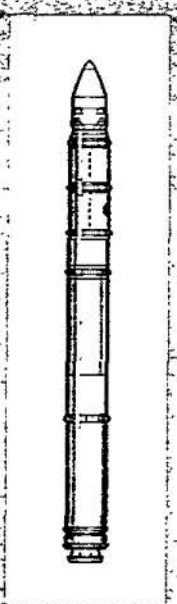
PART I

THE RIDDLE INSIDE THE ENIGMA: UNDERSTANDING SOVIET STRATEGIC POLICY IN THE 1950s



Part I:
The Riddle Inside the Enigma:
Understanding Soviet Strategic Policy in the 1950s

World domination begins at home.

NSC-68

The Soviet Union as a World Power

The process by which the post–World War II Soviet Union emerged as a world power was a gradual one that lasted from the end of hostilities in Europe to the first years of the 1960s. Although the development of nuclear weapons and the intercontinental bombers and missiles needed to deliver them to targets in North America had begun under Stalin, for a long time these new technologies existed only as a kind of veneer laid over a traditional Soviet continentalism rooted deeply in the substrata of Russian and Soviet military traditions. These manifested themselves in an obsessive concern for security in the areas bordering Soviet territory, the perpetuation of a large, redundant ground force structure supported by a predominantly tactical air arm, a stubborn conservatism in the introduction of technological innovations, and a military doctrine emphasizing the rigidly centralized control of military forces. So conservative was the Soviet military mind that, to a substantial degree, these remained the governing principles behind much of Soviet military policy throughout the Cold War.

Nevertheless, the death of Stalin in 1953 and the subsequent rise of Nikita Khrushchev produced a watershed in Soviet military policy. The new Premier identified himself with modernization and reform and plotted nothing less than a revolutionary transformation that would strike deeply at the roots of traditional Russian and Soviet military thinking to influence virtually every aspect of Soviet national life. Khrushchev's role, as he saw it, was to overturn the ossified structure of the Stalinist dictatorship in furtherance of the revolutionary transformation of the Soviet state. For the military, this meant abandonment of what he regarded as anachronistic institutions in favor of a structure more suited to war in an industrialized bourgeois world. Thus, Khrushchev's Twentieth Party Congress speech denouncing Stalinism in February 1956 was more than an announcement of the end to mass murder and arbitrary rule, it was the harbinger of a time of great change for the Soviet military.

On one level, this metamorphosis could be regarded as a part of the historical dialectic. Marxist-Leninist thinking regarded the structure of war as a

product of the political, social, and economic institutions in conflict. In general, weapons kept pace with the development of society through "quantitative" or evolutionary change, but a "qualitative" or revolutionary transformation occurred when a confluence of technological developments brought change, not only to weapons and warfare but to society as a whole.[1] The development of nuclear weapons, combined with the advent of the ballistic missile and the necessary guidance systems needed to make the weapons system work was this kind of change.[2] The restructuring of the military that Khrushchev began in 1956 thus could be regarded as part of an effort to drag the Soviet Union into the space age—if necessary, against the collective will of the ruling elites.

To the intelligence analyst, or the informed student of Soviet affairs, a transformation of this kind promised a period of dramatic change, in which the reduction and reorientation of Soviet Ground Forces was a necessary prerequisite to an all-out drive to acquire the long-range bombers and missiles necessary to deliver nuclear weapons to targets in the United States. The US intelligence community was ill prepared for a restructuring of this kind. Isolated since the October revolution, the Soviet Union had long been outside the mainstream of international relations and was a mystery to most westerners. The Kremlin kept the USSR a closed book by its pervasive effort to control every aspect of Soviet national life and its deep hostility and suspicion toward anything foreign. For the West, intelligence sources on the USSR were few and far between. Although a few startling successes were recorded, the omnipresence of the Soviet police apparatus made the traditional staples of intelligence collection for centuries—such as human source reporting—mainly problematic for most Soviet targets, including military ones. Soldiers were everywhere in the Soviet Union, but the essential fabric of the military—the basing structure, the deployed weapons, the troop concentrations, and the industrial infrastructure that supported it all—was almost invisible, revealing itself only under circumstances that could be carefully controlled—the annual May Day parade, for example. Such occasions were highly prized, but the Soviets, well aware of their importance, saw to it that they often obscured as much as they illuminated.[3]

In this environment, the development of a Soviet strategic nuclear capability emerged as a topic of vital importance—and one that seemed virtually opaque to Western intelligence. Clearly, the development of long-range

[1] For details of the "military revolution," see Harriet Fast Scott and William F. Scott, eds., *The Soviet Art of War: Doctrine, Strategy and Tactics* (Boulder, CO: Westview, 1982), pp. 73-156.

[2] Scott and Scott, p. 123.

[3] See the importance of this factor to the development of the "Bomber Gap" crisis, pp. 5-7.

nuclear weapons was central to Khrushchev's program of forced modernization. It was, moreover, a primary means of achieving the Soviet goals of global power and influence. On the other hand, it was also true that the structural details of strategic programs were the most closely held in the Soviet Union and thus the least susceptible to coherent analysis. This lack of programmatic evidence made it difficult to understand the new strategic systems in context with broader concepts of Soviet strategy or with the development of the Soviet military economy.

The "Bomber Gap," 1955-58

The limitations to US intelligence collection and analysis became manifest in the "bomber gap" of the mid-1950s. The proximate cause of this analytical crisis was subsequently attributed to a Soviet deception at the 1955 "Aviation Day" display. The M-4 Bison (initially referred to as the Type-37 in NIEs), a Soviet heavy bomber with capabilities apparently approaching those of the American B-52, had first been seen at the 1954 May Day parade and was produced in small numbers in the following year. In the 1955 display, what appear to have been the same 10 aircraft were flown around the reviewing stand in different formations, giving the impression that there were at least 20 operational aircraft, which meant (given standard operating procedures and expected serviceability rates) that up to 40 could be assumed to be in the total inventory.[4] The unexpected appearance of what seemed to be so many new Soviet long-range strategic bombers touched off a series of overestimates of Soviet bomber production rates that led US intelligence analysts to believe the Soviets were ahead of the United States in the development and deployment of this important strategic weapons system. Hence the term "bomber gap."

Traditionally a tactical arm, the Soviet Air Force had demonstrated little interest in heavy bomber production before World War II and had concentrated on fighters, light bombers, and medium bombers during the war. After the war, the Soviets had seemed more interested in developing aircraft for theater-strike roles in Europe and Asia than in building intercontinental-range heavy bombers for strikes against North America. No long-range heavy bomber programs were evident in the early 1950s (by which time the United States had the monster turboprop-driven B-36 intercontinental-range heavy bombers in service), but in 1947 the Soviets had produced the Tu-4 Bull, a copy of the American B-29. In 1954 the jet-powered Tu-16 Badger (at first given the designation Type-39 in NIEs) began its long career with Soviet strategic aviation (one year after the first all-jet American medium bomber, the B-47, was deployed). By 1950s standards, both the Tu-4 and the Tu-16 were nuclear-capable medium bombers that lacked the range to strike most population centers and military targets in North America.[5]

The discovery that the Soviets already had what appeared to be an operational four-engine jet bomber in 1955 soon caused a drastic revision of all

[4] In fact, the Soviets apparently had made a special effort for the occasion: the 10 aircraft seen over Moscow probably comprised the entire production run of Bison at that time. Lawrence Freedman, *US Intelligence and the Soviet Strategic Threat* (2nd Edition), (Princeton NJ: Princeton University Press, 1986), pp. 65-67.

[5] Both types of aircraft could just reach targets in North America on suicidal, one-way missions.

previous estimates. Here, the question was not *whether* the Soviets would develop an intercontinental-range heavy bomber, but *when*, and how long it would take them to do so. In plotting the progress that a Soviet strategic bomber program might take, the intelligence community had assumed that the Soviets would proceed in an orderly fashion from the Tu-4 to a multiple jet-engine bomber similar to the B-52 (presumably via a Soviet equivalent of the B-36). This process was expected to advance to the mass production of jet heavy bombers (Bison or Type-37s) by the end of the decade.[6]

The sudden appearance of significant numbers of Bison at the 1955 May Day air display suggested a Soviet crash effort to produce a long-range jet heavy bomber, with the result that production estimates escalated rapidly. A second shock occurred at the July 1955 Tushino Air Show, where the Soviets displayed the first three samples of the Tu-95 Bear turboprop-powered heavy bomber for the first time.[7] This aircraft, too, appeared to be in series production, leading to the inescapable conclusion that a Soviet buildup—possibly a large-scale one—was under way. In 1957 evidence that the Soviets were developing an in-flight refueling system—a prerequisite to an intercontinental strike capability—buttressed the notion of a strong Soviet bomber force.

Hampered by a dearth of good evidence, the intelligence community significantly overstated Soviet heavy bomber production from 1955 through the end of 1957. However, the inability to fully come to grips with the problem spurred the development of increasingly sophisticated analytical techniques and every year saw Western analysts become more adept at using the evidence that was available to them. In this period, too, new sources of information (including the first U-2 photography) became available. By 1958 further analysis had deflated projections of Soviet heavy bomber production to levels approaching reality.

As it turned out, the Soviets never demonstrated the level of interest in heavy bombers that the West assumed, and by at least the late 1950s had decided to concentrate on ICBMs. They apparently never regarded the Bison as a satisfactory aircraft and built fewer than 100, about half of which were removed from service as bombers by the end of the 1960s. The remainder soldiered on until the mid-1980s. Many were converted to tankers.

[6] Freedman, p. 66. NIE 11-5-54 projected about 100 jet heavy bombers by mid-1959. Scott Koch, ed., *Selected Estimates on the Soviet Union 1950-1959* (Washington, DC: CIA History Staff, 1993), p. 210.

[7] Freedman, p. 66.

The mainstay of the Soviet heavy bomber force turned out to be the Tu-95 Bear. Arguably one of the most successful aircraft ever built, about 100 Bears were maintained in service with Soviet Long-Range Aviation throughout the whole of the Cold War. Additional models (the Tu-95 Bear D and the Tu-142 Bear F) were built for the Soviet Navy and used for long-range reconnaissance and antisubmarine warfare.[8] Bear heavy bomber production actually resumed in the 1980s, the newer variants equipped with long-range cruise missiles.[9] Despite what appeared to be enduring Soviet satisfaction with the Bear, Western intelligence continued to believe that the Soviets would build heavy bombers of more modern design. The Tu-160 Blackjack, which finally appeared in the mid-1980s (after the Bear had been in service for some 30 years), filled this perceived requirement, but only a few were built before the Soviet state itself collapsed.[10]

[8] *Soviet Military Power 1987*, (USGPO, 1987) p. 88.
[9] *Soviet Military Power 1990*, (USGPO, 1990) p. 52.
[10] *Soviet Military Power 1988* (USGPO, 1988), p. 50. *Military Forces in Transition* (Department of Defense, 1991), p. 34.

1. NIE 11-56 *Soviet Gross Capabilities for Attack on the US and Key Overseas Installations and Forces Through Mid-1959*

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SOVIET GROSS CAPABILITIES FOR ATTACK ON THE US AND KEY OVERSEAS INSTALLATIONS AND FORCES THROUGH MID-1959

Submitted by the

DIRECTOR OF CENTRAL INTELLIGENCE

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

Concurred in by the

INTELLIGENCE ADVISORY COMMITTEE

on 6 March 1956. Concurring were the Special Assistant, Intelligence, Department of State; the Assistant Chief of Staff, Intelligence, Department of the Army; the Director of Naval Intelligence; the Director of Intelligence, USAF; the Deputy Director for Intelligence, The Joint Staff; the Atomic Energy Commission Representative to the IAC; and the Assistant Director, Federal Bureau of Investigation.

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1. *(Continued)*

~~TOP SECRET~~

TABLE OF CONTENTS

1. *(Continued)*

TABLE OF CONTENTS (Continued)

1. *(Continued)*

~~TOP SECRET~~

TABLE OF CONTENTS (Continued)

1. *(Continued)*

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SOVIET GROSS CAPABILITIES FOR ATTACK ON THE US AND KEY OVERSEAS INSTALLATIONS AND FORCES THROUGH MID-1959

THE PROBLEM

To estimate Soviet gross capabilities to attack the continental United States and certain US installations and forces overseas, as of January 1956 and mid-1959.[1]

SCOPE

This estimate is made as a contribution to the study of Soviet net capabilities to attack the continental United States and is *not* intended to consider all the aspects of a general war. Overseas installations and forces are considered only insofar as they contribute directly to the defense of the continental United States (e.g., as bases for interception of the attack or for counterattacks calculated to reduce Soviet capabilities against the continental United States). The estimate does not take into account competing demands for the allocation of Soviet efforts against the strengths of any nation but the US or against all the strengths of the US that might be involved in the initial stages of a general war. Consequently it does not estimate the degree to which Soviet effort will be allocated to the attack of the continental US or to the attack of US installations and forces overseas or to the attack of any non-US installations and forces overseas.

FOREWORD

The problem of estimating Soviet capabilities three years or more in the future cannot be treated exclusively in terms of present indications of how these capabilities are developing. Current evidence is incomplete and sometimes even fragmentary. Moreover, this estimate is more than usually difficult in that its terminal date approximates the estimated date of emergence of a major Soviet threat in the guided missile field. For these reasons, we are obliged to make our estimate of future capabilities not only on the evidence at hand but also on the basis of judgments of how Soviet leaders may assess their future requirements.

[1] By gross capabilities is meant the probable maximum scale of attack by existing forces, or by the forces estimated to be likely to exist at a future date, taking into account operational factors, but not considering combat attrition.

1. *(Continued)*

The judgments which underlie our estimate of Soviet gross capabilities in 1959 are: (a) that throughout the period of this estimate the Soviet rulers will regard it mandatory to strengthen their capabilities to attack US nuclear retaliatory power wherever located, both in the US and overseas; (b) that the Soviet rulers will consider that, although they will acquire increasing guided missile capabilities throughout the period, they must rely primarily on aircraft carrying nuclear weapons for long range attacks which will have to penetrate an ever-improving defense; and, consequently, (c) that the Soviet rulers will devote a substantial effort to the production of long-range bombers.

These judgments are supported by much current evidence. We believe them the soundest which can be made at this time. There are, however, considerations which require us to regard the Soviet gross capabilities estimated in this paper as subject to revision as the period advances: (a) the USSR may revise the size of its Long-Range Aviation, its bomber production goals, or the future balance between the types and categories of its bomber aircraft; (b) the USSR may judge it advantageous to concentrate its efforts on the rapid development of guided missile weapons systems; and (c) the greatly increasing yield of nuclear weapons, and Soviet estimate of possible changes in the quality of the defenses to be penetrated, will each affect Soviet judgment of its requirements as to the number and types of delivery vehicles.

On these grounds we feel it necessary to emphasize that the gross capabilities described in this paper are those which the USSR *could* acquire, and which we believe it is *likely* to acquire by 1959, but we cannot say with confidence that these are the capabilities which it *will have* at that date.

