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Soviet Capabilities for Strategic Attack

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Submitted by

Richard Helms

DIRECTOR OF CENTRAL INTELLIGENCE

Concurred in by the

UNITED STATES INTELLIGENCE BOARD

As indicated overleaf

26 October 1967

Authenticated:

James S. Lay, Jr.

EXECUTIVE SECRETARY, USIB

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

Concurring:

Vice Adm. Rufus Taylor, Deputy Director, Central Intelligence

Mr. Thomas L. Hughes, the Director of Intelligence and Research, Department of State

Vice Adm. Vernon L. Lowrance, for the Director, Defense Intelligence Agency

Dr. Louis W. Tordella, for the Director, National Security Agency

Dr. Charles H. Reichardt, for the Assistant General Manager, Atomic Energy Commission

Abstaining:

Mr. William O. Cregar, for the Assistant Director, Federal Bureau of Investigation, the subject being outside of his jurisdiction.

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THE DIRECTOR OF CENTRAL INTELLIGENCE
WASHINGTON, D. C. 20505

26 October 1967

MEMORANDUM FOR: Recipients of NIE 11-8-67

SUBJECT : Extreme Sensitivity of NIE 11-8-67, "Soviet Capabilities for Strategic Attack"

1. Dissemination of NIE 11-8-67 must be 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 its existence be made to unauthorized persons.

Richard Helms
Director

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SOVIET CAPABILITIES FOR STRATEGIC ATTACK

THE PROBLEM

To estimate the strength and capabilities of Soviet strategic attack forces through mid-1969 and to estimate general trends in those forces over the next 10 years.

CONCLUSIONS

A. Soviet programs for strategic attack forces have been aimed at narrowing the lead that the US has held in this field. In addition to military considerations, the Soviets undoubtedly see political and psychological advantages in improving their position relative to that of the US. Soviet strategic policy has recognized that its first aim must be to maintain a credible deterrent, not only against US nuclear attack on the USSR but also against US actions that would endanger Soviet vital interests. They have been building strategic attack forces to assure that, however nuclear war began, the US would face destruction on a scale unacceptable to its leadership. Beyond this, they are also seeking, through both offensive and defensive strategic programs, to limit the damage they would sustain should general war occur.

B. The Soviet leaders almost certainly believe that their relative strategic position has improved markedly in recent years, primarily as the result of extensive intercontinental ballistic missile (ICBM) deployment. We estimate that the ICBM force has more than tripled in the past 2 years, that it now has about 700 operational launchers, and that by the end of 1968 will have about 1,000, approximately the same number as the US. We believe that most of these (nearly 80 percent) will be in dispersed, hardened single silos, greatly improving the survivability and readiness of the force. The USSR

will remain inferior, however, in numbers of bombers and submarine-launched ballistic missiles. Moreover, the Soviets almost certainly realize that even this relative improvement in their position does not promise to be permanent. Consequently, they almost certainly believe that to improve their strategic position vis-a-vis the US requires continued effort.

C. For the longer term, Soviet leaders face decisions of increasing complexity and uncertainty. One reason is the inescapable interaction between US and Soviet strategic capabilities in the 1970's. Even with no increase in the number of US launchers, planned improvements in the US strategic attack forces during the next decade will confront the Soviets with much greater numbers of more sophisticated warheads. Moscow must also be concerned that the planned "thin" US antiballistic missile (ABM) defense might be expanded to provide significant damage-limiting capabilities against Soviet forces.

D. Another complicating factor is that their strong research and development (R&D) effort has given the Soviets a broader range of options than in the past, and their programs will almost certainly reflect different priorities from those which have hitherto been controlling. They probably will place greater emphasis on qualitative improvements—including survivability, capacity to avoid early warning (EW) and to penetrate enemy defenses, accuracy, and reliability. The strategic situation emerging in the 1970's will make these qualities more important than sheer numbers of launchers.

E. If the Soviets believed that they could obtain a meaningful advantage over the US in strategic forces, they would, of course, attempt to do so, and they may forge ahead in one or another particular field. In deciding whether to undertake any new weapon program, however, they would have to weigh the prospective gain against the economic cost and the capabilities of the US to detect and counter it. In endeavoring to improve their overall strategic posture, they will be alert to improving their counterforce and damage-limiting capability in the belief this would not only deter the US from nuclear war but would also reduce US opposition to aggressive Soviet actions in support of political objectives elsewhere in the world. As indicated by our projections of Soviet forces for the next 10 years, however, we believe that they will not consider it feasible to achieve strategic capabilities

which would permit them to launch a first strike against the US without receiving unacceptable damage in return.

F. *ICBMs.* We estimate that the Soviet ICBM force will number something more than 1,000, but is not likely to exceed 1,300 launchers by mid-1972; by mid-1977 we estimate a force numbering more than 1,000, but not exceeding 1,500 launchers.[1] A force near the low side, say 1,100, would reflect a deliberate Soviet decision for political reasons to hold the number of launchers at a level about equal to that of the US. Regardless of their decisions as to number of launchers, the Soviets will probably begin deployment of at least one new ICBM system within the next few years. We believe that the Soviets are flight testing a small solid-propellant ICBM and may be developing a new large liquid-propellant system. They are probably investigating a mobile ICBM system and may deploy one. Qualitative improvements may include more sophisticated reentry vehicles (RVs), penetration aids, multiple reentry vehicles (MRVs), multiple independently-targeted RVs (MIRVs), hardened warheads, and better accuracy.

G. *Space Weapons.* For almost 2 years, the Soviets have been conducting flight tests which we believe relate to development of a fractional orbit bombardment system (FOBS). We believe that the chances are better than even that the Soviets will within the next few years deploy a FOBS in order to negate or delay US warning and otherwise complicate the US defense problem; any deployment would be in relatively small numbers. We consider it unlikely that they will deploy a multiple-orbit bombardment system (MOBS) in view of the probable adverse political consequences and of its cost and effectiveness as compared to other systems.

H. *MRBM/IRBMs.* The Soviets will continue to maintain massive strategic forces against Eurasia. We estimate that new MRBM and IRBMs will supersede present systems within the next 10 years, and

[1] Maj. Gen. Jack E. Thomas, the Assistant Chief of Staff, Intelligence, USAF, would delete the first sentence and substitute the following: "We estimate that the Soviet ICBM force in the mid-1970's will number more than 1,000 but is not likely to exceed 1,500 launchers if the USSR by then has operationally deployed missiles with some type of multiple reentry vehicles. Otherwise, and particularly in view of the numbers of targets in the US and the planned US ABM capability, the Soviet Union probably will have considerably more than 1,500 launchers. A program which added only 100 launchers per year beyond those already identified would exceed 1,700 by 1977."

that the introduction of improved missiles may result in some decrease in numbers. We believe that one or more new missiles in this category could become operational as early as 1969. Some of the new missiles may be deployed in mobile launchers.

I. *Submarine-Launched Missiles.* The Soviets are clearly placing increased emphasis on ballistic missile submarines. They are introducing a new nuclear-powered class of ballistic missile submarine with 16 launch tubes which we believe will carry a missile with a range of about 1,500 n.m. We estimate that, by the mid-1970's, the Soviets will have twice as many ballistic missile submarines as at present, and six to seven times as many launchers.

J. *Long Range Aviation (LRA).* Attrition and retirement of older models will gradually reduce the heavy bomber force. We still believe that the Soviets are unlikely to introduce a follow-on heavy bomber. The medium bomber force will probably decline as Badgers are phased out; by the mid-1970's it will probably be composed largely of the supersonic-dash Blinder.[2]

[2] Maj. Gen. Jack E. Thomas, the Assistant Chief of Staff, Intelligence, USAF, believes the Soviet Union will continue to consider manned strategic aircraft an important element of their intercontinental strike forces. He estimates the USSR is likely to introduce both a follow-on heavy bomber and a new medium bomber into LRA within the period of this estimate. He expects that in the mid-1970's LRA still will include about 200 heavy bombers (approximately the same number as at present), and some 400-600 medium bombers of both new and old types.

DISCUSSION

I. TRENDS IN POLICY AND DOCTRINE

1. Our estimate of overall Soviet military policy and doctrine appears in NIE 11-4-67, "Main Trends in Soviet Military Policy," dated 20 July 1967, SECRET. As we emphasized there, the most important issues of Soviet military policy center upon the strategic relationship with the US, and strategic weapons continue to receive primary emphasis in Soviet planning, deployment, research and development (R&D). Soviet strategic policy has recognized that its first aim must be to maintain a credible deterrent; the Soviets are building forces which we believe are giving them greatly increased confidence in their ability, even in retaliation, to assure the destruction of a significant portion of the US population and industrial resources. Beyond this, they are also seeking, through both offensive and defensive strategic programs, to improve their ability to limit the damage they would sustain should general war occur.

2. The Soviet leaders almost certainly believe that their relative strategic position has already improved markedly. They are aware that US deployment of strategic missile launchers has leveled off; their own intercontinental ballistic missile (ICBM) deployment programs, which have been underway for the past few years, will give them a rough parity with the US in numbers of ICBM launchers within the next year or so. After many years of strategic inferiority, they undoubtedly see political and psychological advantages in the attainment of such parity even though it does not alter the basic situation of mutual deterrence and still leaves them inferior in heavy bombers and submarine-launched missiles.

