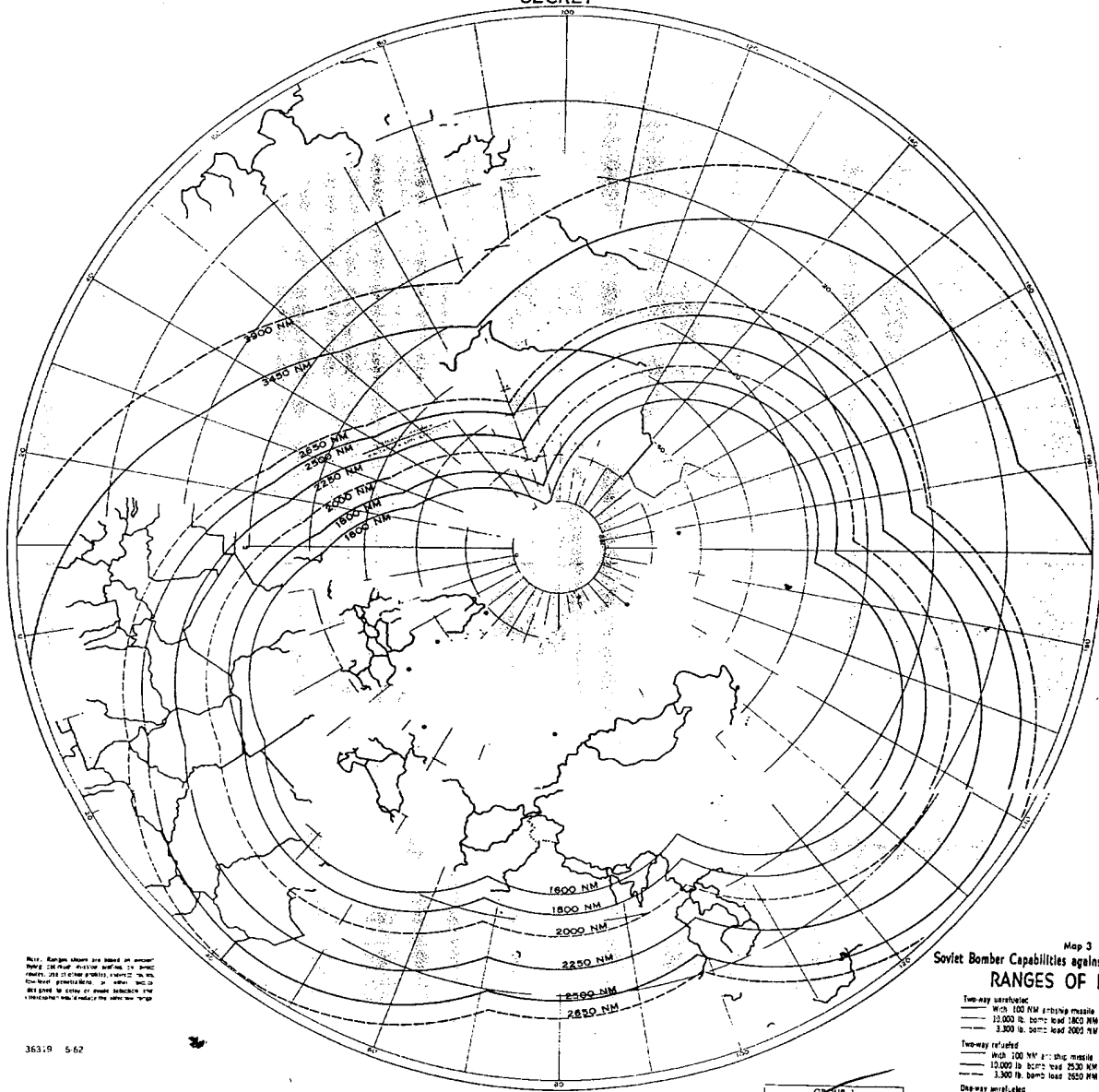
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NOTE: Range shown are based on assumed
range (20,000 ft) and fuel load (20,000 lb)
and are not to be taken as a guarantee of
performance. For more information, see
the appropriate technical manual.