CONCLUSIONS

1. *Objectives.* In conducting initial attacks against the US and key overseas installations and forces, the USSR would probably through 1959 have the following major military objectives:

a. To destroy or neutralize US capabilities for nuclear warfare;

b. To deliver attacks on US and overseas military installations, forces, and land and sea lines of communication in order to prevent effective operational employment of US military forces; and

c. To deliver attacks on urban, industrial, political, and psychological targets in the US in order to reduce to the maximum extent practicable the mobilization of US military and industrial strengths. *(Para. 49)*

2. *The Surprise Factor.* In order to prevent or reduce nuclear retaliation, the USSR would almost certainly attempt to attack with a minimum of warning and yet at the same time to deliver an attack of sufficient weight to destroy or neutralize US nuclear capabilities. The USSR could not count upon being able to achieve surprise against both the continental US and US overseas bases, but it would almost certainly attempt to do so. *(Paras. 50–53)*

1. *(Continued)*

Methods and Scale of Attack Against the US

3. We believe that in attacks on the US through 1959 the USSR would place chief reliance upon aircraft carrying nuclear weapons. Missiles launched from submarines might be an important supplement to nuclear attacks by aircraft, but the risk of disclosure of intent would probably deter their large-scale use. Clandestine delivery of weapons of mass destruction, as well as BW and CW weapons, would probably be employed only on a highly selective basis in an initial attack. *(Para. 54)*

4. *In 1956.* Present Soviet capabilities for air attack on the continental US are restricted by the small numbers of operational heavy bombers, the limited availability of megaton yield weapons, the limited capacity of forward bases, and the probable lack of an operational inflight refueling capability. We estimate that the USSR could at present launch an initial strike of about 600 bombers against the US, of which as many as 500 could reach target areas. A small number of these could be carrying nuclear weapons with yields up to a few megatons. (For estimated coverage of the US by these aircraft under various conditions, see maps in Annex B.) *(Paras. 12–13, 56, 69)*

5. *In 1959.* We estimate that by mid-1959 the USSR will have some 400 BISON [*] and 300 BEAR aircraft in operational use. Also, by mid-1959 the capacity of the forward staging areas and Leningrad could have been increased to permit the entire Soviet long-range bomber force to be launched simultaneously. Moreover, in 1959, the USSR could have developed a substantial inflight refueling capability, permitting it to launch a number of heavy bombers from interior bases on two-way missions. The Leningrad base area could be used for some of the heavy bombers making initial unrefueled attacks on the US. Under these circumstances, the USSR in mid-1959 could launch about 815 mission aircraft in an initial attack, of which as many as 640 could arrive in target areas. Of these aircraft 415 would be BISON and BEAR heavy bombers on two-way missions and 225 BADGER medium bombers on one-way missions. By this time a substantial number of these bombers could be carrying weapons with yields up to 10 megatons or more. (See maps in Annex B.) *(Paras. 12, 60, 71)*

6. Should the USSR elect to use only heavy bombers in an initial strike against the US in 1959, about 630 could be launched if only home bases were used. About 500 could arrive in target areas. If bombers were staged through forward bases, the number launched and the

[*] Description of Soviet aircraft types:

US designation	Description	Soviet designation	Nearest US equivalent
BISON	4 engine jet heavy bomber	.....	B52
BEAR	4 engine turbo-prop heavy bomber	... .	..
BULL	4 engine piston medium bomber	TU–4	B29
BADGER	twin-engine jet medium bomber	. . ..	B47
BEAGLE	twin-engine jet light bomber	IL–28	.
BOSUN	twin-engine jet light bomber	TU–14	..
CAMEL	twin-engine jet transport	. .....	..

1. *(Continued)*

number arriving in target areas would be about 530 and 420, respectively. *(Para. 72)*

7. Submarine-launched guided missiles might be an important supplement to nuclear attacks by aircraft in any Soviet attack plan. These missiles could reach many important targets up to a distance of 500 n.m. from the launching submarines, though with a decreasing accuracy at ranges in excess of 200 to 250 n.m. The scale of attack would depend upon considerations which suggest the employment of only a small portion of the submarines and missiles which could be available in 1959. *(Paras. 43, 54, 74–75)*

Methods and Scale of Attack Against Overseas Targets

8. The USSR would have a wide range of capabilities for attack on key US installations and forces overseas. At present, principal reliance for initial attacks would probably be placed on Soviet medium, light, and fighter bombers, many of which could be carrying nuclear weapons. By 1959 guided missiles, including those launched from submarines, may be the preferred weapon against many of these targets. The increasing mobility and nuclear capability of the large Soviet ground and supporting air forces make them a threat to many US overseas installations and forces in operations immediately following initial attacks. In all overseas areas, attacks by clandestine means and sabotage would also be employed. *(Paras. 12, 55)*

9. Having launched the attack against the continental US indicated in paragraph 4, the USSR would have available for use in 1956 against overseas targets about 300 mediums (mostly BULLS) and 2,900 jet light bombers. By 1959, assuming the attack against the continental US indicated in paragraph 5, the number of aircraft available for attacking targets overseas would be about 330 jet medium and about 3,100 jet light bombers. Large numbers of these could be carrying nuclear weapons. *(Paras. 12, 83, 85)*

10. At present, a Soviet attack against overseas targets probably could also employ 350 n.m. ballistic missiles. In 1956, missiles with a range of 850–900 n.m. could begin to be available as well. However, the small number of missiles probably available, the low yield of their nuclear warheads, and their performance limitations would seriously limit Soviet operational capabilities in this field during the early part of the period. Some submarine-launched missiles might also be used against selected overseas targets to supplement aircraft and ground-launched missile attacks. By 1959, Soviet missile capabilities will probably have increased markedly as a result of greater numbers of these weapons available, the higher yield of the nuclear warheads, and their improved accuracy and reliability. The USSR could by then also have ready for series production a 1,600 n. m. intermediate-range ballistic missile. Large-yield nuclear warheads for ballistic missiles would probably become available in 1959–1960. (For target coverage, see map 22, Annex B.) *(Paras. 12, 86–88)*

11. The USSR could employ ground, airborne, and amphibious forces against Alaska and certain key US overseas installations and forces simultaneously with, or shortly after, initial bomber and missile strikes. However, the Soviet decision as to how and when to use these capabilities, as well as its clandestine and

1. *(Continued)*

sabotage capabilities, would probably be strongly influenced by the Soviet desire to obtain strategic surprise, a consideration which weighs heavily against their employment prior to the time initial air attacks were detected. *(Paras. 89–91)*

DISCUSSION

MAJOR FACTORS AFFECTING SOVIET CAPABILITIES

I. AVAILABILITY OF MASS DESTRUCTION WEAPONS

12. *Nuclear Weapons.* The Soviet atomic energy program, directed primarily toward the production of nuclear weapons, will continue to receive special emphasis during the period of this estimate. By the end of 1955 the USSR had tested small, medium, and large-yield weapons.[3] We estimate that the USSR could now have nuclear weapons deliverable by aircraft with yields ranging from five KT to a few megatons. It will probably continue to work on large-yield weapons as well as on smaller-yield and small-dimension weapons. By straightforward research and development techniques, substantial progress can be made in increasing the yield and also in reducing the size and weight of the 1.6 megaton weapon tested in 1955. By mid-1959 the USSR could have nuclear weapons deliverable by aircraft with yields ranging from 0.5 KT to 10 megatons or more. By then it might also have high-yield warheads for intermediate range (1,600 n.m.) surface-to-surface ballistic missiles.

13. Within the indicated technological limits, Soviet military requirements will govern the allocation of available fissionable material to various types of weapons. The present number of weapons of greater yield than one MT is considered limited, since it is probable that their production was not begun before late 1955. By mid-1959 the only limitation would be the available supply of U–235. Annex D (Restricted Data) provides the basic information required and the method by which possible variations in the Soviet nuclear weapons stockpile can be calculated. The annex also includes an illustrative stockpile within the estimated availability of fissionable material. It must be emphasized that this illustration is not an estimate of the most probable composition of the Soviet nuclear stockpile — the available evidence is not adequate to justify any specific estimate — but is an example only, based on the assumptions prefacing the stockpile tabulation.

14. *Radiological Warfare.* During the period of this estimate, it is most unlikely that the USSR will be able to stockpile militarily significant quantities of radioactive materials for use in radiological warfare weapons. However, the USSR will possess nuclear weapons capable of producing widespread radioactive fall-out, and these weapons could be used primarily for that purpose.

15. *Biological Warfare.* The USSR possesses all the necessary basic knowledge for the production of most BW agents and devices for their effective dissemination. There is evidence that the USSR is engaged in a BW research and development program with primary emphasis on anthrax, tularemia, plague, and brucellosis as antipersonnel bacterial agents. We believe that foot and mouth disease and rinderpest would be considered as the primary antilivestock agents, although conclusive evidence of such Soviet BW research is lacking. No information is available concerning possible anticrop agents. Since it is not feasible to stockpile large quantities of most BW agents in prolonged storage, most

[3] The 1955 test series included airbursts with yields of about 200 KT and 1.6 MT, an underwater burst of about 20 KT, and two other tests of about 5 KT and 25 KT.

1. *(Continued)*

operational requirements would have to be supplied from production facilities.

16. *Chemical Warfare.* The USSR accumulated large stocks of standard CW agents and munitions during World War II. We believe that it is maintaining stockpiles of these toxic agents adequate for large-scale employment in military operations.

17. In regard to other CW agents, the USSR moved a GA nerve gas producing plant and the GB pilot plant from Germany to the Soviet Union in 1947. In addition to possessing the physical facilities, the USSR has the technical knowledge to produce both GB and GA. We believe that the USSR could have been producing GA since 1949, although we have no firm evidence it has done so. The problems involved in stockpiling GB are greater, but we estimate that the USSR has the ability to produce and stock it, at least in limited quantity. The USSR has also had access to openly published information on psychogenic drugs and other potential CW agents, including the method of synthesis. Minute quantities of psychogenic drugs are capable of making individuals indifferent to their surroundings and of inducing apprehension and confusion. We estimate that the Soviet Union has the technical ability to produce such drugs for use as chemical warfare agents.

18. The USSR had chemical disseminating devices and munitions prior to World War II, some of which were suitable for aerial delivery at speeds up to 300 mph. We estimate the USSR could produce devices and munitions for high speed delivery of many of its toxic agents.

II. WEAPONS DELIVERY SYSTEMS — AIRCRAFT

Soviet Long-Range Aviation

19. Soviet Long-Range Aviation is estimated to have had, as of 1 January 1956, an over-all actual strength in operational units of 1,145 bomber aircraft, including 760 BULL piston medium bombers, 310 BADGER jet medium bombers, about 40 BISON jet heavy bombers, and about 35 BEAR turbo-prop heavy bombers.[1] There is evidence that BISON have been assigned to operational units, but the evidence concerning assignment of BEAR aircraft is tenuous. All Long-Range Aviation units are based in the European USSR except the 3rd Long-Range Air Army, which is in the Soviet Far East and has an estimated actual strength of about 220 BULLS.

20. We lack sufficient intelligence to estimate with a confidence that satisfies us the planned future size of Soviet Long-Range Aviation, or the planned future balance between the types and categories of bomber aircraft. In the absence of any evidence indicating reduction in the number of long-range units, we estimate that the current strength will be carried forward throughout the period, with new types being phased in as they become available. It also seems probable that by 1959 actual will be closer to authorized strengths. We estimate, moreover, that during this period the USSR is unlikely to introduce into operational units any medium or heavy bomber types which have not already appeared. We believe that the USSR will devote a substantial effort to the production of medium and heavy bombers. Based on available intelligence and on our estimate of Soviet capabilities to produce and requirements for a long-range bomber force, we believe that the USSR will produce about 700 BISON and 460 BEARS through mid-1959. Accordingly, actual strengths in mid-1959, as compared with current actual strengths, would be as shown below:

Estimated Operational Strength of Long-Range Aviation

Type	1 January 1956	Mid-1959
BULL	760	0
BADGER	310	700
BISON	40	400
BEAR	35	300

The serviceable BULLS phased out of Long-Range Aviation would be available for a variety of uses, including reconnaissance (particularly naval reconnaissance), augmentation of Satellite and Chinese Communist air forces,

[1] Radii-ranges and other performance data estimated for Soviet bomber types are given in Annex C.

1. *(Continued)*

conversion for tanker use or other special purposes, or reserve. The USSR will have no appreciable reserves of other medium or heavy bomber types.

21. *Inflight Refueling.* The USSR would probably require an inflight refueling capability if it intended to employ all of its present or a considerable portion of its prospective bomber force against the continental US without resorting to one-way missions. Evidence does not indicate that in the USSR inflight refueling has gone beyond the experimental stage. Development of a fleet of tanker aircraft, modification of mission aircraft fuel systems, and considerable operational training would be necessary before a significant inflight refueling capability would be achieved. The numerous BULL aircraft being phased out could be converted to tankers, but because of their limited speed, altitude, and fuel capacity their use would probably be restricted to refueling medium bombers. Converted BISON, BEAR, or possibly CAMEL types would be more suitable as tankers. The USSR could also develop a new type specifically for use as a tanker, but we have no evidence thus far that it is doing so. The USSR could have, in 1959, an inflight refueling capability adequate to meet the requirements of Soviet Long-Range Aviation for attacks on the US.

Light Bomber Forces

22. For attacks on targets up to 700 miles from Bloc bases, the USSR has available a substantial jet light bomber force consisting of the types designated as BEAGLE and BOSUN. The BEAGLE is the standard light bomber of both Soviet Tactical Aviation and Naval Aviation. We estimate that all Soviet jet light bombers have the capability of delivering nuclear weapons. Jet light bombers assigned to Soviet Naval Aviation are also capable of carrying out specialized naval missions such as torpedo attacks and minelaying.

Estimated Jet Light Bomber Strength in Operational Units*

	January 1956	Mid-1959
Tactical Aviation	2,230	2,250
Naval Aviation	653	850
Total	2,883	3,100

* See Annex C for estimated performance characteristics of these aircraft.

23. During 1956 the USSR may also begin to have operational an improved jet light bomber, perhaps a twin-jet swept-wing type. In addition, the speed and altitude performance of some BEAGLES has been increased by the installation of higher thrust engines. This, however, has not resulted in a significant change in radius/range. We estimate that by 1958 BOSUN will have been phased out of operational service and replaced by either the BEAGLE or the new light bomber.

Base Areas

24. We estimate that in all there are some 400 operational airfields in the Sino-Soviet Bloc with permanent surfaced runways of 5,000 feet or longer:

	Minimum Runway Lengths (feet)					
	9,000	8,000	7,000	6,000	5,000	Total
USSR	4	28	3	93	41	169
European Satellites	2	49	37	35	1	124
Asiatic Communist Countries	0	2	17	63	25	107
	6	79	57	191	67	400

25. Given standard conditions (normal take-off technique and take-off engine power, no wind, sea level elevation, temperature 59 degrees F., permanent surfaced runway) we estimate take-off distances for Soviet long-range bombers as follows:

Type	Take-off Weight (lbs.)	Ground Run (ft.)	Ground Run to Clear 50-ft. Obstacle (ft.)
BULL	140,000	5,230	7,825
BULL (modified)	135,750	4,800	7,125
BADGER	150,000	4,200	6,300
BADGER (improved)	170,000	4,800	7,100
BISON	365,000	6,400	9,100
BISON (improved)	365,000	5,300	8,200
BEAR	300,000	6,000	9,000

(For the effect of lower temperatures, see paragraph 63.)

1. *(Continued)*

26. There are approximately 25 airfields in the USSR believed to be home bases for operational Long-Range Aviation bomber units, three in the Far East and the remainder in the European USSR. In addition, a number of airfields associated with command and/or training units, factory production and delivery, and testing and development are in effect an integral part of the base structure of Soviet Long-Range Aviation. Moreover, many other airfields in the Sino-Soviet Bloc have runways suitable for medium bomber operations and some have runways suitable for heavy bombers.

27. In areas where airfield development can be easily observed, such as the European Satellites, the Soviet air forces have provided runway lengths in excess of estimated requirements for the assigned aircraft. There is some evidence of runway development at airfields identified as home bases for Long-Range Aviation units. Assuming similar construction practices throughout the USSR, we estimate that concrete runways at BULL home bases have been standardized at lengths between 7,800 and 8,200 feet. Little additional modification of these existing bases would be required for operation of BISON or BEARS. However, if the number of new heavy bombers estimated for 1959 actually appears in operational units, the Soviet long-range home base system will probably require expansion and development in terms of number of fields, runway lengths, and other factors.