3. Moreover, the Soviets almost certainly realize that even this relative improvement in their position does not promise to be permanent. For the longer term, they are aware of announced US programs for various qualitative improvements in strategic missile forces which would erode relative Soviet strength. They must also calculate the effects of the US decision to begin antiballistic missile (ABM) deployment, allowing not only for the system as announced but also for the possibility of its expansion.

4. To maintain an assured destruction capability in the strategic situation that is emerging, qualitative improvements, particularly those related to survivability and capacity to penetrate enemy defenses, become more important than sheer numbers of launchers. There will undoubtedly be pressures for a continuing enlargement of the ICBM force, and it may continue to grow. But having attained rough numerical parity in ICBMs with the US, the Soviet planners will probably give increased attention to other options. Further measures to enhance survivability and effectiveness of the strategic attack forces could include

a greater emphasis on ballistic missile submarines, development of a mobile ICBM, ABM defense of ICBM launching sites, and a variety of systems designed to elude or penetrate US ABM defenses.

5. Thus, the Soviets face a number of uncertainties in deciding what force composition and force levels they should attempt to acquire for the 1970's. The interaction between US and Soviet strategic programs introduces extraordinary complications and variables. But given the technical complexities and long lead times required for modern weapons, the Soviet leaders must already have made some decisions for future strategic systems, and will have to make others before long. Whatever their specific decisions, we believe that they are determined to maintain an assured destruction capability, and that they will seek to improve their strategic position *vis-a-vis* the US.

6. The internal situation appears favorable to continuation of a strong military effort. The present leadership is evidently more responsive than was Khrushchev to the views of the military hierarchy. We estimate that military and space expenditures for 1967 represent an increase of 16 percent over 1965, a decided change from the more stable spending level of 1963-1965. It is not yet clear how the recent 15 percent increase in the publicly stated Soviet defense budget may relate to actual expenditures. Some of it probably reflects programs for military aid to Vietnam and the Middle East, as well as changes in the Soviet price structure and accounting practice. In any case, however, we think it clear that real Soviet military expenditures are continuing to rise.

7. The continuing development and large-scale deployment of strategic weapons has been largely responsible for the increase in these expenditures of the past few years. The Soviets have given roughly equal weight to forces for strategic attack and for strategic defense. We cannot estimate at this time how the increase in 1968 defense expenditures will be allocated among the various force components, but the high priority of strategic programs is almost certain to continue.

8. We believe that the Soviets' effort to improve their strategic position relative to the US—already evident in their ICBM deployment—will be extended to some other components of their strategic attack forces, and that they may see an opportunity to forge ahead in some particular field. We believe that they will also continue to maintain massive strategic forces against Eurasia. And they will almost certainly pursue intensive R&D on strategic attack systems, both in order to prevent the US from gaining a technological advantage and to gain any advantage they can for themselves. In deciding whether to develop and deploy any new weapon system, however, they would have to weigh the prospective gain against the economic cost and the capabilities of the US to detect and counter it.

9. In considering the goals of their strategic weapons programs, the Soviet leaders will, of course, examine the possibility of achieving a first-strike counter-

force capability which—in conjunction with their strategic defenses—would be sufficient to limit to acceptable proportions the damage which a US retaliatory strike could inflict on the USSR. Considering the number, hardness, and reaction times of US targets which would have to be struck in such an attack, and the likelihood that many would escape destruction, such a Soviet effort would require not only a very large, highly sophisticated strategic attack force, but also widespread and effective air and missile defenses as well as an effective antisubmarine warfare (ASW) capability. The technological and economic magnitude of the task would be formidable, however, and the Soviets would have to consider the likelihood that the US would detect and match or overmatch the Soviet effort. In endeavoring to improve their overall strategic posture they will be alert to improving their counterforce and damage-limiting capability in the belief this would not only deter the US from nuclear war but would also reduce US opposition to aggressive Soviet actions in support of political objectives elsewhere in the world. All things considered, however, we continue to believe that the Soviet leaders will not expect to acquire strategic capabilities which they would deem sufficient to permit them to launch a first strike against the US without receiving unacceptable damage in return.

II. INTERCONTINENTAL BALLISTIC MISSILES

A. Current Deployment

10. We believe that within the past year, hard, single-silo launchers have come to comprise the bulk of the Soviet ICBM force. We estimate the present strength of the force to be about 700 operational launchers, deployed in 25 large complexes across the central USSR. We estimate that more than 450 of these launchers are single silos for the SS-9 and SS-11 ICBM systems; older systems, which are deployed in soft sites or in triple-silo hard sites, account for the remainder.

11. *Status of First and Second Generation ICBM Sites.* We estimate that virtually all of the first and second generation ICBM launchers remain operational, most of them employing the SS-7 ICBM. We believe that two of the four SS-6 launchers have been assigned a primary space role; the other two will probably also be allocated to the space program or phased out altogether in the near future. We believe that the 14 soft SS-8 launchers will have been phased out by mid-1969. We believe that the nine hard SS-8 launchers remain operational.

12. In previous estimates we considered the possibility that a group of SS-7 triple-silo launch sites had been equipped with the SS-9 ICBM. We now believe, however, that these sites are equipped with SS-7s and that SS-9s are deployed only in the single-silo configuration. We have no evidence suggesting phase-out of any SS-7 launchers, and believe that they will remain operational for some time to come.

B. Force Levels and Composition to Mid-1969

13. We believe that the Soviets are developing new ICBMs and that at least one of them could be ready for operational deployment soon,[3] but we doubt that it will reach IOC in hard sites by mid-1969. Our estimate of the Soviet ICBM force for the next 2 years includes only types now operational, but we do not rule out the possibility that it will include a few missiles of a new type.

ESTIMATED OPERATIONAL ICBM LAUNCHERS

	1 October 1967	Mid-1968	Mid-1969
Soft			
SS-6	2	0	0
SS-7	128	128	128
SS-8	14	0–14	0
Subtotal	144	128–142	128
Hard (triple-silo)			
SS-7	69	69	69
SS-8	9	9	9
Subtotal	78	78	78
Hard (single-silo)			
Large (SS-9)	114	162–174	180–222
Small (SS-11)	330–380	480–530	560–610
Subtotal	444–494	642–704	740–832
TOTAL*	666–716	848–924	946–1,038

* In addition to the ICBM launchers cited above, we believe that the Soviets have about 50 launchers at the Tyuratam range which are associated with ICBM development. About 40 of these launchers are considered to be complete, and we believe that most of them could be readied to fire at the US. We are unable to make any valid estimate of the time required to ready them, reaction times, or the availability of missiles for them.

C. Operational Capabilities of the Force

Survivability

14. The vulnerability of the force is decreasing. We estimate that about 80 percent of the current operational force is deployed in hard sites. We think it likely that by mid-1969 80 percent of the force will be in single silos. We believe that single-silo sites are so widely dispersed as to present separate aiming points. We believe that all hardened ICBM launchers deployed in the field are designed to remain completely operable when exposed to overpressures on the order of 200-400 psi.

[3] See paragraph 22 below regarding the recent R&D firings of a solid-propellant ICBM. It might achieve IOC before mid-1969. Hence our estimate of ICBMs for the next 2 years may have to be modified. It is also possible that [redacted] relates to both ICBM and IRBM development.

Reliability and Reaction

15. The continuing introduction of single silos has brought improvements in both reliability and reaction time. We believe that ICBMs deployed in single silos can be launched in 5 minutes or less after the execution order is received. Overall reliability of the SS-9 and SS-11 systems is probably somewhat higher than that of older systems.

16. An extensive program of test firings of currently deployed systems has probably improved reliability, in terms of both equipment and training. During the past year, about 100 ICBMs have been launched primarily for purposes of production sampling and crew training. This is the highest yearly total ever observed. Firings included 41 SS-7s, 2 SS-8s, 12 SS-9s, and 45 SS-11s.

Reentry Vehicles

17. Soviet ICBM tests observed during the past year continue to show reentry vehicles (RVs) with low ballistic coefficients and large radar cross sections. There is no evidence to show that the Soviets are trying to develop RVs with higher ballistic coefficients, which are more accurate and less vulnerable to detection and interception. On the other hand, the current Soviet RVs lend themselves to simpler design and packaging of nuclear weapons and may be more adaptable to hardening.

18. We have virtually no evidence to indicate whether current Soviet RVs are designed to withstand nuclear radiation, but we believe that hardening of their RVs for this purpose is within the Soviet state of the art. If they have not already begun to harden, deployment of a US ABM defense would be an added incentive for them to do so.

Accuracy

19. Current Soviet ICBMs use radio-inertial or inertial guidance systems [ ]. The SS-9, using radio-inertial guidance, is the most accurate ICBM in the inventory. We estimate that it has a CEP on the order of 0.5-0.75 nautical miles (n.m.). With this accuracy and its large payload, the SS-9 is suitable for attacking hard targets. The SS-11 has a relatively small payload and an estimated CEP [ ]. Apparently accuracy was not a critical requirement for the SS-11; we believe that the Soviet objective was to deploy rapidly a large number of survivable weapons for use against relatively soft targets.