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Map 3
Soviet Bomber Capabilities against Northern Hemisphere
RANGES OF BADGER

- Two-way unrefueled:
 - With 100 NM probing missile 1600 NM (Naval Badger only)
 - 10,000 lb. bomb load 1800 NM
 - 3,000 lb. bomb load 2000 NM
- Two-way refueled:
 - With 100 NM probing missile 2250 NM (Naval Badger only)
 - 10,000 lb. bomb load 2500 NM
 - 3,000 lb. bomb load 2800 NM
- One-way unrefueled:
 - 10,000 lb. bomb load 3450 NM
 - 3,000 lb. bomb load 3900 NM

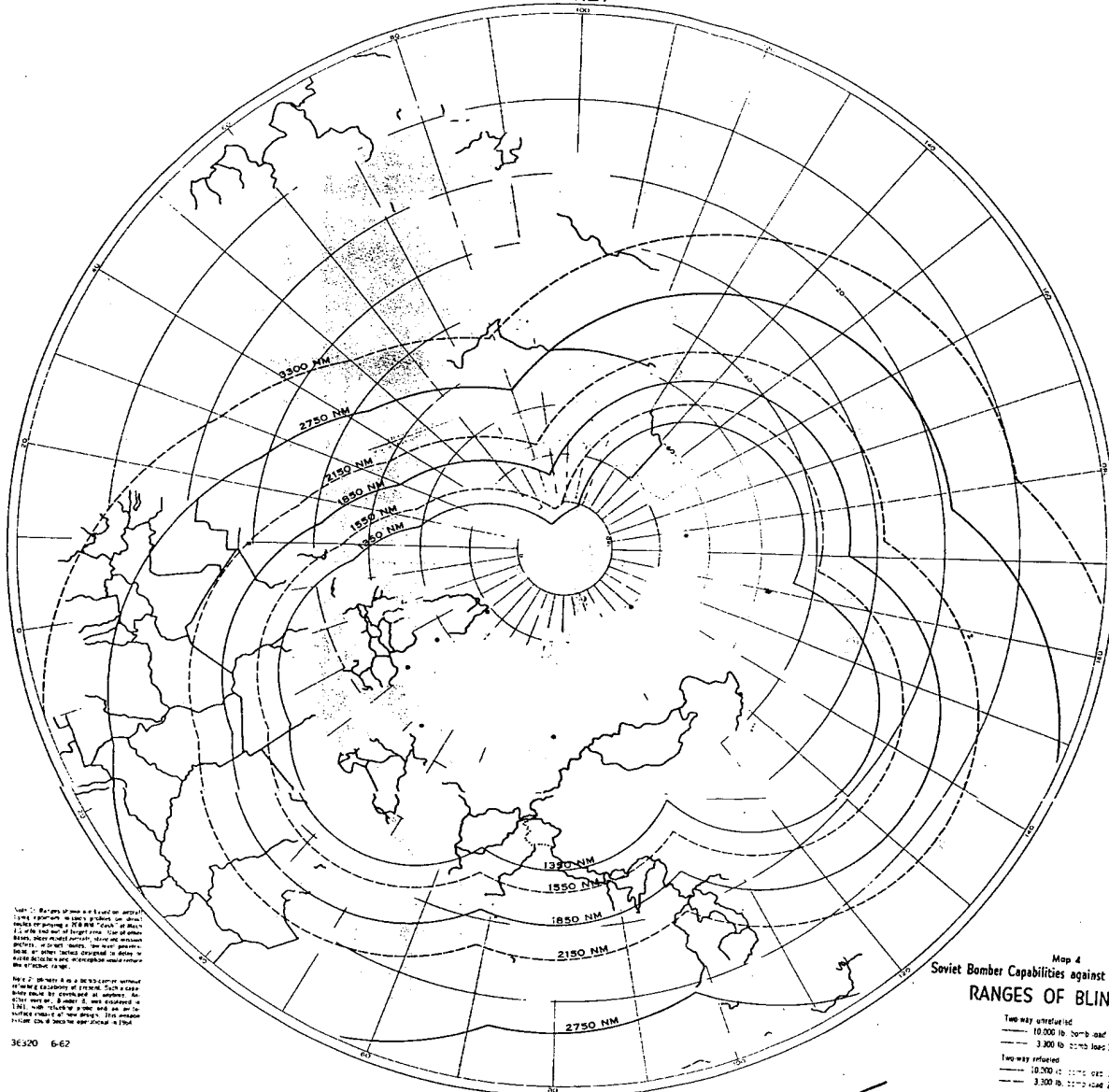
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Note 1: Range of circles is based on standard 15,000 lb bombs in two 7,500 lb bombs on aircraft. Range is based on 100 mph climb or descent. If of the kind not of target area. Use of other bombs, other climb/descent rates, other engine efficiency, or other factors, may vary performance. Use of other factors, except as shown, may be indicated in other appropriate maps.