28. World War II practices suggest that the USSR probably would depend upon auxiliary airfields to insure maximum aircraft dispersal away from home bases in event of hostilities. The actual existence of such auxiliary fields within the Soviet Long-Range Aviation base structure cannot be verified from available intelligence. In fact, the base structure at present is such that, were Soviet Long-Range Aviation to require airfields for dispersal in European USSR, it would have to utilize airfields outside the current home base operational areas. This would mean moving into either the more vulnerable perimeter areas of the USSR or withdrawing farther into the interior. Physical limitations on dispersal, and probable requirements for limiting ground stay to a minimum, would make dispersal and revetment practices unlikely for long-range bombers at forward staging bases in the Arctic areas.

29. Because of the range limitations of available bombers, the launching of strikes against North America in 1956 probably would be limited to operations staged through one or more of six base areas within Soviet-controlled territory — the Chukotski Peninsula, the Kamchatka Peninsula, the Central Arctic area, the Kola Peninsula, the Leningrad area, and the Baltic-East German area. Even the BEAR turbo-prop heavy bomber would have to be launched from these areas in order to hit any but the most northern US targets, unless refueled in flight or employed on one-way missions. Airfields suitable for long-range bombers exist in each of these six areas, although Long-Range Aviation units are stationed only in the Leningrad area.[5]

30. Airbase development over the past few years in the potential forward staging areas has improved the capability of these bases for supporting long-range bomber staging operations. In the Baltic-East German area, only minor additional construction and development of air facilities at existing bases would be required. In the Kamchatka, Kola, Chukotski, Central Arctic, and Leningrad areas, there are 20 bases believed suitable for staging long-range bombers. Four or five of these may be capable of supporting sustained operations. Runway lengths and surfaces at many of these bases are known, but information is meager concerning load-bearing capacity, aircraft servicing, maintenance, storage, and personnel facilities at almost all of these airfields.

31. There are, however, indications that airfield development in the forward base areas is continuing, and we estimate that it is within Soviet capabilities to develop adequate facilities for sustained long-range bomber operations in any of these areas by 1959. For example, we estimate that by 1959, with the con-

[5] Annex A and Annex E (limited distribution) cover air facilities, weather conditions, and base capacities in these base areas.

1. *(Continued)*

struction facilities and personnel now in the area concerned, three new airfields suitable for long-range bomber staging-operations could be developed in the Kola and Leningrad areas, and two each in Chukotski, Central Arctic, and Kamchatka. Improvement of support facilities at already existing potential staging bases in these areas could be carried out concurrently without major interference with the construction effort.

32. In each of the forward areas there are bases, in addition to those considered suitable for staging long-range bombers, which could be utilized for fighters, light bombers, and transports for which the USSR would also have a requirement in any operation conducted from the forward areas. In certain areas, however, there are only a few of these additional bases.

Other Factors Affecting Soviet Air Operations

33. *Navigation.* The USSR has available through open sources virtually complete target and navigation data on North America and its approach routes. It is even probable that in the event of a surprise attack certain Western electronic navigational aids would be available during at least part of the flight. Similarly, meteorological reports, including profile data at all altitudes, are regularly broadcast in the United States and Canada in simple cipher. It is also possible that clandestinely placed navigational beacons may be used for aircraft homing. We estimate that Soviet blind-bombing and navigational radar equipment is capable of equal or better performance than the US World War II equipment which the USSR acquired. The current Soviet training program points to continuing improvement in air crew proficiency.

34. Soviet Long-Range Aviation is probably receiving training in the use of advanced navigation systems and techniques. Some Soviet crews are almost certainly capable of navigation to the most difficult assigned targets in the US. Most crews are probably capable of navigating with sufficient accuracy to reach major US cities and industrial centers. We estimate that by 1959 Soviet Long-Range Aviation will have considerably increased its overall proficiency in long-range navigation.

35. *Bombing Accuracy*

a. Visual Bombing. We estimate that many BULL crews, and crews which have been fully trained in the newer turbo-jet and turbo-prop bombers, are capable of attaining the following visual bombing accuracies (in the case of the BULL, figures are applicable up to 30,000 feet only):

Altitude (ft.)	CEP (ft.)
50,000	2,900
40,000	2,100
30,000	1,400
20,000	900
10,000	400

Most long-range bomber crews will probably achieve the above level of proficiency by mid-1959.

b. Radar Bombing. BULL units generally are estimated to be capable of the following accuracies in radar bombing:

Altitude (ft.)	CEP (ft.)	
	Well-defined targets	Poorly-defined targets
30,000	4,000	5,500
20,000	2,000	3,500
10,000	1,000	1,750

Because of the limitations of the radar installed in the BULL, no significant improvement in the above accuracies is likely. However, we estimate that the newer aircraft, as well as affording more stable bombing platforms, probably have improved radar. This could result in the radar bombing accuracies listed below. By mid-1959, most crews in newer type bombers will probably be able to achieve these accuracies.

Altitude (ft.)	CEP (ft.)	
	Well-defined targets	Poorly-defined targets
50,000	3,100	5,600
40,000	2,300	4,300
30,000	1,500	3,000
20,000	1,000	2,000
10,000	500	1,000

1. *(Continued)*

36. We estimate that jet light bomber CEPs are the same as those for Long-Range Aviation. If the Soviet SHORAN type navigation system were employed as a bomb control system, bombing accuracies of about plus or minus 100 feet could be achieved at a range of 100 n.m. from the transmitter. Soviet ground fire control radar could be used with appropriate modifications to develop a precise short-range bombing system. This system could have a range of 15–20 nautical miles.

37. *Reconnaissance.* It is possible that during the interval between now and mid-1959 the USSR might build up a pattern of reconnaissance of US and allied early warning lines, not only to determine their location, capabilities, and vulnerabilities, but also to delay recognition of the approach of an actual attack. It is unlikely that the USSR would jeopardize surprise by unusual reconnaissance activity before an actual attack. However, there would be a requirement for the surveillance of sea areas from which US and allied carrier task forces could attack the USSR. Such reconnaissance would probably be the primary responsibility of Naval Aviation, to which BULL or other long-range aircraft could be assigned or made available as required. Even if long-range bomber types were not committed in attacks against carrier task forces, their reconnaissance data would be valuable for the direction of submarine and surface forces and for the planning of attacks by Soviet jet light bomber and torpedo aircraft. Post-strike reconnaissance of US targets would probably be done by mission aircraft.

38. *Weather Forecasting.* The USSR has for years devoted considerable emphasis to both short-period and long-period meteorological forecasting and has achieved a high degree of success. We believe that it has the forecasting capability to support long-range air operations. This capability plus extensive experience in meteorological research in the extreme northern latitudes, weather reporting facilities in Siberia and on ice floes in the Central Arctic basin, and constant access to current North American weather reports and forecasts should enable the USSR to predict both route and target weather with reasonable accuracy.

39. *Electronic Countermeasures (ECM).* The USSR has had access to several types of World War II US defensive radar and to some US jamming equipment. Since 1950, a number of instances of Soviet use of Chaff have been observed, and recently the use of active airborne jammers has been noted. We estimate that the USSR now has at least limited quantities of both ground and airborne equipment for jamming radar up through the X-Band (10,000 mc/s) and possibly higher. Such equipment would include active, passive, and confusion devices. We have no evidence of Soviet use of decoys, but consider it to be within their capabilities. We also estimate that the USSR has a ground-based jamming capability to interfere seriously with radio communication between the US and its overseas bases and forces. During the period 1956–1959 the USSR will probably continue to improve its jamming capability by the development of equipment covering a wider range of frequencies and by increased effectiveness of jamming operations. [6]

40. *Evasion of US Radar.* The USSR almost certainly knows at least the general capabilities of US early warning radar equipment, coverage provided by the network, and weak and strong points of the system. With such knowledge it might expect that properly planned attacks could reduce the chance of detection by US radar, particularly if the attacking aircraft made penetrations where radar coverage was limited or nonexistent, or if the physical limitations of the radar equipment were exploited. However, the use of some evasion techniques, particularly low altitude penetration, would require acceptance of reduced range or bomb load.

III. WEAPONS DELIVERY SYSTEMS — GUIDED MISSILES [7]

41. We have no evidence that the USSR now has any offensive guided missile available for operational use. During the period of this

[6] For a detailed discussion, see Annex F (limited distribution).

[7] For a detailed study see NIE 11-12-55, "Soviet Guided Missile Capabilities and Probable Programs," 20 December 1955.

1. *(Continued)*

estimate, it will probably rely primarily upon aircraft for the delivery of nuclear weapons, because of the probable lower relative reliability and accuracy of missile systems and the lower nuclear yield obtainable from missile warheads. Based on US experience, we estimate that at present only 40–60 percent of Soviet missiles would reach target areas, but by 1959 their reliabilities will almost certainly be improved. However, we believe that during this period the USSR will devote a high priority to the development of offensive missiles, and that it will begin to stockpile various types as acceptable reliabilities are achieved and as the improvement of warhead yields tends to compensate for relative missile inaccuracies. By 1959 the USSR will probably have in operational use several types of missiles with nuclear warheads suitable for attacks on overseas installations and forces and for submarine, shipborne, or airborne attack on the continental United States. However, an intercontinental ballistic missile (ICBM) will probably not become available before 1960–1961.

Submarine-Launched Guided Missiles

42. Although there is no firm evidence that the USSR has developed a submarine-launched guided missile capability, we estimate that it could now have submarines equipped for this purpose. Any of the long-range submarine types could be equipped to carry one or two guided missiles in topside stowage. We estimate that a submarine the size of the Soviet Z class could be constructed to accommodate 6 V–1 type or 4 turbo-jet Regulus I type missiles internally. A submarine the size of the "W" class could possibly accommodate 3 V–1 types or 2 of the larger missiles.

43. We estimate that both of the above types of nonballistic missiles could currently be available for launching from submarines. The V–1 could be an improved version of the German V–1, having a range up to 200 nautical miles with a 3,000-pound warhead. At this range this missile could have a CEP of roughly 3 n.m., with inertial guidance. Radar track-radio command guidance could be provided to a distance of 100 miles from the launching submarine, or an advanced guidance submarine could be used. Using radar track-radio command guidance, a CEP of about one to two nautical miles could be achieved, depending on how accurately the submarine's position were fixed. With a 3,000-pound warhead, the turbo-jet missile could have a range of 500 n.m. Radar track-radio command guidance could be provided for about 200–250 n.m. from the guidance submarine, with a CEP of about one to two n.m., depending on the accuracy of navigation. Inertial guidance could be used, but at maximum range would result in a CEP of about 10 miles. All missiles which could be launched from submarines could also be launched from surface vessels, including merchant ships.

Ground-Launched Surface-to-Surface Missiles

44. Several additional missile types could now be, or could become, available for launching from land bases. Current information indicates that surface-to-surface ballistic missiles are being given a high priority in the Soviet research and development program. We estimate that, in addition to shorter range ballistic missiles, the USSR could have had since 1954 an operational ballistic missile with a range of 350 n.m. and a CEP of 2 n.m. We believe that in 1956 it could have ready for series production a single-stage ballistic missile with a range of 850–900 n.m. and a CEP of 3–4 n.m. In 1958–1959 the USSR could have ready for series production an intermediate-range ballistic missile (IRBM) with a range of about 1,600 n.m. and a CEP of 3–4 miles. Only a few of these latter could be available for operational use by trained units in mid-1959, but, if the USSR were willing to accept a reduced range of 1,400 n.m., this missile could be ready for series production as early as 1957. Only low-yield nuclear warheads would be available for these medium and intermediate-range missiles until about mid-1959, when large-yield nuclear warheads could begin to become available.

Air-Launched Missiles

45. The USSR is now technically capable of attacking targets with rocket-propelled glide bombs launched from long-range aircraft.

1. *(Continued)*

These bombs could now have low-yield nuclear warheads. However, their use would be limited to well-defined targets, good visibility conditions, and a maximum range of 20 n.m. During 1956–1957, an improved version with a 50 n.m. range could become available. This missile could be equipped with a semiactive homing guidance system for use against ships or other well-defined targets. By 1958, high-yield nuclear warheads could also be available.

IV. WEAPONS DELIVERY SYSTEMS — CONVENTIONAL FORCES

Ground and Tactical Air Forces

46. Any key US installations and forces overseas within range would be subject to attack by Soviet Bloc tactical air forces. These targets would also be threatened by the advance of Bloc ground forces with tactical air support. It is estimated that, at the present time, Bloc ground forces are composed of 175 Soviet and about 230 other Bloc line divisions. We believe that, in general, Soviet line divisions are maintained at 70 percent or less of authorized strengths. It is estimated that, for air support of its ground and naval operations, the USSR currently has an actual strength of approximately 12,000 aircraft in Tactical (Frontal) Aviation and Naval Aviation. Of this total, approximately 9,600 are jet aircraft. For mid-1959, actual aircraft in these operational units is estimated at about 14,600, of which 13,000 will be jets. In addition there are about 3,000 military aircraft in the European Satellites (4,000 by 1959) and about 2,600 in China and North Korea (3,400 in 1959).

Airborne and Amphibious Forces

47. The USSR also has considerable airborne and amphibious forces which could be used to attack certain US overseas installations and Alaska. There are an estimated 10 Soviet airborne divisions, and some ground troops have received training in air transport operations. Although the USSR still has only twin-engine transports, it is estimated that Soviet Aviation or Airborne troops could lift 9,000 troops in an initial parachute attack. The USSR lacks specialized assault landing craft and support ships for other than short-range amphibious operations. It is estimated that the USSR could at present lift up to three divisions for an initial amphibious assault on Japan or Korea.

Naval Forces

48. The intense and rapid naval construction program carried out by the USSR during the last six years has provided it with an increasingly significant offensive capability. The program for construction of major combatant units has been limited to light cruisers, destroyers, and submarines. At present major surface vessels in the Soviet Navy are estimated to number 225, including 6 heavy cruisers, 22 light cruisers, and almost 200 destroyers. By 1959, we estimate that the USSR will have about 300 major surface vessels, including some 35 cruisers, 265 destroyers, and possibly one or two capital ships. We estimate that, in view of the known submarine building facilities, the Soviet submarine force, currently consisting of about 420 submarines of all types, could be strengthened by the addition of about 520 new long and medium range boats by mid-1959. However, we have no intelligence to indicate that the USSR will in fact produce this number of submarines or to indicate the planned future strength of the Soviet submarine force. Considering such factors as the probable phasing out of older types and the possible introduction of new types, including nuclear-powered submarines, we believe that by mid-1959 the Soviet submarine force will consist of about 780 boats of all types, including about 600 postwar design long and medium range submarines. The capabilities of this force will probably be improved by a limited modernization of older classes (including the installation of snorkel). In addition, some submarines may be adapted for missile launching. Intelligence is lacking on a number of factors essential to the development of such a fleet. We lack adequate information on mobile and permanent logistical support. Little is known of the operating efficiency of the submarine force, which is probably still inferior to that of US and German forces of World War II, but performance standards will probably rise during this period.

1. *(Continued)*

PROBABLE SOVIET GROSS CAPABILITIES

V. SOVIET OBJECTIVES AND METHODS OF ATTACK

49. In conducting initial attacks against the US and key overseas installations and forces, the USSR would probably have the following major military objectives:

a. To destroy or neutralize US capabilities for nuclear warfare;

b. To deliver attacks on US and overseas military installations, forces, and land and sea lines of communication in order to prevent effective operational employment of US military forces; and

c. To deliver attacks on urban, industrial, political, and psychological targets in the US in order to reduce to the maximum extent practicable the mobilization of US military and industrial strengths.

We believe that these Soviet objectives will remain the same throughout the period of this estimate.