20. The Soviets may seek very high accuracies for some future ICBM systems. We have considered their capabilities to achieve accuracies of 0.25-0.5 n.m. Considering the techniques required and probable development times for new systems, we believe that the Soviets could achieve an operational system with a CEP of 0.5 n.m. about 1970 and 0.25 n.m. about 1972. To achieve CEPs in this

range the Soviets would have to improve their guidance systems, probably introduce midcourse corrections, and design new RVs for either faster reentry or limited terminal guidance maneuver.

Refire

21. We believe that Soviet soft launchers have a refire capability and that on the average two missiles are available for each such launcher. This gives the current force a theoretical refire capability of up to 140 ICBMs some 2-4 hours after the initial launch from soft sites. As soft sites are phased out, this capability will decline. The hardened launchers are not considered capable of refire.

D. ICBM Research and Development

Solid Propellants

22. We believe that there are an adequate number of solid-propellant manufacturing and test facilities within the USSR to support a rather ambitious solid-propellant strategic missile program. We believe that the Soviets have a solid-propellant ICBM under development. They have been testing solid-propellant missiles to ranges of 1,050 n.m. from Kapustin Yar and to 3,100 n.m. from Plesetsk for about 2 years. We believe that these two programs are related [ ] Recently (on 23 October), the Soviets fired a solid-propellant missile from Plesetsk to a range of about 4,750 n.m. We believe that this latest test is related [ ]

Status of Mobile ICBMs

23. The Soviets have displayed what they claim to be two mobile surface-to-surface missile launchers and have claimed that one of the missiles (Scrooge) has an intercontinental range. We have no information on such a missile, and there is no evidence that it has been flight tested to ICBM range. We doubt that these missiles are prototypes of a mobile ICBM. The USSR, however, may develop a mobile missile to improve the survivability of its ICBM force. The SS-11 could be adapted for a mobile system, but we consider this unlikely. [ ] would lend itself to mobile deployment but we have no evidence suggesting that this is the Soviet intent.

Future ICBM Development

24. As noted above, evidence of test firings from Plesetsk indicates that the Soviets have a small, solid-propellant ICBM in an advanced stage of development. We estimate that this system will have about the same payload and accuracy as the SS-11. It would be adaptable to mobile deployment but we believe that it will be deployed, at least initially, in hard sites. We doubt that this system could become operational until about mid-1969. It could be deployed in a mobile mode somewhat later.

25. We have detected no test firings of a new ICBM from Tyuratam for over two and one-half years but we estimate that at least one is in R&D. Until flight test begins, we cannot estimate its precise characteristics but we believe that the most likely possibility would be a large, liquid-propellant ICBM about the size of the SS-9, but having better performance, including some form of improved reentry system. This weapon could be either a modification of the SS-9 or an entirely new missile, and would probably be deployed in hard single silos. We estimate that it could reach IOC in the 1970-1972 period.

26. The Soviets will also probably seek to improve the quality of their existing force by modification of the SS-11 and they may replace it with a new, small liquid-propelled ICBM system. Early improvements to the SS-11 could be aimed at better accuracy or the incorporation of penetration aids or multiple reentry vehicles (RVs). If they elect to replace the SS-11 with a new system, it would probably become operational in the mid-1970's.

Reentry Vehicle Development

27. The Soviets will almost certainly take steps to reduce the vulnerability of their RVs, especially in light of the US decision to initiate ABM deployment. A Soviet decision to develop any particular penetration system will, of course, be affected by their knowledge of the nature of the ABM system the US plans to deploy. They have extensive experience in chaff and electronic countermeasures (ECM) in conjunction with aircraft defense. We believe that they could have exoatmospheric (above 300,000 feet) penetration aids 2 to 4 years after starting a development program. The low ballistic coefficients and high observability of present Soviet RVs decrease the effectiveness of endoatmospheric (below 300,000 feet) penetration aids; a terminal decoy program including a suitable RV would probably require at least 5 years of R&D. We believe that the Soviets would test penetration aids to ICBM ranges and we would probably detect such testing a year or two before IOC.

28. The Soviets are probably well aware of the potential use of radiation kill mechanisms, and the development of RVs with increased hardening to withstand some nuclear effects is probably well within their capabilities. With a program of underground nuclear testing, the Soviets could investigate the response of various materials to X-rays at various energy levels in a simulated exoatmospheric environment and conduct development tests of new hardened warheads.

29. There is no evidence that the Soviets have initiated an advanced RV program. However, they might, regardless of US programs, develop MRVs and multiple independently-targeted RVs (MIRVs), for purposes other than penetration, e.g., to increase the numbers of deliverable warheads. A relatively simple MRV delivery capability probably could be achieved within 12 months after the start of flight testing. Development of either very accurate MIRVs or maneuver-

able RVs (MaRVs) would involve significantly greater complications, particularly in guidance and control; operational capabilities could probably be achieved about 2 to 3 years after flight testing began. We would expect to detect any of these developments during the flight test phase.

30. If the Soviets undertake early implementation of a MIRV program, we think the SS-9 would be the most likely carrier because of its large payload capability. An SS-9 MIRV system, capable of attacking soft targets, could be attained by 1969; its development would require about a year of flight testing, which we would expect to detect. We consider it unlikely that this program would be undertaken in light of the substantial capability for attacking soft targets represented by the SS-11 ICBM deployment. To give the SS-9 a MIRV capability against hard targets would require the development of some method for accurately delivering several independent RVs having a combined weight of about 9,000 pounds. Accuracy would be the pacing item and would probably require improvements in boost-phase guidance and the addition of a radio midcourse correction system. Even if such a MIRV program were to be initiated in the very near future, we doubt that IOC could be achieved before 1972. We would expect to detect testing of such a system 2 to 3 years prior to its IOC. Development of a MaRV would take at least as long.

E. Force Levels and Composition 1970-1977

31. Soviet decisions as to the best mix of weapons and the proper force levels have become increasingly difficult, not only because of the growing complexity of the threat they face, but also because of the broadening range of options open to Soviet planners. The size and composition of Soviet strategic forces in the 1970's are most likely to reflect a compromise which will embody several of the options now open to Soviet planners. The most likely effect of such a compromise on ICBM programs would be a shift in emphasis from numbers to qualitative improvements—though this would not necessarily preclude additional deployment. Thus, although the Soviets could deploy several thousand ICBM launchers by the mid-1970's, we do not believe that they will seek a substantial numerical superiority.

32. In estimating the size of the ICBM force for the 1970's, we must use a fairly wide range rather than a precise figure—particularly since, for a period so far ahead, much will depend on the interplay between US and Soviet decisions taken in the interim. The low end of the range represents the minimum figure that can be postulated on the basis of our present evidence. We think that ICBM forces falling anywhere within the ranges estimated below would meet a broad Soviet criterion for an assured destruction capability and, hence, a credible deterrent.

33. We estimate that the Soviet ICBM force will number something more than 1,000, but is not likely to exceed 1,300 launchers by mid-1972; by mid-1977 we estimate a force numbering more than 1,000, but not exceeding 1,500 launchers. A force near the low side, say 1,100, would reflect a deliberate Soviet decision, for political reasons, to hold the number of launchers at a level about equal to that of the US.[4] It would imply some phaseout of older missiles. It would also imply a Soviet decision to emphasize qualitative improvements rather than a simple increase in numbers of launchers. If they opt for the low side, the single-silo launchers for the SS-9 and SS-11 would continue to make up the bulk of the force. A new solid-propellant ICBM would probably be brought into service in the next few years. A new large, liquid-propellant ICBM may also be deployed in hard single silos sometime later in the period. The Soviets will probably undertake qualitative improvements to increase weapon effectiveness and to counter US ABM defenses; such improvements could include better accuracy, more sophisticated RVs, penetration aids, MRVs, or MIRVs.

34. A force toward the high side of our estimate would have many of the features of the smaller force, including the qualitative improvement of existing systems. It would, by the latter part of the period, include some 700 new launchers, requiring a deployment program roughly comparable in size to the current SS-9 and SS-11 programs combined. It would probably also involve retention of the SS-7 hard launchers for several years and the introduction of one or more new ICBM systems. Deployment on this scale would consist primarily of small ICBMs deployed in single silos; some of the deployment may be in mobile launchers.

III. MILITARY APPLICATIONS IN SPACE

35. Throughout the period of the estimate the Soviets will experiment with a variety of space systems which could be used for military purposes. New military space applications will be introduced as Soviet technology advances and as requirements for such systems are developed. The high priority evident in the reconnaissance satellite program will probably be extended to other selected military support systems which the Soviet leaders decide are essential; these will probably include systems for improved communications, weather observation, and navigation.

36. Evidence of Soviet interest in orbital bombardment systems dates from Khrushchev's remarks in early 1962 and subsequent references to "global rockets" and "orbital missiles." These can be interpreted to refer to either or both of two concepts which have come to be called "fractional orbit bombardment system"

[4] For the position of Maj. Gen. Jack E. Thomas, the Assistant Chief of Staff, Intelligence, USAF, see his footnote to Conclusion F.