Note 2: Bombers are a designation without regard to location of origin. Data is based on the range of the aircraft. Data is based on the range of the aircraft. Data is based on the range of the aircraft.

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Map 4
 Soviet Bomber Capabilities against Northern Hemisphere
 RANGES OF BLINDER A

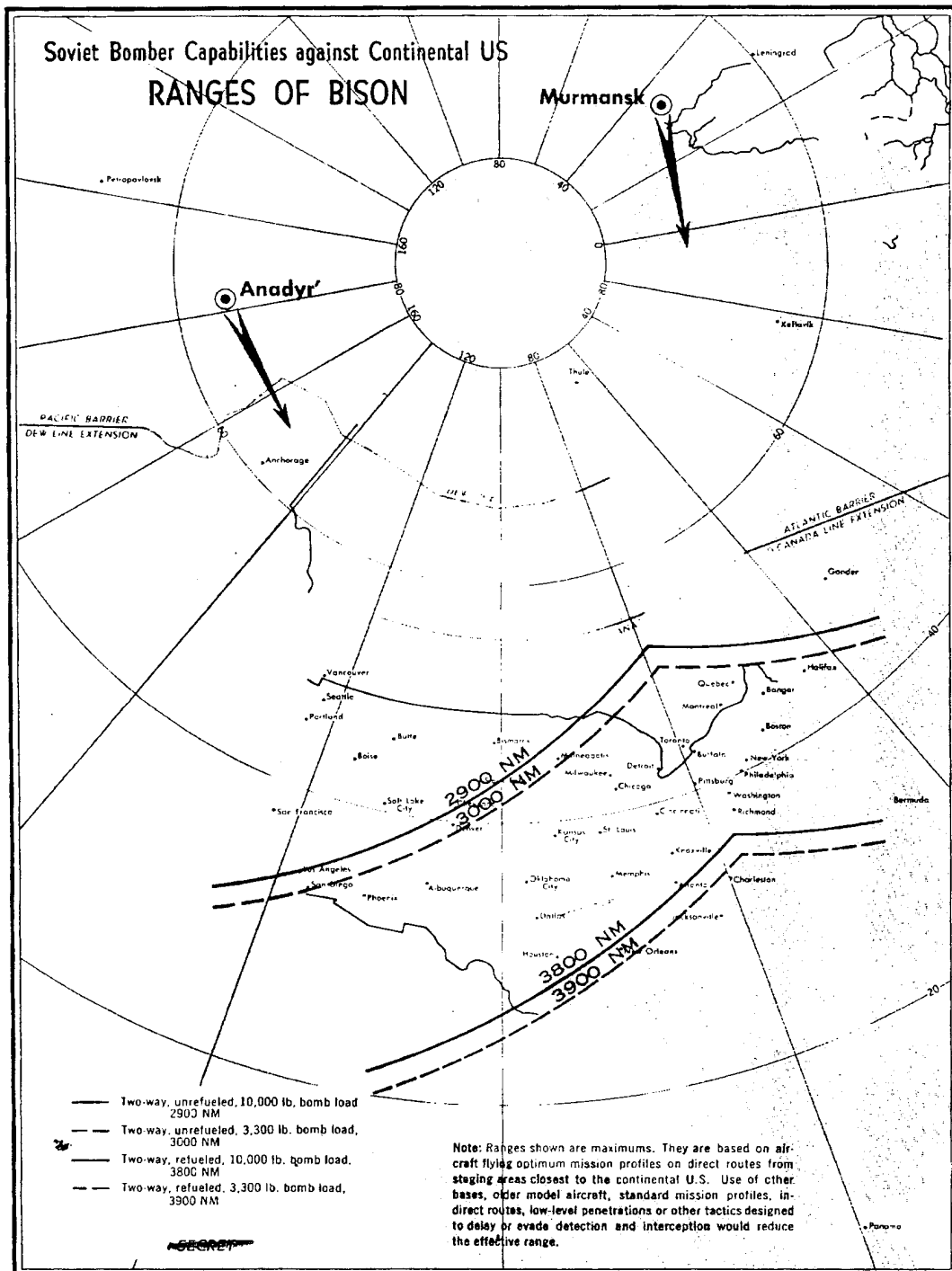
Two-way unrefueled:
 10,000 lb bombs load 2750 NM
 3,000 lb bombs load 3000 NM