Implications of Soviet Efforts to Achieve Surprise

50. In order to prevent or reduce nuclear retaliation the USSR would almost certainly attempt to attack with a minimum of warning. A maximum Soviet attack on the continental US and key overseas installations and forces, involving utilization of all or most of the capabilities discussed below, would require such substantial preparations as to almost certainly result in the loss of surprise. If, however, the USSR attempted to attack without warning it would probably be forced to accept the following major restrictions: (a) no large-scale mobilization of additional units; (b) no large-scale redeployment of Soviet air, naval, or ground forces to reinforce peripheral dispositions; and (c) no unusual movement of Soviet air, naval, or ground forces which would be likely to indicate the imminence of attack. The effect of these restrictions would be reduced, however, if redeployment and high readiness were achieved gradually.[8]

51. Thus, the USSR would have to balance the advantages of surprise against the required weight of attack. In planning initial attacks on US and overseas targets, priority of Soviet effort would be largely determined by Soviet recognition of the need for neutralizing the most immediate threat to Soviet security — a nuclear attack by US forces. These Soviet attacks, therefore, would probably be directed primarily toward those areas and against those forces which comprise the US nuclear strike capability. The Soviet timetable would probably call for almost simultaneous assaults on other target systems, subject to the overriding requirement that these assaults not give warning of the initial attacks against US nuclear strike capabilities.

52. Even in planning attacks directed mainly against US nuclear strengths, the USSR will probably continue to be faced with a difficult choice as to the relative priorities to be given to attacks on key targets in the US itself as opposed to key targets overseas. This dilemma stems from the fact that Soviet planning will not only be concerned with the relative nuclear threats presented by continental US forces as compared with US overseas forces, but also with estimating the relative success which could be achieved against continental US as contrasted with overseas targets. The USSR could not count upon being able to achieve surprise against both the continental US and US overseas bases, but it would almost certainly attempt to do so.

53. The continental US will almost certainly be a high priority Soviet target. However, Soviet operational planning for the initial strikes will probably also be strongly influ-

[8] For extended discussion of the problem of achieving surprise, see NIE 11-6-55, "Probable Intelligence Warning of Soviet Attack on the US Through Mid-1958," 1 July 1955.

enced by the threat to Soviet security from US nuclear capabilities overseas, and by the fact that the Soviet attack capability against such targets is relatively high. We have no basis for estimating what the distribution of Soviet effort between US continental and overseas bases would be. We believe that Soviet planning would probably be calculated to achieve an optimum effect, i. e., the maximum *over-all* reduction of US nuclear retaliatory capabilities, wherever located.

Methods of Attack

54. We believe that through 1959 the USSR would place chief reliance in attacks on the continental US upon aircraft carrying nuclear weapons, since this form of delivery would offer the best chance of combining a minimum warning with a significant weight of attack. Missiles launched from submarines might be an important supplement to nuclear attacks by aircraft, but limitations on target coverage and the risk of premature disclosure of intent would probably deter their large-scale use in an initial attack. The clandestine delivery of nuclear and other weapons of mass destruction might also be attempted, but, because of the risk of premature disclosure of intent, these forms of attack would probably be employed only on a highly selective basis in an initial attack. Sabotage of certain key installations might occur concurrent with or immediately following the initial attack.

55. The USSR would have a much wider range of capabilities for attack on key US overseas installations and forces than on the US itself. At present, principal reliance for initial attacks would probably be placed on Soviet medium, light, and fighter bombers. By 1959 guided missiles, including those launched from submarines, may be the preferred weapon against many of these targets. The USSR's possession of very large numbers of submarines would permit their concentration against US naval striking forces. The increasing mobility and the probable growing nuclear capability of the large Soviet ground and supporting air forces make them a threat to many US overseas installations and forces in operations immediately following initial attack. In all overseas areas, clandestine attacks and sabotage would also be an incidental form of Soviet attack, and might in some locations be highly effective.

VI. CAPABILITIES TO ATTACK THE US[9]

Attacks by Aircraft

56. Present Soviet capabilities for air attack on the continental US are restricted by the small numbers of operational heavy bombers, by the limited capacity of base facilities in forward areas, and probably by the lack of an operational inflight refueling capability. Forward base capacities will continue to limit the total number of aircraft which could be launched against the US at one time, but as the number of BISON and BEARS increases, less reliance will have to be placed on forward bases for launching intercontinental attacks. Improved crew proficiency, development of an operational inflight refueling capability, and extensive improvement of the forward staging areas would result in a substantial increase in Soviet capabilities for attack on the US by mid-1959, even though the increase in the number of BISON and BEAR heavy bombers were less than estimated herein.

57. During the early part of the period of this estimate, the BULL and the BADGER would be the principal aircraft available for intercontinental attacks. We estimate that, however, as increasing numbers of newer types become available, the BULL will be phased out of long-range bomber units. In the latter part of the period the USSR would almost certainly place chief reliance on the BISON and the BEAR for intercontinental attacks on the US, with an improved BADGER playing a significant role primarily in shorter-range missions.

58. Without inflight refueling the BULL (see maps 1–4) would be unable to reach targets in the US on two-way missions even from forward bases unless it were modified,[10] in which case it could reach the Seattle area.

[9] For range coverage, see maps, Annex B.

[10] E. g., stripped and altered for longer range in a manner similar to the US B 29B.

1. *(Continued)*

The modified BULL could, without inflight refueling, reach all of the US on a one-way mission from Chukotski. The current BADGER would require inflight refueling in order to cover most of the important target areas in the US, even on one-way missions from forward bases, but an improved BADGER (see maps 5–8), which we estimate will be available in 1957, will probably have adequate range to carry out these one-way missions without inflight refueling. In order to reach all targets in the US with the BISON (see maps 9–12, 17–18), the USSR would have to employ one-way missions. On two-way missions from forward bases and without inflight refueling, the BISON could reach only the northwestern quarter of the US. However, the BEAR (see maps 13–16, 19–20), if launched from the Chukotski Peninsula, could reach almost all of the US on two-way unrefueled missions; from the Kola area it could reach only the northern half of the US. Other significant range capabilities under varying conditions are as noted on the maps.

59. *Base Areas.* At the beginning of the period the entire Soviet long-range bomber force could be launched against the US only if bases in the Baltic-East German area were used in addition to those within the USSR. This area is not a likely choice for initial strike operations against the US, because direct routes to the US would involve overflight of Western territory with consequent loss of surprise, and because of the greater likelihood that preattack preparations would be detected. Except for heavy bombers, and possibly modified BULLS on one-way missions, bases in the Leningrad area are unlikely to be used for initial strikes because of the problems involved in either overflying or by-passing Scandinavia. If overflight of the Scandinavian area were to be avoided on an attempted strike against the US, a dog-leg over the Kola Peninsula of about 600–750 n.m. would be necessary. Therefore, the bases believed to be likely Soviet choices for mounting initial attacks on the United States at the beginning of the period are those in Kola, Chukotski, and Kamchatka. However, after an initial surprise intercontinental strike, all base areas could be used for reattack. Bases in the Central Arctic area might also be used for initial attacks despite unfavorable weather conditions and difficult logistical problems.

60. By mid-1959, the capacity of the bases in the Kola, Chukotski, Kamchatka, Central Arctic, and Leningrad areas could have been increased so that these bases could be used to launch simultaneously the entire long-range bomber force.

61. *Staging.* About a 10-hour flight would be required to move BULL aircraft from Far East home bases to Chukotski area bases, and about three to five hours from Western USSR bases to the Kola Peninsula. Flying times for BADGER and BISON aircraft would be about half as long. We have almost no evidence on the current status of servicing and fuel storage and transfer facilities at the forward bases. However, the USSR is fully capable of developing these facilities, if they are not already available. For example, we believe the USSR has a fuel truck with a capacity of 6,000 gallons and a pumping rate of 240 gallons per minute. We estimate that, when BISON and BEAR bombers appear in service in large numbers, the USSR will have available refueling equipment more compatible with the requirements of these aircraft. In order to service large numbers of long-range bomber aircraft at staging bases in forward areas, it would probably be necessary to increase present stocks of POL and servicing equipment and to establish or increase weapons stockpiles at these bases.

62. *Weather.* Weather and climatic conditions in the far northern staging areas would have a considerable impact on the timing and magnitude of attacks on the US. During cold weather, requirements for high-speed refueling and heated hangar space are among the critical problems which would be magnified as numbers and size of aircraft increased. Moreover, the coordinated launching of a large-scale attack composed of elements from widely separated base areas would probably be further complicated by varying weather conditions at the different bases. Cold weather problems would, however, be less critical with jet than with piston aircraft.

1. *(Continued)*

63. The USSR has demonstrated that it can effectively operate aircraft under extreme cold weather conditions. In addition, aircraft performance is improved by low ground temperatures in Arctic areas where the higher density of cold air increases engine thrust and increases airfoil lift so that take-off distance may be reduced or maximum gross take-off weights increased. For example, at 0° F. the ground run requirement for take-off of jet bombers would be about 25 percent less than under standard conditions (see paragraph 25). Ground run requirements for the BULL would also be reduced but the difference would not be as great as for jet bombers.

64. The low temperatures of the Arctic region also pose some special problems in the handling of nuclear weapons. However, virtually all of the components of nuclear weapons are better able to resist the effects of cold weather than are the delivery aircraft, and provision of adequate shelters and equipment to overcome the undesirable effects of cold weather on the bombs is a much simpler problem. We estimate that the USSR can successfully store and assemble nuclear weapons for use at Arctic bases under any weather conditions which will permit the operation of bombers. The problem of storage could also be largely eliminated by storing the bombs in rear areas and moving them to the advanced bases as needed, although such an operation would introduce additional timing problems.

65. *Scale of Prestrike Preparations.* At present the preparations necessary for launching a maximum-scale attack from likely staging areas would probably require several months after their initiation. By mid-1959, however, only minimum preparation would be required, provided that during the interim a major effort had been made to improve base facilities and training, logistics, and equipment of the Long-Range Air Force.

66. *Assumptions Underlying Estimated Intercontinental Striking Forces.* Within the limits of base capacity, aircraft performance, and operating conditions, the size of the strike force which the USSR could launch would vary with the employment of different types of aircraft. The variety in methods of employment and attack patterns open to the USSR makes it difficult to estimate which airfields the Soviet Union might employ in an initial surprise attack. Moreover, on many forward airfields, we lack sufficient intelligence to make firm estimates of their capacities to stage bomber aircraft.

67. In order to determine the general order of magnitude of Soviet capabilities for an initial attack against the US, we have considered the available intelligence on runway lengths, POL, maintenance, other base facilities and accessibility for supply purposes, and have arrived at an estimate of a probable maximum capacity of each of the forward bases for staging bomber aircraft. All bases that we have selected for the staging of heavy bombers have runway lengths of at least 7,500 feet and are considered to have an average maximum staging capacity of 30 heavy or 60 medium bombers. Those selected for staging medium bombers only have generally fewer base facilities, but have runways estimated to be at least 5,200 feet in length. Their maximum staging capacities are considered as varying from 20 to 60 medium bombers, depending on the facilities at each base. Although usable on the basis of estimated aircraft performance figures, existing runways at many of these airfields are considerably below the standards normally associated with Soviet long-range bomber bases, and their use in 1956 would require the acceptance of reduced safety margins.

68. The following planning factors, based largely on US experience, have been assumed:

a. 90 percent of aircraft at home base in commission after stand-down;

b. 85 percent of those aircraft departing home bases can be launched from staging bases (includes attrition enroute to and while at staging bases);

c. 80 percent of these bomber aircraft launched on unrefueled missions will arrive in target area (excluding combat attrition);

d. 75 percent of those bomber aircraft launched on missions utilizing inflight refueling will arrive in target areas (excluding combat attrition); and

e. An allowance of 1.2 tanker aircraft provided for each bomber refueled in flight (compatible [11] tanker assumed).

69. *Estimated Strike Forces in 1956.* We estimate the USSR could, from its present forward bases, augmented by the three home bases in the Leningrad area, mount an initial strike of approximately the following size: 700 bombers on base, 600 could be launched, and as many as 500 could arrive in the target area. If tankers were available and used from these bases, the bomber force would have to be reduced accordingly. (See Annexes A and E for an estimate of staging capacities of individual bases in each area.)

70. If the USSR elected to utilize all available bases, including some in the Baltic-East German and Leningrad areas, and thus lessen its chances of achieving surprise, it could initially launch the maximum number of aircraft which would be serviceable (approximately 900) against the US in 1956. Not considering combat losses, approximately 720 might reach target areas.

71. *Estimated Strike Forces in Mid-1959.* By mid-1959, the capacity of the forward staging areas and Leningrad could be increased to permit the entire Soviet long-range bomber force to be launched from these areas in an initial attack. We have also estimated that by mid-1959 the USSR would have some 400 BISON and 300 BEAR aircraft in operational use. Moreover, the USSR could have a substantial inflight refueling capability and a number of heavy bombers could thus be launched from interior bases in initial attacks on two-way missions. In this case the Leningrad base area could be used for some of the heavy bombers making initial unrefueled attacks on the US. Under these circumstances, the mid-1959 Soviet strike capability could be as follows:

	On Base	Launched	Arriving in Target Area
BADGER	330	280	225
BISON	360	310	235
BEAR	270	225	180
Tanker	360	300	...
Totals	1,320	1,115	640

We have assumed the following method of employment:

	2-way Unrefueled	2-way Refueled	1-way Unrefueled	Totals
BADGER	.	..	280	280
BISON	50	260	..	310
BEAR	225	.	.	225
	275	260	280	815

72. Should the USSR elect to use only heavy bombers in an initial strike against the US, about 630 could be launched if home bases were utilized as launching bases. About 500 could arrive in the target area, not considering combat losses. If bombers staged through forward bases, the number launched and the number arriving in the target area would be about 530 and 420, respectively.

73. *Allocation to ECM and Diversionary Tasks.* It is important to note that a significant proportion of the above strike aircraft would probably be used solely for ECM and diversionary tasks.

Naval Attack Capabilities Against the US

74. Although there is no firm evidence that the USSR has developed a submarine-launched guided missile capability, such a capability would constitute a significant threat against US targets and could be used to supplement aircraft strikes. By this means the USSR could attack important US military, economic, and population centers along both seaboards and inland within range.

75. In view of current indications of an extremely active Soviet long-range submarine building program, and the considerable capabilities that submarine-launched missiles would provide for hitting vital US targets, submarine-launched guided missiles might be an important supplement to nuclear attacks

[11] As used in this estimate, "compatible" means having characteristics of speed and altitude suitable to the bomber employed, and a transfer capability sufficient to add 35 percent to the range of the bomber.

1. *(Continued)*

by aircraft in any Soviet attack plan. This would be more likely by 1959, when such missiles could have not only nuclear warhead yields consonant with their CEP's but also increased range and reliability. However, no firm estimate as to the probable magnitude of such submarine-launched guided missile attacks can be made at this time. The actual scale of such attack would depend not only upon the availability of missiles and of specially configured submarines, but also upon the Soviet requirement for submarines in their conventional role. Soviet judgment as to the risk of forfeiting the element of surprise would also be involved. The chances for such forfeiture would mount as the numbers of submarines to be deployed prior to initial attacks was increased. Such considerations suggest that the actual force involved would be only a small portion of the total submarines available now and in 1959.

76. The capabilities of Soviet surface naval forces for attacks on the US are very low. Sporadic raider operations are possible, but the surface fleet in general, lacking aircraft carriers, is unsuitable for transoceanic naval operations on any significant scale.