(FOBS) and "multiple orbit bombardment system" (MOBS).[5] Actual flight testing of what we believe to be hardware for a FOBS began in December 1965 and is continuing.[6] These tests involve a developmental vehicle which we designate the SS-X-6; it uses the first two stages of the SS-9 ICBM as the launch vehicle.

37. All of these orbital tests have been fired in an easterly direction, giving them the advantage of the earth's rotation to achieve orbital velocities. In order to attack targets in the US on the initial orbit, however, a FOBS would have to be launched on a northerly or southerly azimuth, depriving it of this advantage. Hence, any system so employed must be capable of achieving orbital velocity on these azimuths. There are some uncertainties about this system, particularly as regards the SS-9 launch vehicle, but in the configuration tested so far it does not achieve the necessary velocity. To do so, it would require additional thrust. Hence, if it is to be used as a FOBS, it would probably have to be modified, either through a reduction in the weight placed in orbit, or through an increase in the capability of the launch vehicle. If the Soviets choose to reduce the weight, the modification would probably be relatively simple and the system could probably be ready for operational deployment by early to mid-1968. If, on the other hand, they elect to improve the SS-9 launch vehicle, the system would probably not be ready for deployment until late 1968 or early 1969. A third alternative would be for them to go for an entirely new launch system; if they do this, we would expect to see a series of tests extending over a year or two, and the system would probably not be ready for deployment before 1969.

38. In the present state of the art, a FOBS would be more complex and less accurate than an ICBM. Moreover, it would deliver a smaller payload than an ICBM employing the same booster. Nevertheless, the degree of effort going

[5] *FOBS* is used to designate *a system deployed on the ground, targeted prior to launch, and launched with intent to attack.* Its operational and control requirements would be like those for an ICBM except for the requirement for a vehicle to place a warhead in a temporary orbit and deorbit it on target. In practice, such a vehicle would probably be targeted to attack on the first orbit but it could be allowed to travel several orbits without altering the basic concept. *MOBS* is used to designate *a system deployed in orbit, launched with no immediate commitment to attack, targeted after launch, and retargeted as necessary.* It would require command and control links between ground control centers and orbiting vehicles; hence it would be much more complex than either an ICBM or a FOBS. MOBS vehicles could have useful orbital lifetimes of a few days to one or more years. Both a FOBS and a MOBS could be developed without violating the space treaty. The deployment of a MOBS would be a violation of the treaty.

[6] The geometry of the early tests suggested development of a depressed trajectory ICBM (DICBM). Subsequent evidence leads us to believe that they were testing reorientation and deorbit components for a FOBS. A FOBS can perform essentially the same function as a DICBM (i.e., reduce the amount of warning that the US BMEWS can provide), but would have greater flexibility since it could attack the US from the south as well as from the north.

into this program and the record of successful launches in recent months indicate that the Soviets see certain advantages in such a system. A FOBS would probably be intended to delay or negate US early warning (EW) and to attack soft, time urgent targets (such as SAC alert bases). The Soviets may also consider that it would complicate US ABM defenses. In no previous case has the USSR tested a long-range missile system as much as it has the SS-X-6, and then abandoned it without operational deployment; hence we believe that the chances are better than even that the Soviets will deploy a FOBS within the next few years. If they do, it will probably be in relatively small numbers. Considering that the SS-X-6 uses the SS-9 ICBM booster and it therefore may be adaptable for deployment in SS-9 silos, we might not be able to detect and identify FOBS deployment as such.

39. There is no identified program which indicates that the Soviets are developing a MOBS. Much of the space technology and hardware currently being tested by the Soviets could be used as a basis for development of such a system, but it would also require the development of several new components, including a long-life power source and an attitude reference system. For the foreseeable future, we think that a MOBS would not compare favorably with ICBMs in terms of effectiveness, reliability, vulnerability, average life, and susceptibility to loss of control from accident or countermeasures. Having agreed to the treaty on peaceful uses of space, the Soviet leadership probably would recognize that the deployment of a nuclear-armed orbital bombardment system would entail serious political consequences. They would also be concerned that it would give a strong new stimulus to US military programs. In view of these factors and the much greater cost of such orbital weapons, we believe that the Soviets are unlikely to deploy a MOBS in space during the period of this estimate.

IV. MEDIUM AND INTERMEDIATE RANGE BALLISTIC MISSILES

A. Force Levels and Composition

40. The Soviet MRBM/IRBM force of more than 700 launchers poses a massive threat to targets in Eurasia, especially Europe. About 90 percent of the force is deployed in a wide belt extending from the Baltic to the Black Sea. The balance of the force is deployed in the Far East, with a scattering of sites in the Caucasus and an isolated facility on the Chukotsk Peninsula apparently targeted against Alaska.

41. We estimate that the MRBM/IRBM force is comprised of some 600 launchers for the 1,020 n.m. SS-4 and about 100 launchers for the 2,400 n.m. SS-5. The force is predominantly soft; we estimate that some 130-140 launchers are in hard sites. We continue to estimate that they have the same design overpressure of 200-400 psi as hard ICBM sites (see paragraph 14). We believe that the soft launchers have a refire capability but that the hard launchers do not.

42. There are [ ] fixed field sites located at or near MRBM complexes, which originally were probably intended for use as training sites or as alternate launch sites. Soviet documents of 1960-1961 discussed the use of alternate sites for refire purposes after an initial salvo from the primary site. We believe that most of these alternate sites have been inactive for 2 years or more. Whatever their original purpose, we doubt that they now figure in strategic plans for use of the force.

43. We foresee little change in the size or makeup of the MRBM/IRBM force through mid-1969. By mid-1969, any new missiles in this category are likely to have entered service only in small numbers, and their introduction would probably be accompanied by a phaseout of some of the older missiles.

B. MRBM/IRBM Research and Development

44. Flight testing of a new medium-range missile [ ] began [ ] 1966. Recent evidence indicates that this missile is intended to be a naval weapon, probably associated with the new ballistic missile submarine (see Section V below); but it may also be intended to replace the SS-4 MRBM. The test program has been rapid and successful; [ ] shots at Kapustin Yar [ ] reached the 1,050 n.m. impact area. The most recent test was conducted on the Northern Fleet missile test range, probably to well over 1,000 n.m. There is some indication that increased accuracy is a goal [ ] Available data indicates [ ] storable liquid propellants and an inertial guidance system. We believe that this system could reach IOC in 1968. If [ ] intended for only naval use, we believe that the Soviets will develop a new MRBM system to replace the SS-4. This new system could be either a solid or liquid-propellant missile.

45. We have noted above the [ ] program, which we believe is directed to development of a solid-propellant ICBM. The course of this program, however, particularly the shorter range firings, suggests that it could also involve the development of solid-propellant missiles of MRBM or IRBM range. Whether this has been an objective [ ] or not, the size and scope of the Soviet effort in the solid-propellant field lead us to estimate that the Soviets will deploy a solid-propellant IRBM within the period of this estimate. If it is an outgrowth of [ ] it could probably reach IOC in 1969.

46. On several occasions the Soviets have displayed two types of mobile transporter-erector-launch vehicles with the Scamp and Scrooge missiles. These are not operational systems, but they reflect continuing Soviet interest in mobility. We believe that some future MRBM/IRBM systems will be deployed in a mobile configuration. [ ]

C. Force Levels and Composition in 1970-1977

47. We estimate that new MRBM and IRBM systems will supersede present systems within the next 10 years. We cannot determine whether these new systems will be based on [ ] discussed above. Apart from these, we have observed no flight tests of a possible follow-on MRBM or IRBM. A new system could probably enter service about 2 years after flight testing began. In any case, we doubt that a new system could achieve IOC before 1969. Initial deployment would probably be in hard single silos; solid-propellant missiles may also be deployed in a mobile mode.

48. We do not believe that old systems will be replaced by new systems on a one for one basis. As the survivability and overall capability of the force are increased by the introduction of the new systems, there will probably be some reduction in the total size of force. The reduction in numbers is not likely to be great, however, since the Soviets will probably see new requirements as the result of the threat from a hostile China, with its emerging strategic capabilities. For these reasons we estimate that the strength of the Soviet MRBM/IRBM force will fall somewhere within a range of 500-700 launchers throughout the period of this estimate.

V. MISSILE SUBMARINE FORCES

49. The Soviet ballistic missile submarine force is composed of 37-38 submarines with a total of about 105-110 launchers. This represents an increase in the size of the force of one or two units (of the nuclear-powered H-class) over our previous estimate.[7] The new figure reflects reanalysis of the H-class conversion program rather than new production. The USSR also has 52-57 cruise-missile submarines equipped with some 300-330 launchers.

50. We continue to believe the ballistic missile submarine force is intended for use against land targets, and that cruise-missile submarines have a primary mission of countering naval forces, particularly aircraft carrier task forces. Cruise-missile submarines could be employed against land targets, but with the growth of the ICBM force and the introduction of a new class of ballistic missile submarine, we believe that the Soviet requirement for such employment becomes increasingly marginal.