Two-way refueled:
 10,000 lb bombs load 2400 NM
 3,000 lb bombs load 2750 NM

One-way unrefueled:
 10,000 lb bombs load 2750 NM
 3,000 lb bombs load 3000 NM

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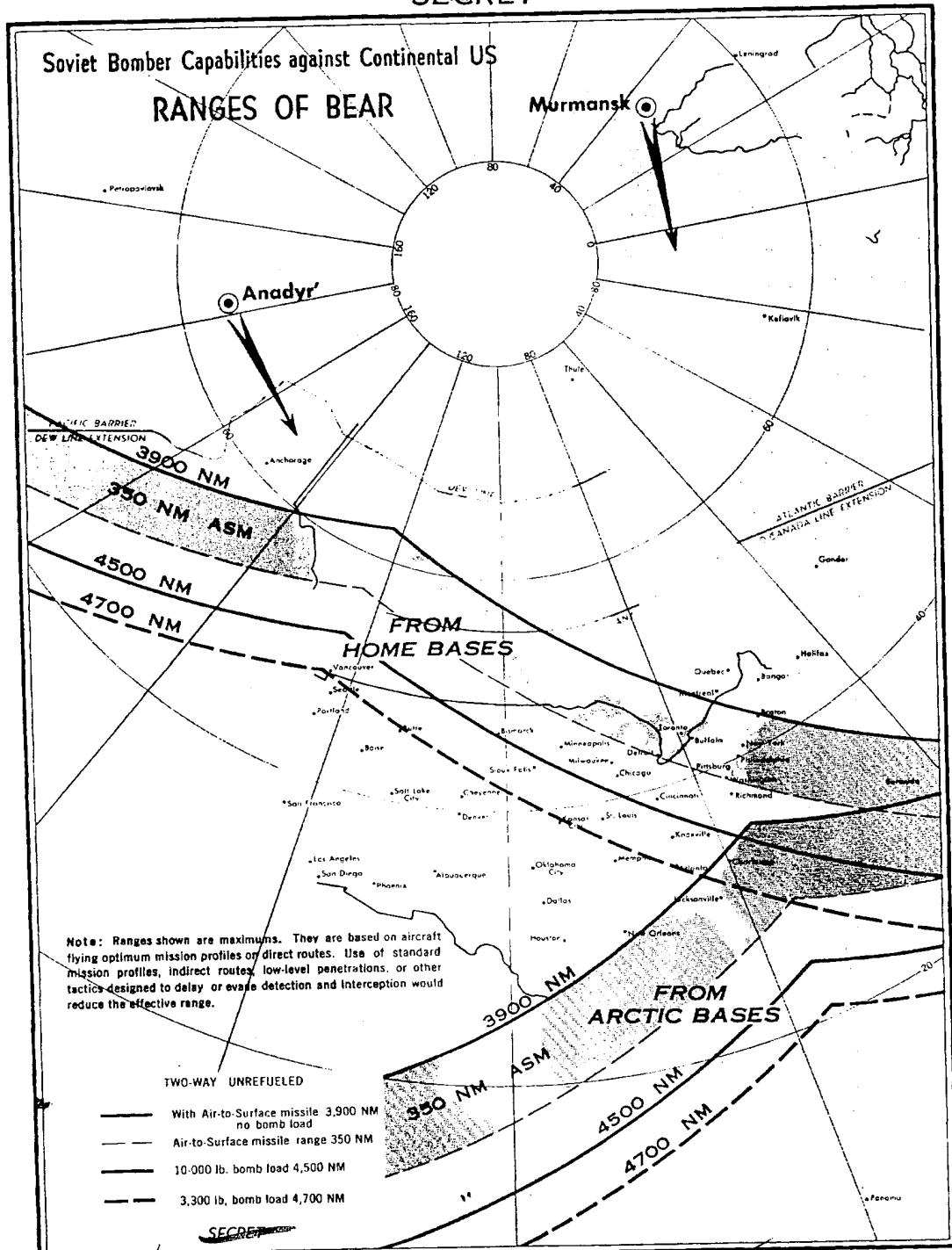
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Map 5

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Map 6

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