Clandestine Methods of Attack Against the US

77. *Clandestine Delivery of Nuclear Weapons.* We have no evidence as to any Soviet plans or preparations for clandestine delivery of nuclear weapons against the US. However, during the period of this estimate the USSR will be capable of producing nuclear weapons which could be smuggled into the US either as complete assemblies or as component parts of subassemblies. These could range from small-yield weapons (five kilotons or less), weighing a few hundred pounds and small enough to fit into the luggage compartment of an automobile, up to the highest-yield device the USSR was capable of producing (10 megatons or more). All of these weapons or devices could be designed to break down into a number of relatively simple and readily transportable components. Those designed to give a relatively low yield would not require much labor or technical training for assembly. Somewhat more labor and training would be required to assemble weapons designed to give high yields, and, once assembled, they would be more difficult to transport. The size and weight of any multimegaton device would be such that it could probably be used only as a fixed installation in the hold of a merchant vessel or in secure premises, such as the Soviet embassy.

78. Considering the known limitations of the means of physical detection, the USSR could probably introduce into the US and detonate in place a considerable number of nuclear weapons by clandestine means. A variety of methods of clandestine delivery suggest themselves. Assembled weapons could be dropped by apparently friendly aircraft, detonated in the hold of a merchant ship, or sown as underwater mines by submarines and possibly by merchant ships. Either components or assembled weapons could be brought in under diplomatic immunity, smuggled across land or sea frontiers, introduced through normal import channels, or brought in as bonded merchandise awaiting transshipment.

79. In introducing nuclear weapons clandestinely into the US, the USSR would have to take into account not only the estimated chances of detection, but also the consequences of detection, including the loss of surprise in any intended overt attack and the possible provocation of US military action. As the number of weapons clandestinely introduced was increased, the risk of compromise would grow. This increased risk would be less a function of the physical means of detection (the effectiveness of which is extremely limited) than of the possibility of US penetration of the Communist apparatus, or of the defection of even a trusted agent, or of sheer accident. The USSR could not be confident that none of these mischances would occur. We conclude that, although clandestine attack with nuclear weapons might be made against specially selected targets, as a supplement to overt delivery by air, the use of large numbers of such weapons would probably be precluded by security considerations.

80. *Clandestine Use of BW and CW Weapons.* Most biological warfare (BW) agents are peculiarly adaptable to clandestine utilization,

1. *(Continued)*

since detection of their intended use would be difficult. Even small-scale employment of BW agents against livestock could be highly effective. BW attacks against personnel concentrated in selected buildings could also be effective. Anticrop BW operations could be carried out clandestinely, with possible damaging effects under proper environmental conditions.

81. CW agents are not as suitable to clandestine operations as BW agents. The effects are more readily identifiable and except on a limited scale, a much greater effort would be necessary to deliver quantities required for lethal concentrations. Although it probably would not be feasible to accumulate CW agents or dissemination devices for more than limited attacks against population centers in the US, CW attacks against personnel in buildings could be effective.

82. *Subversion, Espionage, Sabotage.* The USSR is capable of subversion, espionage, and widespread sabotage in the US through the use of existing subversive elements and the placement of foreign agents. Sabotage probably would not be initiated on a large scale prior to an all-out attack on the US since these efforts would nullify the advantage of surprise, if identifiable with the USSR. Attempts to sabotage US transportation, industrial and communications facilities, and military installations could be expected with and immediately following surprise attack by the USSR. Communist party members and adherents are capable of organizing saboteur units of varying sizes equipped with small arms and other suitable material which could strike at especially selected and widely separated targets simultaneously and without warning. Whether these attacks would be timed with a surprise military attack or carried out after attack would be dependent upon the Soviet appraisal of the relative advantages of such action.

VII. CAPABILITIES TO ATTACK US OVERSEAS INSTALLATIONS AND FORCES

Attacks by Aircraft

83. Assuming the USSR launched attacks against the US on the scales indicated in paragraphs 69 and 71, there would remain in its operational establishment about the following numbers of long-range bombers:

	At Present	Mid-1959
BULL	250	0
BADGER	50	330
BISON	0	0
BEAR	0	0
	300	330

These aircraft would be subject to the attrition factors set forth in paragraph 68. In addition, an indeterminate number of reparable planes and salvaged aborts from the aircraft committed to the intercontinental attack would also be available for later employment.

84. From bases in the USSR, the BULL, if modified, and the improved BADGER, on two-way missions carrying a 3,500 lb. bomb load, could reach key US installations in the UK, Western Europe, Iceland, Greenland, the Azores, French North Africa, Libya, the Middle East, Japan, Okinawa, Alaska, Guam, and the Philippines. To reach key installations beyond these areas, they would have to resort to inflight refueling or one-way missions. Jet heavy bombers on two-way missions from bases in the USSR could reach all the above areas and, in addition, Hawaii, Labrador, and Newfoundland. The BEAR, from interior bases, and the BISON, from forward bases, would be able to reach the Panama Canal but only on one-way missions. (See map 21.)

85. The USSR's estimated 2,900 jet light bombers (3,100 in 1959) could also be used for attacks against the many key US installations and forces overseas within their operational radius. There is an adequate number of Bloc fields suitable for jet light bombers within range of key US overseas installations and forces. From bases in East Germany, jet light bombers on two-way missions could reach the entire North Sea area, the UK and its northern and western approaches (including the Faroes), France and its western approaches, and northeastern Spain. From bases in Hungary, Bulgaria, and Rumania these aircraft could reach most of the Mediterranean Sea. From the southern USSR, they

1. *(Continued)*

could reach the area north of an arc Crete-Israel-Kuwait. Jet light bombers based in the Vladivostok and Dairen areas could reach all of Japan. To reach Okinawa and Luzon on two-way missions, they would have to stage from bases in Communist China. (See map 21.) However, for maximum effectiveness of attacks by light bombers against the more distant targets, considerable redeployment from present base areas to forward bases would be required.

Attacks by Guided Missiles

86. *Ground-Launched Missiles.* The 350 n.m. ballistic missile which we estimate the USSR could now have, and the 850–900 n.m. missile which could begin to be available in 1955–1956, could be used against US overseas installations and forces. From forward Bloc areas such missiles could reach most US overseas installations, including bases in the UK, Spain, Japan, and Alaska. However, the small number probably available and their performance limitations would seriously limit Soviet operational capabilities in this field during the early part of the period.

87. However, Soviet ground-launched missile capabilities probably will increase markedly as a result both of the greater numbers of these weapons available and their improved performance and reliability. In 1958–1959, the USSR could also have ready for series production an IRBM with a range of about 1,600 n.m. Large-yield nuclear warheads for ballistic missiles would probably be available in 1959–1960. With the IRBM the USSR could attack most of the more distant US overseas targets, while simultaneously using short- and medium-range missiles against less distant targets. (See map 22.) These missiles could therefore constitute in 1959 a significant threat to US overseas installations and forces, largely because of the probable invulnerability of ballistic missiles to countermeasures.

88. *Submarine-Launched Missiles.* Submarine-launched guided missiles might be used against selected targets to supplement aircraft and ground-launched missile attacks. The range estimated for Soviet submarine-launched missiles (see paragraph 43) would permit them to reach many key overseas installations. These missiles could also be used against carrier and other naval forces in port or as weapons of opportunity at sea.

Attacks by Conventional Forces

89. *Ground Attack.* The decision as to how and when to use Bloc ground capabilities would probably be strongly influenced by the desire to obtain strategic surprise, a consideration which weighs heavily against their employment prior to the time initial air attacks were detected. Ground attacks supported by tactical air and naval forces would almost certainly be an integral part of the over-all Soviet campaigns on the Eurasian land mass, and would present a threat to overseas installations and forces in operations immediately following initial attacks.

90. *Airborne Attack.* Soviet airborne and amphibious operations might be conducted in several areas in order to achieve early destruction of US overseas forces and installations. The capability of these forces to seize and destroy key installations and to assist in the destruction of US forces would be substantial in certain areas including Alaska. Soviet airborne capability is limited by the availability of transport aircraft. It is estimated that Soviet Aviation of Airborne Troops can lift 9,000 troops with one drop on D–day, or 14,000 with two drops, to a maximum distance of 500 n.m. For a five-day operation approximately 23,000 to 25,000 troops could be lifted. By 1959, it is estimated the USSR will be able to lift 11,000 troops on D–day and 29,000 over a five-day period. The lift capability in both periods could be increased by about 1,800 troops for every 100 aircraft made available from the 3,000 transport aircraft of the civil air fleet and other components of military aviation. If the USSR converted BULL aircraft for transport purposes, the Soviet capability to transport troops by air could be increased by about 5,000–6,000 troops per 100 aircraft converted

91. *Amphibious Attack.* Because of the lack of aircraft carriers and vessel types suitable for amphibious warfare, large-scale Soviet amphibious attacks would be limited to short-

1. *(Continued)*

range operations in areas where air cover could be provided from Communist-controlled territory. However, amphibious raids by submarine-borne forces to attempt destruction or neutralization of key US overseas installations are possible. Amphibious assault against the continental US (except Alaska) is beyond Soviet capabilities. In assaults against Alaska, certain restrictions would be imposed by: (a) the limited number of landing beaches; (b) climatic conditions; (c) problems of establishing and maintaining lines of communications; (d) the difficulties of maintaining adequate logistic support; (e) the limited amphibious capability of the Far Eastern Fleet; and (f) the difficulties of maintaining adequate air cover. Amphibious attacks against other key US overseas installations, except in the Far East, would probably be limited to amphibious raids by submarine-borne forces. Amphibious operations with an initial assault force of up to three divisions, and a follow-up force of five to six divisions, could be launched against Japan. This lift capability could be employed in other areas of the Far East within range of Soviet land-based support aircraft.

92. *Naval Forces.* We estimate that, in a maximum initial effort, as many as 220 of the long and medium range submarines located in the Baltic-Northern Fleet and Pacific Fleet areas — 160 and 60 respectively — could be made available for attacks against US naval forces and sea communications, and key installations overseas. By mid-1959, these numbers could be increased to about 420 and 100 respectively. A portion of these submarines would almost certainly be employed against US naval forces, and especially to prevent attacks by carrier striking forces with a nuclear delivery capability. In addition, Soviet submarines would almost certainly be employed against US sea communications by attacks on shipping and by mining the approaches to harbors and ports. Many of these could be concentrated, as opportune, against US naval task forces.

93. Soviet surface naval forces have a low capability for contesting control of the high seas. The Soviet surface fleet lacks advanced bases and does not possess a shipborne air arm, but these forces could be effectively employed within the radius of shore-based air cover.

Clandestine Attack Capabilities

94. *Subversion, Espionage, Sabotage.* Soviet capabilities for subversion, espionage, and widespread sabotage attacks against key overseas bases are greater than against the continental US because of the much larger proportion of Communist elements, widespread political discontent, and lack of adequate security measures in certain foreign nations. Communists in some of these countries are experienced in such operations, and sabotage efforts timed with large-scale military attacks could materially reduce the capability of US military forces overseas.

95. *Clandestine Delivery of Mass Destruction Weapons.* Considerations influencing the use of clandestine methods of delivery of mass destruction weapons by the USSR against overseas targets will in large part be similar to those discussed above in paragraphs 78–80. However, because of generally greater subversion capabilities and of geographic propinquity, Soviet capability for using these methods overseas, while limited, is greater than against the US.

1. *(Continued)*

ANNEX A

BASE AREAS SUITABLE FOR LONG-RANGE BOMBER OPERATIONS

1. *Chukotski Peninsula.* As the result of runway construction believed to have been carried out at several airfields within the past two years, we believe that at least six airfields probably now have runways adequate for staging medium bombers and that at least two of these are suitable for heavy bomber operations. Military air units are based on some of these airfields but none are subordinate to Long-Range Aviation.

2. Air operations in this area are made difficult by several factors. Recent construction of long, surfaced runways indicates that climatic and logistical difficulties of this area are being overcome. However, ice and compacted snow runways are also still in use. The lack of modern navigational aids hampers operations, but there are some indications that the USSR is steadily improving its operational potential through installation of modern radio navigation facilities. In addition, the USSR has an ever-increasing fund of Arctic experience which can be applied to staging operations in this area.

3. Cold, wind, snow, and fog, which are prevalent throughout the area, tend to make operations difficult and hazardous. The most unfavorable weather conditions occur during November through March.[1] The most favorable conditions occur at all stations during the spring and early summer. Weather in the interior is highly favorable during the summer months. Only those areas adjacent to the Chuckchee Sea or which lie along the Bering Sea coast have a relatively high incidence of unfavorable conditions during the midsummer months.

4. The status of base logistical support facilities required to stage long-range strike operations from the Chukotski area is unknown. The area is accessible only by air and by sea during the ice-free season, and supply problems would be difficult. However, the USSR is considered capable of stockpiling the necessary supplies. Moreover, the area's staging potential could be markedly increased by 1959. By using construction elements already available in the area the USSR could build two additional concrete surfaced runways, 6,000 to 8,000 feet in length, by 1959.

5. *Kola Peninsula.* The Kola Peninsula has at least six bases believed adequate for staging operations of medium bombers at maximum gross weights, provided that a reduced safety margin on take-off was accepted for the BULL. One other airfield is considered to be suitable for use on an emergency basis, but its extremely isolated location, plus its apparent lack of recent development or use, argue against its use as a staging base. At least one of these airfields would be adequate for heavy bombers at maximum take-off weights, provided reduced safety margins were accepted. Permanent-surfaced runways can be constructed throughout the area without difficulty as it is relatively free of permafrost.

6. Prevailing climatic conditions, while a restrictive factor on air operations, are relatively more favorable than in other regions of the Soviet Far North. In general, the most favorable conditions occur in the late spring and early summer. In late summer and early autumn, conditions are favorable except at bases adjacent to the cold waters of the White Sea. However, during May through October conditions are favorable at all locations over

[1] In order to estimate the seasonal suitability of average weather conditions in potential staging areas, the percentage frequency of occurrence of those conditions which would handicap the mass movement of aircraft into or out of staging areas was computed. Two conditions were selected as a basis for analysis: (1) ceiling/visibility less than 300 feet/1 mile; (2) temperature below −20° F., although with adequate preparations staging operations could be carried out successfully in temperatures below −20° F.

1. *(Continued)*

90 percent of the time. In winter, conditions are less favorable due to the more frequent occurrence of low ceilings and poor visibilities. Extremely cold temperatures are relatively infrequent, and occur less than 10 percent of the time at any base.

7. The status of base logistical support facilities required to conduct long-range bomber strikes from airfields in this area is unknown, but it is considered that logistics would not be an important limiting factor. Supply routes by rail and road are open to the Kola Peninsula on a year-round basis, although logistical support of large-scale air operations would still pose difficulties under extreme weather conditions. Moreover, the staging potential of the area could be readily increased. No additional construction capability would be required in order to build three additional concrete-surfaced runways 6,000 to 8,000 feet in length by 1959.

8. *Central Arctic.* An airfield construction and development program in this area has been in progress since early 1949. Five airfields are known and others probably exist. The development program was carried out for the Directorate of Polar Aviation of the Northern Sea Route Administration, but at least some of the airfields built probably have runways of sufficient length to handle the staging of medium bombers under conditions of reduced take-off weights and/or reduced safety margins. In addition, there is one field suitable for the staging of heavy bombers. However, logistical support would be difficult, probably requiring heavy stockpiling.

9. This area has by far the most unfavorable weather of all the areas considered. The major handicap to air operations arises from the frequency and persistence of extremely low temperatures. For example, at Tiksi over 50 percent of all observations during January record temperatures lower than —20° F. Jet engines, however, are less adversely affected by low temperatures than piston engines and jet take-off requirements are considerably reduced. Even the summer months are not very favorable due to the high frequency of fog in the coastal belt.