A. Ballistic Missile Submarines

51. The Soviets are clearly placing increasing emphasis on their ballistic missile submarine force. They are building a new class of submarines which we believe is nuclear powered and will carry 16 ballistic missiles. We estimate that the first unit of this new class will reach IOC by mid-1968. A second submarine in this class probably is in the early stages of fitting out.

[7] Memorandum to Holders of NIE 11-8-66, dated 13 March 1967.

52. We have estimated that the Soviets will develop a new ballistic missile with a range of 1,000-2,000 n.m. for this submarine class. We have noted above (paragraph 44) the evidence indicating [ ] is being developed to meet such a requirement. Our evidence is inconclusive as to its range, but it clearly exceeds 1,000 n.m. and may be as much as 1,500 n.m. We believe that [ ] will soon be ready for fitting into the new submarine and that the entire system—submarine and missile—will reach IOC by about mid-1968.

53. In addition to new submarine construction, we believe that the Soviets are continuing to retrofit G- and H-class submarines with the SS-N-5 submerged-launch 700 n.m. missiles. These submarines were initially equipped with the 350 n.m. surface-launched SS-N-4 ballistic missile. Some 12 to 14 of these submarines have probably been modified or are undergoing modification at the present time. We expect these modification programs to continue until all of the H-class and most of the G-class have undergone retrofit.

B. Cruise-Missile Submarines

54. Soviet cruise-missile submarines became operational sometime after the initial ballistic missile units. We believe that production of the nuclear-powered E-II and the J-class of cruise-missile submarines is continuing, although production of the E-II class has probably been considerably reduced. We expect production of both to end within the next few years, since it appears that the force is approaching what we believe to be its planned level. We do not believe the Soviets will develop any new cruise-missile submarines, but they may develop a new cruise missile with increased range and speed to replace their present type. All Soviet cruise-missile submarines are equipped with the SS-N-3. We believe this missile could be fired to a maximum range of 450 n.m., but that its likely operational range would be on the order of 250 n.m.

C. Strength and Composition of the Force to 1969

55. Our estimate of the strength and composition of the Soviet missile submarine force through mid-1969 is shown below.

BALLISTIC MISSILE SUBMARINES

Class	Number of Launchers Per Unit	1 October 1967	Mid-1968	Mid-1969
Nuclear Powered				
H-I	3	2–1	1–0	0
H-II	3	6–8	7–9	8–9
New Class	16	0	1	3–4
Diesel Powered				
G-I	3	20	17–16	14–12
G-II	3	3	6–7	9–11
Z-Conversion	2	6	6	6
TOTAL Ballistic		37–38	38–39	40–42

BALLISTIC MISSILE SUBMARINES (*Continued*)

CRUISE MISSILE SUBMARINES

Nuclear Powered				
E-I	6	5	5	5
E-II	8	24–26	26–28	28–30
Diesel Powered				
J	4	10–13	11–15	13–15
W-Conversion	1, 2, or 4	13	13	13
TOTAL Cruise	...	52–57	55–61	59–63

D. Operational Capabilities of the Force

56. Open ocean patrols by both ballistic and cruise-missile submarines were first noted in 1964, increased sharply in 1966, and have continued during 1967. What we believe to be ballistic missile submarines carried out eight patrols in the North Atlantic in 1965 and about 15 in 1966. The number has declined in 1967, probably because of the extensive retrofit program. In 1965 all such patrols were conducted in an area southeast of Greenland, but in 1966 a new area was established northeast of the Azores. Since early 1966 patrols in these areas have been carried out by diesel-powered submarines, probably G-class. Those near Greenland are probably targeted against naval installations in the UK, such as the Polaris base at Holy Loch and the British ballistic missile submarine base nearby, and against bases in Iceland. Patrols near the Azores are probably targeted against the Polaris base at Rota, Spain, and the important airbase at Lajes in the Azores.

57. In the Pacific, individual patrols continue to be conducted northeast of Hawaii, normally by diesel submarines, probably G-class. This is probably a holding area from which submarines would deploy to launch positions off Hawaii or the west coast of the US.

58. Patrols by cruise-missile submarines have been maintained at a high level since 1966. A patrol area west of the Azores is now continuously manned by at least one nuclear-powered submarine probably an E-II; the location astride the great-circle routes between the US and Europe suggests that their principal mission is to intercept US carrier forces at sea.

59. We estimate that this patrol activity will increase, and that with the advent of the new ballistic missile submarine, additional patrol areas will be established. Because of the lack of forward bases and the operational limitations of the force, however, the Soviets probably could keep no more than about 30 percent of their nuclear-powered ballistic missile submarines continuously on station in potential missile launch areas off the US. We believe that by the mid-1970's this will be the normal operating pattern. The Soviets may be able to maintain a somewhat higher percentage of submarines on station in areas closer to the USSR.

60. Current Soviet nuclear-powered missile submarines have about the same operating depth limitation as US ballistic missile submarines, but are somewhat slower and considerably noisier. When seeking to counter US submarine detection systems, the Soviets apparently use the technique of operating at slow speed (below 10 or 12 knots) to reduce noise levels. We believe that the new ballistic missile submarine incorporates features which will somewhat reduce the level of noise it generates.

61. The Soviets have substantially improved the logistic and communications support for their submarine forces during the past several years. During the summer of 1967, they experimented in the central Atlantic with what appears to be a unique open ocean submarine support and replenishment concept, involving a variety of auxiliary and support vessels. Classes of submarines sighted in company with one or more of the ships included the cruise-missile E-II, the torpedo attack N, and the torpedo attack F. At least one of the missile submarines operating with this support group evidently remained at sea for about 6 months. Should the concept prove feasible and be put into practice, it would greatly increase the patrol areas which submarines could cover and also serve, to some extent at least, as a substitute for distant land-based submarine support facilities. It might also permit more of the force to be continuously on patrol.

E. Force Levels and Composition in 1970-1977

62. We believe that the Soviets are building toward a ballistic missile submarine force that will confront the continental US with a threat roughly comparable to that which the Polaris force presents to the USSR. The Soviets might define such comparability in terms of numbers of Polaris-type submarines, in terms of numbers of submarine missile launchers, or in terms of launchers that could be maintained continuously on station. Depending on how they define comparability, we believe that the Soviets would see a force of between 35 to 50 of the new submarines, together with their H-class units, as meeting these requirements. (The diesel-powered G-class submarines, because of their limited on-station time at long range, are probably intended primarily for use against Eurasian targets.)

63. We estimate the number of Soviet ballistic missile submarines in mid-1972 at 45 to 55, of which 15-18 will be of the new type. By 1977 we expect the ballistic missile fleet to be composed of about 65-85 submarines, including about 35-50 of the new class. All the Z-conversion models will probably be phased out by 1973.

64. We estimate that the cruise-missile submarine force will number between 50 and 60 units in 1972 and between 40 and 50 by mid-1977. The estimated reduction in the force is based on our belief that phaseout of the W-class conversion will be completed by 1976.

VI. LONG RANGE AVIATION[8]

65. Although the ballistic missile has clearly replaced the manned bomber as the principal means of strategic attack, the bomber forces of Long Range Aviation (LRA) still represent a substantial capability for strategic strike and reconnaissance. We believe that Soviet planning calls for the use of LRA in attacks following an initial missile strike, or to supplement the retaliatory blow if the USSR is attacked first. LRA now comprises a force of about 200 heavy bomber/tanker aircraft and about 750 medium bomber/tankers. We believe that the heavy bombers have the primary mission of intercontinental attack, and that the mediums are intended mainly for operations against Eurasia. LRA activity over the past year continued to reflect training for these primary missions; the secondary mission of naval reconnaissance received less emphasis, particularly in the medium bomber force.[9]

A. Recent Developments in Long Range Aviation

66. The most important recent development in LRA has been the equipping of the Badger medium bomber force with a new air-to-surface missile (ASM) which will probably extend the useful life of the Badger. We believe that a significant portion of the Badger force has already been equipped with the new missile and we estimate that as many as 250-300 Badgers may carry the missile by the time the reequipping and training program has been completed. The missile, which we designate AS-5, is estimated to fly at high subsonic speed to a maximum range of 120 n.m.

67. Another important new development is that the AS-4 appears finally to have reached operational status. During the Soviet airshow in July 1967, 19 Blinders equipped with the AS-4 participated in the flyby. (Blinder aircraft configured to carry the AS-4 are designated Blinder B.) We estimate that 40-50 Blinder B aircraft have been delivered to LRA.

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[8] Maj. Gen. Jack E. Thomas, the Assistant Chief of Staff, Intelligence, USAF, considers that this section does not adequately address present and future capabilities of Soviet Long Range Aviation and seriously underestimates the manned aircraft threat to the US. He believes this threat involves more than 400 aircraft—including about 300 medium bombers on range missions—and that a threat of this magnitude will continue well into the future. His specific disagreements with this section of the estimate are explained in footnotes to the appropriate paragraphs below.

[9] Maj. Gen. Thomas believes that the USSR would commit the majority of its medium bombers, as well as the entire heavy bomber force, against the US, rather than use the mediums mainly against Eurasia. It is his view that the greater number of essential and desirable targets in the US, as compared with the number in Eurasia, poses a requirement that the medium bombers be focused against North America. Even without the medium bombers, the USSR possesses a massive capability against Eurasian targets with MRBM/IRBMs, shorter range missiles, light bombers and tactical fighters, as well as bombers of Naval Aviation and the cruise-missile submarines.