10. *Leningrad.* This area contains at least three home bases of Long-Range Aviation units equipped with BULL aircraft. These bases probably have runways of sufficient length for heavy jet bomber operations under conditions of reduced take-off weights and/or reduced safety margins. The Long-Range Aviation basing potential of the area could be increased without difficulty by employing available airfield construction units to further improve existing airfields. Such development would require only a minimum of additional construction, as there are already 18 airfields within 200 nautical miles of Leningrad with concrete runways at least 6,000 feet in length, and seven other airfields with concrete runways in excess of 5,000 feet in length. None of these additional bases, however, are known to be associated currently with Long-Range Aviation operations. Operations from this area by long-range aircraft would offer the advantage of a temperate climate and good logistical support.

11. The bases in this area have the most favorable weather during the late spring and summer, when about 97 to 99 percent of the time is favorable for operations. Even during autumn and winter 88 to 90 percent of the weather is favorable at all bases. There appears to be little difference between night-time and daytime weather except during September, October, and November. During these months, reduced visibility sometimes occurs during the early morning hours. Temperatures below —20° F. occur less than five percent of the time at all bases.

12. *Kamchatka–Sea of Okhotsk Area.* Four airfields in this area have runways which would permit ground runs of at least 5,000 feet. One of these airfields is considered adequate for medium bombers at maximum gross weights, provided reduced safety margins were accepted for BULLS. The other three could be used by BULLS with considerably reduced take-off weights and by BADGERS at maximum gross weight, provided lower safety margins were accepted. For the above reasons long-range capabilities from this area are estimated to be extremely limited, but facilities could be developed to accommodate medium and heavy bomber operations by 1959.

1. *(Continued)*

13. The weather in this area is relatively favorable for air operations. Throughout the year the weather on the east coast of Kamchatka Peninsula is the most favorable in the entire area. In the Magadan area the best weather occurs during the early spring and autumn.

14. *Baltic-East Germany.* Poland and the Soviet Zone of Germany have a total of at least 60 airfields from which medium and heavy bomber operations could be mounted against the US and US bases in Western Europe. However, a disadvantage of this area as a base for air attacks on North America is that Great Circle routes pass over nations friendly to the US. In addition, it would be more difficult than in other forward base areas to maintain security of preparations for attack. However, climatic conditions are most favorable and there would be relatively few logistical problems. This base complex is served adequately by all types of transportation.

15. The bases located in the Baltic coastal area are most suitable for air operations during April through August, when favorable conditions occur about 97 percent of the time, both day and night. The least favorable period is December through March, when frequency of favorable conditions drops to about 75 percent. However, the unfavorable conditions occur most often during the night and early morning hours. The midday hours are favorable for operations about 85 percent of the time. Very low temperatures are rare in this area.

2. SNIE 11-6-57 *Soviet Gross Capabilities for Attack on the Continental US in Mid-1960*

would require such substantial preparations as almost certainly to result in the loss of surprise. If, however, the USSR attempted to attack without warning it would probably be forced to accept major restrictions with respect to substantial mobilization, redeployment, or unusual movement of Soviet forces.[6] Thus, the USSR would have to consider the advantages of the maximum chance of surprise as against the maximum weight of attack.

3. In planning initial attacks on continental US targets, the timing and strength of the Soviet effort would be determined largely by recognition of the need for neutralizing the most immediate threat to Soviet security — a nuclear attack by US forces and Allied forces, wherever disposed. The Soviet timetable would almost certainly call for virtually simultaneous assaults on other target systems.

4. Since Soviet attacks on the continental US would be tantamount to general war, the USSR would have to prepare at the same time to commit military forces against targets and areas overseas. While Soviet capabilities for attacking overseas bases, forces, and areas are outside the scope of this estimate, it is pertinent that Soviet requirements for such attacks would not only affect the size and weight of the forces the USSR would actually commit against the continental US, but also the degree to which surprise could be achieved in attacking the continental US. In mid-1960, the USSR probably could not count upon being able to achieve surprise against both the continental US and US and Allied bases and forces elsewhere.

MAJOR FACTORS AFFECTING SOVIET CAPABILITIES AGAINST THE CONTINENTAL US

II. AVAILABILITY OF MASS DESTRUCTION WEAPONS

Nuclear Weapons[7]

5. The USSR is continuing to give high priority to the development and production of nuclear weapons. We estimate that the USSR could now have nuclear bombs with yields ranging from 0.5 KT to 10 MT. We also estimate that by 1957–1958, the USSR could increase the yield of its most powerful nuclear bombs to at least 20 MT, and by mid-1960 could further increase the economy of use of nuclear materials in these very large-yield weapons. In addition, warheads with yields [redacted] could be provided for use in submarine-launched surface-to-surface missiles and in air-to-surface missiles by 1957–1958, and for use in ICBMs as they become available. (For the yields of particular warheads, see NIE 11–2–56.)

6. Available evidence is inadequate to justify a calculation of the probable Soviet stockpile of nuclear weapons of various types and yields. Within the limits of nuclear weapons technology and of fissionable materials availability, the actual stockpile developed during the period of this estimate will be determined by Soviet military requirements, as currently visualized by Soviet planners and as revised during the period.[8]

7. *Radiological Warfare.* During the period of this estimate, it is most unlikely that the USSR will be able to stockpile militarily significant quantities of radioactive materials for use in radiological warfare weapons. However, the USSR will possess nuclear weapons

[6] For extended discussion of the problem of achieving surprise, see NIE 11-6-55, "Probable Intelligence Warning of Soviet Attack on the US Through Mid-1958," published 1 July 1955. This paper will be superseded by the forthcoming NIE 11-3-57, covering the period through mid-1960.

[7] For details, see NIE 11-2-56, "The Soviet Atomic Energy Program," published 8 June 1956 (Limited Distribution). This paper will be superseded in early 1957 by NIE 11-2-57.

[8] Arbitrary future stockpiles based on various assumptions are presented in NIE 11-2-56.

2. *(Continued)*

capable of producing widespread radioactive fall-out, and these weapons could be used primarily for that purpose.

Biological Warfare

8. Relatively little is known about the nature and magnitude of the Soviet BW program, particularly its offensive aspects. However, accumulated evidence shows that the USSR almost certainly has an active BW research and development program encompassing antipersonnel, antilivestock, and possibly anticrop agents. The causative organisms of at least four human diseases (anthrax, tularemia, plague, brucellosis) and of two animal diseases (foot-and-mouth disease, rinderpest) are believed to be under consideration as BW agents.

9. Based on a general appreciation of Soviet capabilities in this field, we estimate that in mid-1960 the USSR could be prepared to disseminate BW agents both covertly and overtly. The USSR already has the capability for clandestine BW attack against personnel in buildings or concentrated in relatively small areas, and for such attack against livestock and certain crops. The small amounts of BW agents required could be introduced into the US clandestinely or, in some cases, produced near the sites of their planned employment. They could be employed by saboteurs using a wide variety of disseminating devices, some of which could be procured locally. We believe covert BW attack could be highly effective against livestock and moderately effective against humans and crops. With regard to overt delivery, relatively large quantities of BW agents would probably be required. Soviet capabilities for this means of attack would therefore be limited by the infeasibility of stockpiling large quantities of most BW agents in prolonged storage.

Chemical Warfare

10. The USSR has a well-established CW research and development program, which we believe emphasizes the development of nerve agents. In addition to agents of the tabun and sarin types, the USSR is believed to be working on the more persistent, extremely lethal nerve agents of the "V" series as well as agents having psychogenic effects.

11. The Soviet stockpile of standard CW agents, in bulk and in munitions, is estimated to have been 140,000 metric tons at the end of World War II. Although there is no direct evidence that the USSR is currently engaged in large-scale production of CW agents, a stockpile of a similar magnitude probably represents the minimum which the USSR maintains in peacetime. Losses caused by deterioration and in reloading into newer munitions in the intervening period have probably been made up with nerve gases. By 1960, the Soviet CW stockpile will probably consist mainly of nerve gases, including limited quantities of "V" agents.

12. We have no firm evidence of Soviet CW munitions development since World War II, when the USSR had munitions suitable for delivery by both ground weapons and aircraft flying at speeds up to about 250 knots. The USSR is probably developing spray tanks, bombs, and unfuzed containers for use by higher speed aircraft. We believe the USSR is technically capable of modifying its present bomb and warhead designs to permit the delivery of CW agents by jet aircraft and by certain guided missiles.

III. WEAPONS DELIVERY SYSTEMS — AIRCRAFT

Soviet Long-Range Aviation

13. As of 1 October 1956, Soviet Long-Range Aviation is estimated to have been composed of 61 bomber regiments with an actual strength of 1,405 bomber aircraft in operational units: i. e., 745 BULL piston medium bombers, 585 BADGER jet medium bombers, 40 BISON jet heavy bombers, and 35 BEAR turboprop heavy bombers.* We have no evidence

*The Assistant Chief of Staff, Intelligence, Department of the Army, does not believe that the available evidence warrants the above estimate of the number of BULL bombers (745), the total number of bombers (1,405), or the number of regiments (61), in Soviet Long-Range Aviation.

2. *(Continued)*

of any tanker aircraft in operational units at present.[10] All Long-Range Aviation units are based in the European USSR except the Third Long-Range Air Army, which is in the Soviet Far East and has an estimated actual strength of 220 BULLS and 25 BADGERS.

14. We estimate that in mid-1960 Soviet Long-Range Aviation will probably comprise 56 bomber regiments and a tanker force possibly equivalent to 15 regiments.[11] [12] The bomber force will probably consist of some 1,500 aircraft, including 700 BADGERS, 500 BISONS, and 300 BEARS.[13] Evidence in support of this estimate is found in: (a) the rapid increase in the number of Long-Range Aviation regiments from 48 in January 1956 to 61 in October 1956; (b) the trend toward replacement of BULLS by more modern aircraft since 1954; (c) the apparent intent to build up a heavy bomber force implicit in the development of BISON and BEAR aircraft and their introduction into operational units, now in an early stage; and (d) current indications of the development of an inflight refueling capability.

15. The foregoing estimate of the size and composition of Soviet Long-Range Aviation is subject to all the uncertainties implicit in any estimate of a situation to be expected three years in the future. However, it is consistent, not only with the considerations enumerated in the preceding paragraph, but also with estimated Soviet strategic requirements for high-performance, long-range bombers in the event of general war, including requirements for nuclear air attack on the continental US. It is also within estimated Soviet aircraft production capabilities, although the proportion of aircraft production facilities assigned to heavy bomber production would have to be increased. We believe it unlikely that the USSR will curtail its heavy bomber force at least until it has achieved a substantial operational capability with an intercontinental ballistic missile. Such a capability almost certainly will not be achieved during the period of this estimate.

16. Soviet Long-Range Aviation will probably continue with its present aircraft types throughout the period. An improved model of the BISON is probably now becoming available, and improved versions of both the BEAR

[10] Discussion of tanker strength will be found in paragraphs 18–21.

[11] The Assistant Chief of Staff, Intelligence, Department of the Army, does not concur in the numbers of regiments shown in this sentence. While some tanker regiments or their equivalent in smaller units will probably be included in Soviet Long-Range Aviation by mid-1960, there is in his opinion no adequate evidence to indicate that the total of bomber and tanker regiments will be in excess of previously estimated bomber regiments. Some or all of the bomber regiments which may have been formed in addition to the 48 held as of 1 January 1956 may be destined to become tanker regiments. In this case, many of the tanker regiments estimated to be in existence in mid-1960 would be included in a 56 regiment level. It would not seem justifiable to estimate an *additional* 15 regiments, over and above recent increases which may represent the initial phases of the formation of tanker regiments.

[12] The Assistant Chief of Staff, Intelligence, Department of the Army, does not concur in the estimate of the mid-1960 heavy bomber strength (500 BISON and 300 BEAR) presented in this sentence. The presently estimated 1 October 1956 force level of 40 BISON would have to be increased at an average rate of more than 10 per month to achieve this level while present evidence indicates that production is continuing at about two to three per month, a rate which has remained roughly constant for some time. Achievement of the above force level would require that additional facilities presently producing other aircraft would have to be devoted to BISON production in the near future and that all factories achieve optimum or near optimum production rates. An increase in the production rate of BEAR aircraft would also have to be achieved since continuation of the present production rate would not achieve this force level. While it is possible that some increase in production may be planned and achieved, a more realistic estimate of the mid-1960 heavy bomber force level should be somewhat lower. To properly reflect the uncertainties inherent in this estimate heavy bomber strength should be stated as a bracket between the force which a continuation of present production would achieve and the optimum force level shown in paragraph 14. Such a bracket would indicate the following mid-1960 heavy bomber force level:

BISON: from 180 to 500
BEAR : from 240 to 300

2. *(Continued)*

and the BADGER will probably appear in 1957.[14] At current rates of introduction into operational units, Long-Range Aviation will have achieved its full estimated complement of BADGERS by mid-1957; continued production at present rates could provide an appreciable reserve of BADGERS by the end of the period. BULLS will probably have been entirely phased out of long-range bomber units by mid-1959; serviceable BULLS surplus to the needs of Long-Range Aviation will be available for some time for a variety of uses.

Inflight Refueling

17. We now have good evidence that the USSR is developing an inflight refueling system, and we believe that during the period of this estimate it will achieve a substantial inflight refueling capability. Soviet planners have almost certainly recognized the potentiality of inflight refueling to overcome to some extent the geographic disadvantage they face in the application of their strategic air power against the continental US. On the basis of comparative speed and altitude capabilities of Soviet long-range aircraft, and of their comparative capabilities to reach US targets on refueled and unrefueled missions from Soviet bases, we believe Soviet planners will seek to provide a refueling capability primarily for BISON aircraft. One refueling by a compatible tanker [15] could approximately double the area of the continental US that could be reached by an improved BISON on a two-way mission from Chukotski. The BEAR's greater combat radius would make refueling less essential to its operations, although its capabilities to reach targets in continental US from interior Soviet bases could be increased substantially by this means. Refueling would increase BADGER capabilities to reach targets in the continental US, but against most targets would still not make two-way BADGER operations possible.[16]

18. We therefore believe that during the period of this estimate the USSR's chief requirement for tanker aircraft would stem from the desirability of refueling a substantial number of its BISONS. To provide reasonably flexible support for a force of 500 BISON bombers, some 350 compatible tankers would be required. To meet this requirement, the USSR could employ one or a combination of the following alternatives: (a) produce BISON tankers; (b) produce BEAR tankers; (c) develop and produce a new heavy aircraft designed specifically as a tanker. BISONS and BEARS could be used as convertible tanker-bombers by employing bomb-bay tanks, but such tankers would not be fully compatible insofar as range extension is concerned.

19. We know of no tanker production or tankers in operational units in the USSR at present. By mid-1960, the USSR could acquire 350 heavy tankers as well as a bomber force of the size estimated in paragraph 14. However, in order to do so, it would in the near future have either to increase production rates at facilities which we estimate will be in the heavy bomber program, or to open additional production facilities. We doubt that the USSR will produce as many as 350 heavy tankers during the period of this estimate, in view of the probability that the bomber program will have priority over the tanker program, and the fact that to produce the estimated number of heavy bombers will itself require an early increase in the facilities allocated to the heavy bomber production program (see paragraph 15).[17]

[14] For estimated performance characteristic of Soviet long-range bombers, see Annex C.

[15] As used in this estimate, "compatible" means having characteristics of speed and altitude suitable to the bomber employed, and a transfer capability sufficient to add 35 percent to the range of the refueled bomber.

[16] For refueled and unrefueled coverage of continental US, see Annex B, Maps and Summary Charts.

[17] The Assistant Chief of Staff, Intelligence, Department of the Army, considers that aircraft production programs in the USSR are probably geared to the achievement of an inflight refueling capability compatible with its bomber force by 1960, and that the requirement for tankers is one of a number of factors which would militate against the production of a bomber force of 500 BISONS and 300 BEARS as forecast in paragraph 14. The size of the tanker force, therefore, is subject to the same elements of uncertainty which attend bomber strength (see his footnote to paragraph 14).

2. *(Continued)*

20. Therefore, we estimate that in mid-1960 the USSR will be building toward, but will probably not have achieved, a force of 350 heavy tankers. We believe that, without interfering with currently estimated Soviet bomber production programs, the USSR could, by mid-1960, have a force of some 150 heavy tankers. This could be accomplished by continuing the production of BEAR type aircraft at existing facilities.[17]
(See footnote, page 7.)

21. The USSR could develop a BADGER tanker force as an interim measure, for the purpose of increasing the range of some BISON bombers for which compatible tankers were not available. Refueling by a BADGER tanker could increase the radius of a BISON by some 500 n.m., and the range by some 1,000 n.m., although the net gain in radius/range in any particular operation would be limited by the route flown and refueling point employed. In addition, BADGER tankers could be employed as compatible tankers for BADGER bombers.

Base Areas

22. We estimate that there are some 525 operational airfields in the Sino-Soviet Bloc with permanent surfaced runways of 5,000 feet or longer. They are distributed as follows:

	(Minimum Runway Length (feet)					
	9,000	8,000	7,000	6,000	5,000	Total
USSR	9	39	19	167	44	278
European Satellites	2	47	45	36	1	131
Asiatic Communist Countries		7	23	54	32	116
	11	93	87	257	77	525

23. Given standard conditions,[18] we estimate take-off distances for Soviet long-range bombers as follows:

Type	Take-off Weight (lbs.)	Ground Run (ft.)	Ground Run to Clear 50-ft. Obstacle (ft.)
BULL	140,000	5,230	7,825
BULL (modified)	135,750	4,800	7,125
BADGER	150,000	4,200	6,300
BADGER (improved)	170,000	4,800	7,100
BISON	365,000	6,400	9,100
BISON (improved)	365,000	5,300	8,200
BEAR	300,000	6,000	9,000
BEAR (improved)		no data available	

24. There are approximately 27 airfields in the USSR believed to be home bases for operational Long-Range Aviation bomber units, three in the Far East, and the remainder in the European USSR. In addition, a number of airfields associated with command and/or training units, factory production and delivery, and testing and development are in effect an integral part of the base structure of Soviet Long-Range Aviation. As indicated by the table in paragraph 22, many other airfields in the Sino-Soviet Bloc have runways suitable for medium bomber operations and some have runways suitable for heavy bombers. These airfields could be used as auxiliary airfields to insure maximum aircraft dispersal away from home bases, but the actual designation of such auxiliary fields within the Soviet Long-Range Aviation base structure cannot be verified. Physical limitations on dispersal, and probable requirements for limiting ground stay to a minimum, would make dispersal and revetment at forward staging bases in the Arctic unlikely.

25. We estimate that Soviet planners are now developing air facilities to meet their anticipated requirements for the next 10 years or more. Progressive extension of runways at Long-Range Aviation home bases from current 8,200-foot lengths to 9,000 feet or more is believed to be under way. In the case of new runway construction at bases, it is estimated that weight-bearing capacities are being made adequate for heavy bombers of all types programmed, and that runway lengths will generally exceed 11,000 feet.

[18] Normal take-off technique and take-off engine power, no wind, sea level elevation, temperature 59 degrees F., permanent surfaced runway. At 0 degrees F., ground run requirements for take-off of jet bombers would be about 25 percent less than under standard conditions. Ground run requirements for propeller-driven bombers would also be reduced, but the difference would not be as great as for jet bombers.

2. *(Continued)*

26. Because of the range limitations of available Soviet bombers, the launching of strikes against the continental US at present would probably involve staging through one or more of five base areas within the USSR — the Chukotski Peninsula, the Kamchatka Peninsula, the Central Arctic area, the Kola Peninsula, and the Leningrad area. (If overflight of Scandinavia were to be avoided in an initial strike from Leningrad, a dog-leg route over the Kola area would be necessary.) For purposes of this estimate, these five potential staging areas are designated "forward" base areas.[19] In each of these areas, airfields suitable for long-range bombers exist, although the Leningrad area is the only one of the five now occupied by units of Long-Range Aviation. Bases in East Germany and Poland could also be used, but because of the likelihood that surprise would be sacrificed by the necessity of overflying West Europe, as well as the lower security of preparations in the Satellites and vulnerability to NATO forces, this area would not be a likely choice for staging initial strikes against the continental US.

27. Air base development over the past few years in the forward base areas has improved the capability of these areas for supporting long-range bomber staging operations. In the Kamchatka, Kola, Chukotski, and Central Arctic areas, there are now 29 airfields with runways long enough to accommodate Soviet long-range bombers.[20] Information is incomplete concerning load-bearing capacity, aircraft servicing, maintenance, storage, and personnel facilities at almost all of these airfields, but we estimate that 10 could stage either medium or heavy bombers, and that 19 others could stage medium bombers. In addition, there are at least 23 airfields in the Leningrad area capable of staging medium bombers, of which three are present home bases of Long-Range Aviation, capable of staging heavy bombers. In summary, we estimate that, for purposes of Long-Range Aviation operations against the continental US, there are available in the five forward base areas 52 airfields capable of staging medium bombers, of which 13 are also capable of staging heavy bombers.

28. There are indications that airfield development in the forward base areas is continuing, and it is within Soviet capabilities to have developed adequate facilities for sustained long-range bomber operations in any of these areas by 1960. We believe that runways are being developed with length, surface, and weight-bearing standards similar to those at Soviet Long-Range Aviation home bases. We estimate that by 1960, with the construction facilities and personnel now in the area concerned, three new airfields suitable for heavy bomber staging operations could be developed in the Kola area, three in the Leningrad area, and two each in the Chukotski, Central Arctic, and Kamchatka areas. Improvement of support facilities at existing potential staging bases in these areas could be carried out concurrently without major interference with the construction effort.

29. In each of the forward areas there are bases, in addition to those considered suitable for staging long-range bombers, which could be utilized for the fighter aircraft which the USSR would also require in any operation conducted from these areas. In certain forward areas there are only a few such additional bases at present. If necessary, by mid-1960 the USSR could provide additional facilities for fighter protection of its long-range bomber staging bases, and for surface-to-air missile defenses.

Other Factors Affecting Soviet Air Operations

30. *Reconnaissance.* The USSR is not known to have developed long-range reconnaissance aircraft as such. It is possible that during the interval between now and mid-1960 the USSR, employing existing long-range bomber types, might build up a pattern of activity along the early warning lines of the North American continent, not only to determine their location, capabilities, and vulnerabilities, but also to increase the problem of recog-

[19] Annex A and D (the latter in limited distribution under separate cover) cover air facilities, weather conditions, and airfield capacities in these base areas.

[20] In addition, there are eight airfields whose runway characteristics indicate a marginal capability for long-range bomber operations.

2. *(Continued)*

nizing the approach of an actual attack. It is unlikely that the USSR would jeopardize surprise by unusual reconnaissance activity immediately preceding an actual attack.

31. *Weather Forecasting.* The USSR has for years devoted considerable effort, with a high degree of success, to both short-period and long-period meteorological forecasting. We believe that it has the forecasting capability to support long-range air operations. This capability plus extensive experience in meteorological research in the extreme northern latitudes, weather reporting facilities in Siberia and on ice floes in the Central Arctic basin, and constant access to regularly broadcast North American weather reports and forecasts should enable the USSR to predict both route and target weather with reasonable accuracy.

32. *Navigation Aids.* The USSR has available through open sources virtually complete target and navigation data on North America and its approach routes. It is probable that in the event of a surprise attack certain Western electronic navigational aids would be available during at least part of the flight. For example, meteorological reports are regularly broadcast in the United States and Canada. It is also possible that clandestinely-placed navigational beacons might be used for aircraft homing. We estimate that Soviet navigational radar equipment is capable of better performance than the US World War II equipment which the USSR acquired.

33. *Electronic Countermeasures (ECM)*

a. Soviet Offensive Capabilities. Soviet ECM development is rapidly approaching, if it has not already reached, the point at which ECM will constitute a major threat to US air defense capabilities. Within the past year or so the USSR has entered actively into developing techniques for the tactical employment of CHAFF. We have evidence that CHAFF has been used in training exercises against Soviet ground-based radars, and we estimate that CHAFF would be widely used in a Soviet air attack. In addition, we estimate that Soviet capabilities for airborne jamming of both communications facilities and radar will materially increase during the period. The USSR has conducted some jamming training exercises against its own airborne radars, and we believe that active airborne jamming would be used against US radar, communications, and navigation facilities in the event of Soviet attacks in mid-1960. However, even in 1960 Soviet active airborne jammers for use against radars at frequencies above the X-band will probably be limited in quantity. We have no evidence of Soviet use of decoys, or of the modification of aircraft specifically for ECM use, although we consider both to be within Soviet capabilities.

b. Vulnerabilities. The concentration of all known Soviet blind-bombing and AI radars in the narrow frequency band 9,250–9,500 Mc/s increases the vulnerability of this equipment to ECM. The circuits of the only Soviet microwave radar studied in detail, the shipborne NEPTUNE, indicate that it is vulnerable to ECM and interference. Although such vulnerability may not extend to all airborne radars, it probably applies to at least some earlier sets, especially the MUSHROOM. Passive ECM receivers and radiation control are probably in use as anti-ECM techniques at present, but we believe the vulnerabilities outlined above will continue to exist for some time. However, Soviet airborne radar will eventually employ greater frequency spreading, and antijamming techniques employing the switch-tuning of magnetrons and klystrons to effect rapid changes in frequency may be under development.

34. *Evasion of US Radar.* The USSR almost certainly knows at least the general capabilities of US early warning radar equipment, coverage provided by the network, and weak and strong points of the system. With such knowledge it might expect that properly planned attacks could reduce the chance of detection by US radar. However, the use of some evasion techniques, particularly low altitude penetration, would require acceptance of reduced range or bomb load.

35. *Crew Training and Proficiency.* Flight training for Long-Range Aviation crews has increased in both intensity and scope during the past five years, especially since 1954, when jet bombers began to be introduced into the

2. *(Continued)*

long-range bomber force. At present, we estimate that long-range bomber crews average at least 15–20 hours of flying time per month. The regular training program emphasizes the attainment of navigational and bombing proficiency during the hours of darkness and in bad weather. A 1955 manual for Soviet navigator-bombardiers indicates that they are required to achieve proficiency in the use of magnetic compass, pilotage, radio, celestial, and radar navigation techniques. They also probably receive extensive training in the utilization of ground-based electronic navigation aids, such as Shoran, direction-finding and distance-measuring equipment, and hyperbolic navigation systems. We estimate that the capabilities of Long-Range Aviation crews for landing and take-off under instrument flight conditions compare favorably with those achieved in the USAF.

36. The current trend in Long-Range Aviation training is believed to be toward larger-scale operations and longer-range flights out of home base areas, including bomber operations into and over the Arctic areas as well as simulated attacks on major Soviet cities. Last summer a large-scale temporary deployment of medium and heavy bombers was apparently conducted into the Satellites, probably to test the capabilities of the units involved to stage into and operate from forward areas. Considerable over-water flying has been undertaken during the past five years.

37. The current state of training in Soviet Long-Range Aviation leads us to estimate that at present the mounting of an initial attack against the continental US utilizing the bulk of the long-range bomber force would require several months of intensive preparatory training. However, a reduced scale of attack, still sufficient to deliver a devastating blow upon the US, could currently be mounted with a minimum of pre-strike preparatory activity. The current training program points to continuing improvement in air crew proficiency. Moreover, past Soviet personnel practices, which insure relatively little turnover in personnel over the years, indicate that improvements in proficiency will be cumulative during the period of this estimate. Therefore, the over-all proficiency of Long-Range Aviation crews will almost certainly be much higher by mid-1960.

38. *Bombing Accuracy.* By mid-1960, most Soviet long-range bomber crews will probably have achieved the following levels of bombing proficiency:

Altitude (ft.)	Visual Bombing CEP (ft.)	Radar Bombing CEP (ft.)	
		Well-defined targets	Poorly-defined targets
50,000	2,900	2,400	3,100
40,000	2,100	2,000	2,700
30,000	1,400	1,700	2,300
20,000	900	1,400	2,100
10,000	400	900	1,600
5,000		800	1,400

IV. WEAPONS DELIVERY SYSTEMS — GUIDED MISSILES [21]

39. We have no firm evidence that the USSR now has any offensive guided missiles available for operational employment against the continental US, although we believe that employment of missiles launched from aircraft or submarines is within present Soviet capabilities. We estimate that for some time after a particular missile system becomes operational, its system reliability [22] will probably be about 40–60 percent. By 1960 the reliabilities of earlier Soviet missile systems will almost certainly have been improved. In mid-1960 the USSR will probably have operational stockpiles of several types of missiles with nuclear warheads suitable for launching from submarines or aircraft in an attack on the continental US.

[21] For a detailed study see the forthcoming NIE 11-5-57, "Soviet Guided Missile Capabilities and Probable Programs."

[22] System reliability refers to the percentage of missiles which will function according to specifications from the launching area to detonation in the target area.

3. SNIE 11-7-58 *Strength and Composition of the Soviet Long Range Bomber Force*

~~TOP SECRET~~

STRENGTH AND COMPOSITION OF THE SOVIET LONG RANGE BOMBER FORCE

THE PROBLEM

To estimate the strength and composition of the Soviet long range bomber force, through mid-1963.

CONCLUSIONS

1. At present, Soviet Long Range Aviation is primarily a medium bomber force, best suited for operations against targets on the Eurasian periphery and capable of large-scale attacks against the continental US through extensive use of one-way missions. Considerable effort has been devoted to the development of heavy bombers, but it appears that within the past year or two Soviet planners decided to forego a rapid buildup with present versions of the BISON and BEAR. *(Para. 12)*

2. In estimating the operational strength and composition of Soviet Long Range Aviation, we have projected heavy bomber and tanker figures for 1959 and 1960 as lying within a range. The low side reflects a Soviet option to forego further buildup of their heavy bomber force through mid-1960. The high side reflects a Soviet option to produce some additional aircraft of BISON and/or BEAR types, and to introduce a new subsonic heavy bomber into operational units before mid-1960. A new medium bomber with supersonic "dash" capability will probably be introduced some time during 1960–1961; the Soviet jet medium bomber force in mid-1960 may include a few such aircraft in addition to BADGERs.

	mid-1958	mid-1959	mid-1960
Jet and Turboprop Heavy Bombers and Tankers	100–125	100–150	100–200
Jet Medium Bombers and Tankers	925	1025	1100
Piston Medium Bombers	425	300	150

(Paras. 24, 25)

3. There is no question that by mid-1963 the Soviets could produce and put into operational units five or six hundred heavy bombers and tankers, should they desire this large a force of such subsonic aircraft, augmented by small numbers of advanced types. It seems to us more likely, however, that the Soviet heavy bomber and tanker force will remain smaller than this — say about two or three hundred — and that by about mid-

3. *(Continued)*

1963 the USSR will be placing major reliance on ICBMs for intercontinental delivery of nuclear weapons. *(Paras. 30, 31)*

4. The number of medium bombers in Soviet Long Range Aviation will probably decrease by mid-1963. Supersonic "dash" medium bombers may become an important element in the force, but BADGERs will probably have continuing utility. *(Para. 32)*

DISCUSSION

CURRENT STATUS OF SOVIET LONG RANGE AVIATION

5. A rapid expansion of Soviet Long Range Aviation occurred with the introduction of the present generation of long range bombers. About 1950 the Soviets began devoting high-priority efforts to developing the BADGER jet medium bomber and the BISON jet and BEAR turboprop heavy bombers, which were placed in series production in 1954–1955, after lead-times which were relatively short by US standards. The greatest expansion in total strength took place from 1954 through 1956; it apparently levelled off around mid-1957. We estimate that as of 1 April 1958, Long Range Aviation included more than 1,450 bombers in about 60 regiments, against an early 1954 strength of about 1,000 in about 40 regiments.