B. Aircraft Production

68. The Bear and the Blinder are the only strategic bomber aircraft now in production. Plant 18 at Kuybyshev is producing about one Bear per month, but we estimate that since 1964 most, if not all, of the Bear aircraft produced have gone to Naval Aviation. We believe that within the next year the requirements of Naval Aviation for Bears will be met. We think production will then cease; if some kind of program in connection with the Bear does continue at this plant, its purpose would probably be to effect qualitative improvements such as adapting the Bear for a new ASM or, conceivably, to replace some aging aircraft. We believe that Plant 22 at Kazan is continuing to produce about 3-4 Blinders per month; we are uncertain as to how long this production will continue but we doubt that it will extend longer than about 2 years.[10]

C. Force Levels and Composition to Mid-1969

69. The strength of LRA has remained relatively stable over the past year. We believe the Soviets will retain their heavy bomber force at close to the present level for the next few years. The medium bomber force will probably decline somewhat. Our estimate of the strength and composition of LRA through mid-1969 is as follows:

	1 October 1967	Mid-1968	Mid-1969
Heavy Bombers/Tankers			
Bison	90–95	85–95	80–95
Bear	110–115	110–115	105–115
Medium Bombers/Tankers [11]			
Badger	600–625	525–575	425–475
Blinder	125–140	150–175	175–200

D. Operational Capabilities of the Force

70. A review of LRA training activity over the past several years strongly indicates that an aircraft attack against the US (except Alaska) would be carried out almost exclusively by heavy bombers and that the Soviets would use virtually their entire force of heavy bombers and tankers for that mission.

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[10] Maj. Gen. Thomas does not consider there is adequate basis for a judgment that Bear and Blinder production will end in 1 or 2 years, unless it is accepted that the Soviet Union already is preparing to produce follow-on models. He believes that Soviet efforts to modernize the long range, manned-aircraft capability, as evidenced by limited, but continuing, production of Bear and Blinder, probably will continue until the USSR has decided upon specific follow-on models.

[11] Maj. Gen. Thomas expects that any reduction in the medium-bomber force over the next two years will be very minor, and not nearly as much as the 90-125 aircraft reduction indicated in the table. He notes that in the past year total reduction in the medium-bomber force was only five aircraft.

71. We continue to believe that medium bombers do not figure prominently in Soviet plans for an initial attack on the US. To carry out two-way missions against US targets, they would require Arctic staging and aerial refueling. Furthermore, we believe that the Arctic staging bases, which must be supplied almost entirely by sea during the short annual shipping seasons, could not simultaneously support heavy bomber and medium bomber strikes of major size. A few squadrons of Badgers might be employed on two-way missions against targets in Alaska, Canada, Iceland, and Greenland.[12]

72. The Soviets could, if they elected to do so, increase the weight of an attack against the US by utilizing a portion of the medium bomber force on range (one-way) missions, since the aircraft do have the capability. Considering training patterns, as well as the growth of the ICBM and submarine missile forces, we believe such use of the medium bomber is unlikely.[12]

73. We believe that LRA does not continuously maintain a portion of its force on an airborne or ground alert (i.e., with a reaction time of 15 minutes or less). We estimate that with current manning, LRA could establish and maintain one-third of the force on ground alert; with a slight augmentation in personnel this could be raised to 50 percent. We believe that, if LRA were to establish a ground alert status on a routine basis, this would be detected.[13]

E. New Aircraft Development

74. Our evidence indicates that Soviet work in large aircraft is directed primarily toward the development of new transports. This work advances the state of the art and provides a technological and production base which could be applied to bomber development. The US announcement to deploy ABM defenses may lead the Soviets to consider a new manned bomber as a response to such defenses. If the Soviets did elect to develop a new heavy bomber, we probably would obtain indications of the development and production of such an aircraft 3 to 4 years prior to its introduction into operational units. Considering the growing of Soviet ballistic missile capabilities, however, and the other options open to them to counter ABM defenses, we continue to believe

[12] Maj. Gen. Thomas believes that because of their range and weapon carrying capabilities, and in view of the large number of US targets as against the number of Soviet delivery vehicles, medium bombers continue to have a major mission of attack against the US if a major nuclear assault is launched. In such a situation, he estimates more than 300 medium bombers would be used on range missions.

[13] Maj. Gen. Thomas does not consider available information is sufficient to provide basis for judgment that the LRA does not maintain a portion of the force on ground alert. In view of Soviet doctrinal emphasis on alert readiness, he considers it likely that some portion of the bombers is on constant alert.

it unlikely that the USSR will introduce a follow-on heavy bomber into LRA during the period of this estimate.[14]

75. The Soviets have experienced difficulties in bringing the Blinder to operational status. Unless these problems have been resolved, the Soviets may elect to develop a follow-on medium bomber. One possibility is a supersonic-dash aircraft, perhaps with variable geometry wings, having better speed, altitude, and radius than the Blinder; it could be introduced in the 1972-1975 period. An alternate possibility, which could be introduced somewhat later than the dash model, would be a supersonic-cruise medium bomber based on the Soviet supersonic transport development; it would probably have a radius about the same as the Blinder.

F. New Air-to-Surface Missile Development

76. The Soviets are continuing developmental work on ASMs for attack against both land and sea targets. Even though the AS-3, now carried by two models of the Bear, has been operational since 1960, we believe that the Soviets are still trying to improve the weapon. The most likely component to be improved would be the guidance system. It is also possible that the Soviets will develop a new ASM for use with the Bear.

77. We believe that the Soviets are working on an ASM with a range of about 350 n.m. and a cruise speed of Mach 3. We think it unlikely, however, that it has achieved IOC, but the program is probably continuing.

G. Future Force Levels

78. The LRA heavy bomber aircraft are on the average about 8 years old and attrition is beginning to take effect. The strength of the Bear force has not changed appreciably during the past 2 or 3 years, but the number of Bisons has declined. We estimate that over the next 5 years or so the number of Bear ASM carriers will remain relatively constant but that overall heavy bomber strength will decline, due to attrition of the older Bear and Bison free-fall bombers. We estimate that by mid-1972 the heavy bomber force will be comprised of 70-90 Bear ASM carriers and some 65-80 Bisons. We estimate that by mid-1977 this force will consist of no more than 40-60 Bears and 30-50 Bisons.[15]

[14] Maj. Gen. Thomas believes a new heavy strategic aircraft system is likely to be introduced to support the present force level into the mid-1970's. This follow-on system could be an improved Bear with a new ASM or a supersonic aircraft based on research and development relating, in part at least, to supersonic transports.

[15] Maj. Gen. Thomas notes that both Bear and Bison strength has remained unchanged in the past year, and he believes that the USSR will continue to maintain about 200 heavy bombers in operational units throughout the period of this estimate, using a follow-on system to support the force level in the 1970's.

79. Over the past 5 years the strength of the medium bombers in LRA has been declining; the Badger force has been decreasing at an average rate of about 70 aircraft per year and Blinders have not been deployed in sufficient numbers to offset this decline. Since we do not believe that all the Badgers now in the force will be equipped to carry the ASM, we expect a continued reduction in Badger strength. We estimate that by mid-1972 the medium bomber force will comprise some 250-325 Badgers and some 175-225 Blinders. By 1977 the Badger force will probably have declined to some 100-200 aircraft but the number of Blinders will probably have remained relatively constant. If the Soviets introduce a new medium bomber in the 1970's, we believe that it would replace some of the older current types rather than being additional to the above strengths.[16]

VII. COMMAND AND CONTROL

80. Supreme authority over the Soviet Armed Forces is probably vested in the Politburo as a whole, or at least in a committee of the Politburo. In peacetime the political authorities exercise control through the Ministry of Defense. In the event of war the channel would probably run through a Supreme High Command, which would include political as well as military leaders and would have wide powers in the direction of the war effort.

81. During the past 2 years, some elements within the military have emphasized the critical importance of fast reaction and surprise in a modern nuclear environment and have stressed the need for a permanent political-military command organ—apparently similar to the wartime Supreme High Command—to operate in peacetime as well as in wartime. We do not know whether such an organ has in fact been created. We believe that arrangements exist for the quick assumption of command by the political leadership in the event of emergency, but we doubt that any one of the present collective leaders has been given the authority that Khrushchev exercised as "Supreme Commander-in-Chief." We believe that the collective nature of the present leadership works to inhibit such a centralization of command authority at this time.

82. We believe that within the military itself, however, the Soviets are moving toward a highly integrated command structure for their strategic attack forces. There are various indications that during the past year there has been a continuing refinement and improvement of operational controls within those forces.

[16] Maj. Gen. Thomas expects a more gradual decline in the Badger force and a somewhat larger Blinder force than this paragraph indicates. He estimates a mid-1972 medium-bomber force of 625-725 (rather than the 425-550 in paragraph 79) and a mid-1977 force of 400-600 (rather than 275-425).

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ANNEX A

GLOSSARY OF MISSILE TERMS

TABLES OF SOVIET WEAPON SYSTEMS CHARACTERISTICS AND PERFORMANCE

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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.

MAXIMUM OPERATIONAL RANGE (N.M.)

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

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

ACCURACY

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

FOBS AND MOBS—See footnote definition on page 14.

REENTRY VEHICLES AND WARHEADS

Reentry Vehicle (RV)—That part of a missile designed to reenter the earth's atmosphere in the terminal portion of its trajectory.

Multiple RVs (MRVs)—A payload package consisting of two or more RVs. The individual RVs are dispersed (but not independently-targeted or maneuvered) during the free flight or terminal portion of the trajectory in order to confuse enemy radars, aid penetration, and/or to increase kill area.

Multiple Independently-targeted RV (MIRV)—A payload consisting of two or more RVs each of which is independently targeted.

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

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

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

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

RANGE CLASSES

Short Range Ballistic Missile (SRBM)

Up to about 600 n.m.

Medium Range Ballistic Missile (MRBM)

About 600 to 1,500 n.m.

Intermediate Range Ballistic Missile (IRBM)

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

Intercontinental Ballistic Missile (ICBM)

Over 3,000 n.m.

RELIABILITIES

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

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

Force—The percentage of the operational missile force that will successfully detonate in the target area. This is the product of Alert Rate and Weapon System reliability.

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

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

TABLE I

SOVIET ICBM SYSTEMS

Estimated Characteristics and Performance

	SS-6	SS-7	SS-8	SS-9	SS-11*	SS-Small Follow-on**	SS-Large Follow-on**
IOC	1960	1962	1963	1966	1966	Mid-1969	1970–1972
Operational Range-NRE-(nm)	6,000	5,000–6,000	6,000	5,000–6,500	5,500	About 5,000	6,500
Reentry Vehicle Weight (lbs)	7,000–9,000	4,200 [redacted] 3,500	3,000–4,000	12,500 [redacted] 10,000	[redacted]	[redacted]	[redacted]
Warhead Weight (lbs)	5,000–7,000	3,300/2,800	2,400–3,200	10,000/8,000	[redacted]	[redacted]	[redacted]
Warhead Yield (MT)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
CEP (nm)	2.0	1.0–1.5	1.0	0.5–0.75 [b]	[redacted]	[redacted]	[redacted]
Improvement/Year	..	..	..	..	..	..	..
Weapon System Reliability (%)	75	75	75	75	75	..	..
Alert Rate (% of Force)	80	80 [c]	80 [c]	85	85	..	..
Force Reliability (Rounded) (%)	60	60 [c]	60 [c]	65	65	About 50	About 60
Improvement/Year	..	..	..	..	..	60/IOC+2 yrs	65/IOC+2 yrs
Deployment	Soft	Soft & Hard	Soft & Hard	Hard	Hard	Hard; possibly mobile later	Hard
Time to Fire From Normal Readiness Condition.	At least 12 hrs	1–3 hrs 5–15 min	1–3 hrs 30–45 min	3–5 min	0.5–3 min	About 1 min	About 1 min
Time to Fire From Peak Readiness.	5–10 min	3–5 min 3–5 min	5–10 min 5–10 min	3–5 min	0.5–3 min	About 1 min	About 1 min
Hold Time (at Peak Readiness)	About 1 hr	Many hours Days	About 1 hr	Unlimited	Unlimited	Unlimited	Unlimited
Refire Time	At least 12 hrs	2–4 hrs *na*	2–4 hrs *na*	*na*	*na*	*na*	*na*
Guidance	Radio Inertial	Inertial	Radio Inertial	Radio Inertial	Inertial (Possible Radio Inertial)	Inertial	Radio Inertial
Propellant	Nonstorable Liquid	Storable Liquid	Nonstorable Liquid	Storable Liquid	Storable Liquid	Solid	Storable Liquid

* Over the next few years, the Soviets will probably improve the SS-11 system, and in the mid-1970's they may elect to replace it with a new small liquid-propellant ICBM.

** This is the ICBM associated with the KY-6 program.

[a] These ICBMs have been tested to different ranges using different weight warheads.

[b] Using only inertial guidance, the SS-9 would have an estimated CEP of about 1 n.m.

[c] May be somewhat higher in hard sites.

TABLE II

SOVIET FRACTIONAL ORBIT BOMBARDMENT SYSTEM *

Estimated Characteristics and Performance

IOC	1968–1969
Reentry Vehicle Weight (lbs)	3,000–4,000 *
Warhead Weight (lbs)	2,400–3,200 *
Warhead Yield (MT)	[redacted]
CEP (nm)	1–3 b
Deployment	Hard
Force Reliability (percent)	50
Improvement	60 (2 years after IOC)
Reaction Time	
Normal Readiness	3–5 minutes
Peak Readiness	Same
Hold Time	Unlimited
Guidance	Inertial
Propellant	Storable Liquid

* This is an estimate of a FOBS based on the SS-X-6 system which the Soviets have been testing for almost 2 years. Evidence indicates that the SS-X-6, as it has been tested to date, would probably have to be modified to attack the US on a polar trajectory. If the modification were merely a reduction of weight in orbit, IOC could be achieved by early to mid-1968 and the lower RV and warhead weights would apply. If the modification were to be so drastic as the development of a new launch vehicle, IOC could not be achieved before 1969 but the higher RV and warhead weights could be delivered. If the modification were to be an improvement in the thrust of the present launch vehicle, the higher RV and warhead weights would apply but IOC could not be achieved until late 1968 or early 1969.

b If the FOBS were to be launched on a North Pole trajectory, we estimate that its CEP would be about 1–2 n.m. If it were to be launched on a South Pole trajectory, we estimate that its CEP would be about 1.5–3 n.m.

TABLE III

SOVIET MRBM/IRBM SYSTEMS

Estimated Characteristics and Performance

	SS-4	SS-5	Follow-on MRBM*	Follow-on IRBM
IOC	1958	1961	1968-1969	1969-1971**
Maximum Operational Range-NRE-(nm)	1,020	2,400	About 1,500	2,000-3,000
Reentry Vehicle Weight (lbs)	3,300	3,500	About 2,000	About 1,500
Warhead Weight (lbs)	2,200	2,800	About 1,500	About 1,000
Warhead Yield (MT)				
CEP (nm)	1.25	1.0	0.5-1.0	About 1.5
Reliability (%)				
Weapon System Reliability (%-Rounded)	75 •	75 •	..	..
% of Force on Alert	80	80	..	..
Force Reliability (%-Rounded)	60 •	60 •	About 60	55-60
Improvement/Year	..	..	About 65/IOC+2 yrs	65/IOC+2 yrs
Deployment	Soft/Hard	Soft/Hard	Hard; possibly mobile	Hard; possibly mobile
Time to Fire From Normal Readiness Condition	1-3 hrs/5-15 min	1-3 hrs/5-15 min	About 1 min	About 1 min
Time to Fire From Peak Readiness	3-5 min/3-5 min	3-5 min/3-5 min	About 1 min	About 1 min
Hold Time at Peak Readiness	Many hrs/days	Many hrs/days	Unlimited	Unlimited
Refire Time	2-4 hrs/*na*	2-4 hrs/*na*	*na*	*na*
Guidance	Inertial	Inertial	Inertial	Inertial
Propellant	Storable Liquid	Storable Liquid.	Storable Liquid	Solid or Storable Liquid

* This missile system is an estimate based on [redacted]. Recent evidence suggests [redacted] for use in the new ballistic missile submarines. It may, however, also be deployed as an MRBM. If [redacted] not intended for use as an MRBM, we believe that the Soviets will develop a new MRBM to replace the SS-4. It would probably reach IOC later in the period and it could be either a solid or liquid-propellant type. It could be deployed in either hard or mobile configuration.

** We estimate that a new IRBM will be brought to operational status during the period of this estimate. If such a missile is developed as an outgrowth [redacted] it probably could reach IOC in 1969. If, on the other hand, it is a new system which has not yet been flight tested, IOC could probably not be reached until 1970-1971.

• May be somewhat higher in hard sites.

TABLE IV

SOVIET BALLISTIC MISSILE SUBMARINES

Estimated Characteristics and Performance

Class	H-I	H-II	New Class	G-I	G-II	Z-Conversion
Type of Propulsion	Nuclear	Nuclear	Nuclear	Diesel	Diesel	Diesel
Type of Missile	SS-N-4	SS-N-5	SSN-Follow-on	SS-N-4	SS-N-5	SS-N-4
Speed (KTS)						
Maximum Surface	20	20	16	18	18	18
Maximum Snorkel	*na*	*na*	*na*	10.5	10.5	7
Maximum Submerged/Endurance (KTS/nm)	20/*na*	20/*na*	About 20/*na*	16/12	16/12	15/15
Economic Submerged/Endurance (KTS/nm)	..	..	..	3.5/175	3.5/175	3/150
Armament						
Torpedoes	32	32	32	26	26	26
Missiles	3	3	16	3	3 [a]	2
Patrol Duration (days) [b]	60	60	60	60	60	60
Days on Station/Distance (nm)	0/8,600	0/8,600	0/8,600	0/3,600	0/3,600	0/3,600
	10/7,200	10/7,200	10/7,200	10/3,000	10/3,000	10/3,000
	20/5,800	20/5,800	20/5,800	20/2,400	20/2,400	20/2,400

[a] The first submarine of the G-II class was equipped to carry only two SS-N-5 missiles. Later models, however, are equipped to carry three.

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

TABLE V

SOVIET CRUISE MISSILE SUBMARINES

Estimated Characteristics and Performance

Class	E-I	E-II	J	W-Long Bin	W-Twin Cylinder
Type of Propulsion	Nuclear	Nuclear	Diesel	Diesel	Diesel
Type of Missile	SS-N-3	SS-N-3	SS-N-3	SS-N-3	SS-N-3
Speed (KTS)					
Maximum Surface	20	20	16	18	18
Maximum Snorkel	*na*	*na*	9	5.5	5.5
Maximum Submerged/Endurance (KTS/nm)	20/*na*	20/*na*	16/12	12/12	12/12
Economic Submerged/Endurance (KTS/nm)	..	..	3/150	2.5/125	2.5/125
Armament					
Torpedoes	32	32	26	12	14
Missiles	6	8	4	4	2
Patrol Duration (days) [a]	60	60	60	40	40
Days on Station/Distance (nm)	0/8,600	0/8,600	0/3,600	0/2,400	0/2,400
	10/7,200	10/7,200	10/3,000	10/1,800	10/1,800
	20/5,800	20/5,800	20/2,400	20/1,200	20/1,200

[a] See footnote [b], Table IV.

TABLE VI

SOVIET SUBMARINE-LAUNCHED MISSILE SYSTEMS

Characteristics and Performance

	SS-N-3 *	SS-N-4	SS-N-5	Follow-on SS-N*
IOC	1961	1960	1963	1968
Maximum Range (nm)	450	350	700	About 1,500
Warhead Weight (lbs)	1,000–2,000	2,200	1,500–2,500	[redacted]
Warhead Yield (MT)	[redacted]			
CEP (Against Land Targets) (nm)	1–2	1–2	1–2	[redacted]
Type and Propulsion	Cruise Turbo Jet	Ballistic Storable	Ballistic Storable	Ballistic Storable
Speed (Mach)	0.9–1.8 *	*na*	*na*	*na*
Cruise Altitude (ft)	1,000–40,000 *	*na*	*na*	*na*
Launch Mode	Surfaced	Surfaced	Submerged	Submerged
Weapon System Reliability (%) (Rounded).	75	75	75	Unknown
Alert Rate (%)	95	95	95	Unknown
Force Reliability (%) (Rounded) [b]	70	70	70	About 60 (65 two yrs after IOC)
Guidance	Inertial *	Inertial	Inertial	Inertial
Salvo Time by Submarine Class (min)				
W-Class Conversion (1, 2, or 4 missiles) [c]	2–9	..	..	..
J-Class (4 missiles)	5	..	..	..
E-I Class (6 missiles)	10	..	..	..
E-II Class (8 missiles)	15	..	..	..
Z-Class (2 missiles)	..	4	..	..
G-I Class (3 missiles)	..	8	..	..
G-II Class (2 or 3 missiles) [d]	..	..	4–8	..
H-I Class (3 missiles)	..	8	..	..
H-II Class (3 missiles)	..	..	8	..
Follow-on SSBN (16 missiles)	..	..	..	15–19
Reaction Time (min) [e]	20–40	20–40	15–30	15–30
(Includes Minutes on Surface Before Launch).	(5)	(3)	(None)	(None)

* This missile is based on [redacted]

* We believe that the SS-N-3 was designed for use against naval surface vessels but that it can be employed in the strategic attack mission against land targets. The characteristics and performance data given on this table are for its use in this latter role. Some of the performance data shown would be different if the system were to be employed against naval forces. The 450 n.m. figure represents the maximum range of this missile but we believe that the likely operational range would be on the order of 250 n.m.

[b] Pertains only to submarines on patrol.

[c] There are three variants of the W-class conversion in the Soviet fleet.

[d] The first submarine of the G-II class was equipped to carry only two SS-N-5s. Later models, however, are equipped to carry three missiles.

[e] Time required to proceed from a specified readiness condition to firing. For submarine-launched missiles, time is taken to include the time from the moment of the order to fire to launch of the first missile assuming: (1) the submarine is on alert; (2) targets have been selected; (3) the missile system includes continuous computation of firing data, and (4) the missiles have been checked and are ready for countdown. For surface-launched SLBMs submarine time on surface is included in reaction time; for underwater launched missiles, submarine time to attain proper launch attitude is included.

TABLE VII

SOVIET LONG RANGE AVIATION BOMBER AND TANKER AIRCRAFT

Estimated Characteristics and Performance

	Bison	Bear	Badger	Blinder A [a]	Blinder B [a]
Combat Radius/Range (nm) (As a free fall bomber)					
a. 25,000 lb. bombload	2,800/5,200	4,150/7,800	..	..	..
one refuel	3,950/7,300				
b. 10,000 lb. bombload	3,050/5,950	4,500/8,800	1,550/2,950	1,700/3,250	..
one refuel	4,150/7,900	..	2,200/4,150	2,350/4,500	
c. 6,600 lb. bombload	3,100/6,050	4,600/9,000	1,650/3,200	1,800/3,450	..
one refuel	4,200/8,100	..	2,300/4,400	2,400/4,650	
d. 3,300 lb. bombload	3,150/6,150	4,700/9,300	1,750/3,400	1,850/3,650	..
one refuel	4,250/8,250	..	2,400/4,600	2,500/4,800	
e. With ASM					
1. One AS-3 (Bear B&C)	..	3,950/7,150	..	..	..
one refuel	..	5,050/9,200	..	..	..
2. One AS-4 (Blinder B Subsonic)	..	..	..	..	1,500/2,800
one refuel	..	..	..	..	2,150/4,000
3. Two AS-5	..	..	1,300/2,500	..	..
one refuel	..	..	1,750/3,350	..	..
f. 10,000 lb. bombload (Supersonic-dash)	..	..	..	1,200/2,650	..
one refuel	..	..	..	1,850/3,900	..
6,600 lb. bombload (Supersonic-dash)	..	..	..	1,300/2,850	..
one refuel	..	..	..	1,950/4,100	..
3,300 lb. bombload (Supersonic-dash)	..	..	..	1,400/3,050	..
one refuel	..	..	..	2,050/4,300	..
one AS-4 (Supersonic-dash)	..	..	..	..	1,000/2,100
one refuel	..	..	..	..	1,600/3,300
Target Speed/Altitude (KTS/ft.)					
Subsonic	465/about 43,000	435/about 42,000	475/about 41,000	560/about 37,000	560/about 37,000
Supersonic	..	..	..	860/about 46,000	860/about 43,000
System Reliability (% aircraft reaching target areas in North America) [b]	79–85	79–85	76–85	79–85	79–85

[a] Blinder A is a bomber. Blinder B is a missile carrier equipped with one AS-4/Kitchen missile. Blinder aircraft missions are based on a Mach 1.5, 100 n.m. dash in and out of target area on radius mission and 100 n.m. dash in only on-range mission. There is no direct evidence of an operational refuel capability for these aircraft at present.

[b] This range is based on the following noncombat attrition rates: (1) 90 percent of the aircraft assigned to home base (AOB) would be in commission after a 5–10 day standdown prior to initial operations, and would become airborne at launch time; (2) 94 percent of the aircraft airborne would reach BRL directly from home base or from staging base; (3) 95 percent of the aircraft launched from home base would be launched from staging base; (4) 98 percent reliability should be applied to aircraft equipped for probe and drogue and requiring inflight refueling to accomplish their mission. A 95 percent reliability should be applied to aircraft employing wing-tip to wing-tip refueling.

TABLE VIII

SOVIET LONG RANGE AVIATION ASM SYSTEMS

Estimated Characteristics and Performance*

	Kangaroo AS-3	Kitchen AS-4	AS-5
IOC	1960–1961	1967	1965
Maximum Range (nm)	350	300	120
Warhead Weight (lbs)	4,500–5,500	2,200	1,000–2,000
Warhead Yield	[redacted]		
Accuracy (CEP) nm	1–3	1–2	1–2
Speed (Mach)	1.8–2.0	3–4 at 80,000 ft	0.9–0.95
Overall Reliability (%)[a]	75	65	70
Improvement/Year	..	75/IOC+2 yrs	75/1968
Carrier Aircraft/Number of Missiles	Bear B&C/1	Blinder B/1	Badger/2
Launch Altitude ft/Launch Speed (KTS)	36,000–39,000/420	40,000[b]	30,000–35,000/440
Guidance	Preprogrammed autopilot with command override.	Unknown	Preprogrammed autopilot with command override.

* We believe that the Soviets currently have in R&D a new ASM with an estimated range of about 350 n.m. and a speed of Mach 3. It has almost certainly not achieved IOC. We do not know which aircraft may be intended to carry it or when it may become operational.

[a] Does not include the reliability of the carrier aircraft.

[b] There are no limitations on the speed at which this missile can be launched.

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