6. *Medium Bomber Force.* Most of the recent expansion has occurred in medium bomber strength, which comprised about 900 BADGERs and about 450 obsolete BULL piston medium bombers as of 1 April 1958. The production of BADGERs, and their introduction into operational units, has proceeded at a fairly high and steady rate since 1954. This rate is now tapering off somewhat, but production is still estimated to be in excess of 30 per month, and deliveries to Long Range Aviation units continue. BADGERs are also being supplied to some Soviet air components other than Long Range Aviation. BULLs began phasing out of the force with the introduction of the BADGER, but the present rate of retirement is slow.

7. About four-fifths of these medium bombers are based in the area west of Moscow between Leningrad and the Black Sea; most of the remainder are in the southern portion of the Soviet Far East; a few are in the Caucasus. Their base locations and normal patterns of activity would facilitate bombing missions launched directly from home bases to targets in Eurasia and its periphery. The majority of land targets of strategic importance to the US outside the Americas — including overseas air bases, potential IRBM sites, allied ports, and industrial, military, governmental and communications centers — fall within the combat radii of Soviet medium bombers operating directly from home bases. Many important naval operating areas are also within their combat radii.

8. The Soviets have also taken measures to prepare medium bomber elements for the type of operations necessary for attack on North American targets. Training activities over the past several years have included more realistic, larger-scale exercises and long-range flights. More recently, there have almost certainly been an increasing number of flights to potential staging bases in the Soviet Arctic, though far fewer than would be expected for a fully combat-ready capability against the US. Inflight refueling techniques have been developed for BADGERs, apparently using a convertible tanker-bomber version of the aircraft, although at present only a limited operational capability exists. Moreover, certain BADGER units have been trained and equipped to employ air-to-surface missiles of about 55 nautical miles range, probably designed primarily for anti-ship use but also suitable for attacking well-defined radar targets on land. By staging through Arctic bases, BADGERs could reach: Alaska, Greenland, and part of Canada on unrefueled two-way missions; more of Canada and a small portion of the US on refueled two-way missions; all of Canada and much of the US on

3. *(Continued)*

unrefueled one-way missions; all US targets on refueled one-way missions.

9. *Heavy Bomber Force.* In strong contrast to the apparent rapidity with which the BISON and BEAR were developed, their production and introduction into units has been at very low and uneven rates. The BISON program was characterized by repeated modifications to the aircraft until about mid-1956, when an improved version appeared. Production rates at the one identified BISON factory (Moscow/Fili) rose to a maximum of three to four per month in the summer of 1957, and then began to decrease in a manner suggesting the phase-out of production of this model. Aircraft design work and/or retooling were apparently instituted at Moscow/Fili in the fall of 1957, and we are reasonably confident that no other factory is producing BISON. We therefore believe that production of the present version has virtually stopped, and that as of 1 April 1958, total cumulative BISON production amounted to about 85 aircraft.

10. Considerably less evidence is available on BEAR production, but at no time does more than a fraction of the capacity of one aircraft factory (at Kuibyshev) appear to have been allocated to the program. BEAR production has probably averaged no more than about two per month. A continuing absence of good indications of BEAR production since late 1956, together with the subsequent development at Kuibyshev of the TU-114 transport version of the BEAR, leads us to believe that the BEAR program was probably terminated, at least temporarily, by early 1957, although it is possible that production continues at a low rate. Total cumulative BEAR production as of 1 April 1958 may have been between 50 and 60 aircraft.

11. The activity of Long Range Aviation units has likewise failed to demonstrate a recent enlargement of the heavy bomber force, although unit structure could readily accommodate expansion. We estimate total operational strength in BISON and BEAR as probably between 100 and 125 aircraft as of 1 April 1958; the bulk are based in Southwestern USSR, with a small number in the Far East. During 1957, operational BISON units conducted only a small amount of training in Arctic staging and inflight refueling, both of which would be essential for two-way operations against most US targets. Moreover, discernible BISON activity has virtually ceased during the past six months, while BEAR activity has continued at modest rates.

12. In sum, Soviet Long Range Aviation remains primarily a medium bomber force, best suited for operations against targets on the Eurasian periphery and capable of large-scale attacks against the continental US through extensive use of one-way missions. Considerable effort has been devoted to the development of heavy bombers, but it appears that within the past year or two Soviet planners decided to forego a rapid buildup with present versions of the BISON and BEAR.

FACTORS AFFECTING SOVIET POLICY

13. Dissatisfaction with the BISON and BEAR probably affected the Soviet decision. Unexpected technical difficulties apparently delayed the BISON program in its early stages and may still be plaguing the Soviets. Moreover, the combat radius of the current BISON, even with inflight refueling, appears to be insufficient to ensure flexibility in two-way operations against the continental US. The BEAR's combat radius is adequate, but its speed and altitude are somewhat inferior to those of the BISON and its turboprop propulsion system probably has less growth potential than a turbojet system. Furthermore, existing heavy bomber models have become progressively less effective in relation to US defensive capabilities. While the Soviet program lagged, the West continued counter preparations which included improved active air defense, early warning, and other measures calculated to reduce the USSR's chances of successfully neutralizing US retaliatory forces.

14. Progress in developing more advanced intercontinental weapon systems probably also played an important role in the Soviet decision. Evidence in technical fields leads to the conclusion that the Soviets have active and well-advanced programs in those primary

3. *(Continued)*

areas which support new long range bomber development; they have probably made good progress toward a successor to BISON and BEAR. Moreover, in the past two years the Soviet leaders have probably become increasingly confident of their ability to acquire an early operational ICBM capability, in view of the impressive results achieved to date in missile testing and earth satellites. Soviet plans for submarine-launched missiles may also have contributed to the decision.

15. But the curtailment of BISON and BEAR production before acquiring even an initial operational capability with either an ICBM or a follow-on bomber involved Soviet acceptance of at least some calculated risk. The Soviet leaders almost certainly appreciate that at present the USSR could not launch an all-out nuclear attack against the US and its allies without receiving unacceptable damage in return, but at the same time, they are probably confident that their existing capabilities are a powerful deterrent to Western initiation of general war. Moreover, the risk involved is reduced by the existence of a still-growing BADGER force. In the face of known US power, Soviet planners have lived with a one-way medium bomber capability against the US for some ten years, and may think they can live with it at least a little longer. Thus the USSR may consider its medium bomber force, together with a small heavy bomber capability, at least temporarily acceptable for supporting Soviet foreign policy objectives and for use against the US if general war should occur.

16. Meanwhile, the USSR is almost certainly continuing to strive for technological superiority over the US in intercontinental weapon systems. It is clear that Soviet planners are laying great store by the ICBM as posing an entirely new type of threat. However, they probably also take into account that a mixed strike capability including both manned bombers and missiles would further complicate Western defensive problems, and that the accuracy and payload of the ICBM will for some time be inferior to those of manned bombers. In this connection, last year's derogatory remarks about bombers by Khrushchev and others have been considerably mitigated by subsequent statements. We believe that manned bombers, especially advanced types, will almost certainly continue to play a considerable role, with emphasis on those functions for which they are particularly well-suited, such as attacks on small, hardened targets, damage assessment, and reconnaissance.

BOMBER DEVELOPMENT AND PRODUCTION CAPABILITIES

17. We estimated in SNIE 11-58 that over the next few years the USSR could: (a) improve the BISON and BADGER by modifying them between now and 1960 to increase their range and altitude capabilities; (b) develop a new subsonic heavy bomber having performance somewhat better than that of an improved BISON, especially in range, introducing it into operational units in 1959–60; (c) develop a new medium bomber with supersonic "dash" capabilities and a range roughly equivalent to that of an improved BADGER, introducing it into operational units in 1960–61. We also noted, however, that none of the above types would add substantially to Soviet intercontinental attack capabilities, and that the USSR may be proceeding directly toward considerably more advanced aircraft for operational use. It was estimated that a nuclear reactor suitable for propulsion of subsonic aircraft could probably be available by 1962. Soviet achievement of two-way operational capabilities against all targets in the continental US with manned delivery systems capable of supersonic speed was estimated to require longer periods, i.e., probably until after about 1962 for a chemical-powered aircraft and well beyond 1962 for either nuclear-powered aircraft or hypersonic boost-glide vehicles.[1]

18. Evidence received since publication of SNIE 11-58 does not justify any change in the above estimate of Soviet bomber development capabilities, but it strengthens the likelihood that the USSR now has one or more types of

[1] See SNIE 11-58: Possible Soviet Long Range Bomber Development, 1958–1962, 4 March 1958 (Secret). Refer, however, to the footnote to the following paragraph by the Assistant Chief of Staff, Intelligence, USAF.

3. *(Continued)*

large bomber aircraft in flight-test status.[2] Considering the available information on research, development, flight-testing and aircraft plant activities, we believe that a prototype of at least one new or improved type of large bomber has probably been completed, possibly early in 1957. Khrushchev recently stated that the USSR would soon unveil a "new and very interesting bomber." Although we are still unable to determine what specific type or types of aircraft may have reached flight-test status, we expect to see a prototype at any time, possibly on Soviet Aviation Day this summer. In the interim, we do not exclude the further possibility that the USSR is developing a very advanced intercontinental bomber at a faster pace than we estimated in SNIE 11–58.

19. Meanwhile, Soviet capacity to produce long range bombers and other large aircraft has continued to expand. Major new construction has been reported at most Soviet airframe plants over the past four years; construction at bomber plants has been characterized by high-bay buildings well-suited to the assembly of large aircraft. Expansion amounting to some 20 to 30 percent additional floor space has already occurred at some bomber plants, and it is probable that comparable increases will have been completed at others by 1959. Much of this added capacity is believed to be for the production of large transport aircraft. Nevertheless, fulfillment of the USSR's announced transport production goals would still leave sufficient plant capacity to build bombers at more rapid rates than those of the past few years. In recent years the USSR has also expanded or constructed a number of airfields, including some in potential Arctic staging areas, which are identified with or suitable for heavy bombers of current or advanced types. This program is still under way.

20. Considerable lead-time is required prior to achieving an operational capability with large, complex military aircraft. Analysis of past Soviet experience indicates that reasonable times to be expected are: (a) about two years or a minimum of eighteen months, between completion of a prototype and completion of the first series produced aircraft; (b) about an additional year until the introduction of aircraft into operational units. Assuming that a new prototype was completed early in 1957 (see para. 18 above), and that a priority program was undertaken without delay, the first series produced aircraft could probably be completed in late 1958 or early 1959, and such a new type could probably be introduced into operational units in late 1959 or early 1960. Because of deficiencies in our information, we recognize that the USSR could already have instituted series production of a new long range bomber type entirely without our knowledge, but consideration of all the factors involved leads us to believe that no *new* bomber type will appear in Long Range Aviation units until some time after mid-1959. On the other hand, if the recent cut-back in heavy bomber production merely marked the modification or redesign of existing types, production of an improved model could begin at any time.

SHORT-TERM ESTIMATE, TO MID-1960

21. We believe that during the five-year period of this estimate the USSR will continue to maintain a heavy bomber force. It follows from what has been said in previous paragraphs that the Soviets may either begin at an early date to produce improved versions of the BISON and perhaps additional BEARs, or may forego any buildup at least until a new subsonic heavy bomber can be made available, some time after mid-1959. Even in the first case, the numbers produced would probably not be very large, because Soviet planners probably do not feel compelled, in the interim before the advent of more advanced weapon systems, to acquire a heavy bomber force of much larger size but with aircraft of only marginally better performance.

22. The 1959–60 subsonic heavy bomber mentioned in SNIE 11–58 would help the USSR overcome the geographic disadvantage it faces in the application of strategic nuclear

[2] The Assistant Chief of Staff, Intelligence, USAF, believes the evidence does, in fact, change the estimate of Soviet bomber development capabilities. In this respect, he believes an aircraft nuclear propulsion system could now be undergoing flight tests in a prototype airframe.

3. *(Continued)*

power against the US, but its capabilities to penetrate North American defenses would be little better than those of an improved BISON. The Soviets might nevertheless produce such an aircraft during the early years of ICBM availability and prior to the advent of more advanced intercontinental bombers — partly as a "hedge" against slippage in either of the latter programs. A few might be introduced into operational units by mid-1960.

23. The BADGER force will probably be strengthened somewhat over the next year or more. Soviet planners will continue to view a large medium bomber force as a necessity, not only for potential employment against targets in and near Eurasia, but also for maintaining a one-way intercontinental strike capability. However, the rate of introduction of new BADGERs will probably continue to decline, and a peak strength of about 1,100 (including convertible tanker-bombers) will probably be reached in 1960. A program of modification and improvement of BADGERs may be undertaken during the next two years. The BULL will continue to be useful for some purposes; its phase-out will probably be gradual, reducing the piston medium bomber strength of Long Range Aviation to about 150 in mid-1960.

24. The new supersonic "dash" medium bomber mentioned in SNIE 11-58 would be a useful successor to the BADGER, particularly if equipped with advanced air-to-surface missiles. We believe that a new medium bomber will probably be introduced some time during 1960-61; a few might have reached operational units by mid-1960.

25. In estimating the operational strength and composition of Soviet Long Range Aviation, we have projected heavy bomber and tanker figures for 1959 and 1960 as lying within a range. The low side reflects a Soviet option to forego further buildup of their heavy bomber force through mid-1960. The high side reflects a Soviet option to produce some additional aircraft of BISON and/or BEAR types, and to introduce a new subsonic heavy bomber into operational units before mid-1960.

	mid-1958	mid-1959	mid-1960
Jet and Turboprop Heavy Bombers and Tankers	100–125	100–150	100–200
Jet Medium Bombers and Tankers	925	1025	1100
Piston Medium Bombers	425	300	150

26. The Soviets will continue their efforts to optimize the capabilities of their long range bomber force. Over the next two years, they will probably improve inflight refueling techniques and make them more generally available. The weight of present evidence points to continued employment of convertible tanker-bombers, but one or more of the new Soviet transport types could be modified to perform a tanker role. Improved electronic countermeasures, navigation and bombing techniques, and other supporting equipment will probably be provided. Air-to-surface missile launching capabilities will probably be augmented. Operations into and from potential Arctic staging areas will probably be intensified, and base facilities in these areas will continue to be improved.

LONGER TERM TRENDS, TO MID-1963

27. Our estimates of trends in Soviet long range bomber strength beyond 1960 are tinged with more uncertainty, especially with respect to heavy bombers. If our estimates of Soviet guided missile capabilities are correct, 1960–63 could see the advent of a substantial Soviet ICBM capability, increased submarine-launched missile capabilities, and a considerable buildup of ballistic missiles with short and medium ranges. The same period could bring the introduction of very advanced intercontinental bombers, of new medium bombers, and of improved air-to-surface missiles. The range of options open to the Soviet planners is wide and the number of variables great. Indeed we question whether decisions which the Soviets may have made along these lines will remain firm.

28. A key factor influencing Soviet decisions as to military force levels is of course the Soviet estimate of the likelihood of all-out nuclear war with the US. We believe that the Soviet leaders do not intend during the period

3. *(Continued).*

of this estimate to initiate general war themselves as a deliberate act of policy, and that they judge that the US is likewise indisposed to do so. It is true that the Soviets, like ourselves, are well aware that general war may arise out of accident or miscalculation. Their armed forces must be reasonably prepared for such a contingency. Yet it is obvious from Soviet policies, both military and non-military, that the Soviet leaders do not believe the likelihood of general war in itself to be so great as to require a rapid buildup in force levels.

29. Regardless of the immediate political situation, however, the Soviet leaders would probably build up their force levels very greatly if they believed that by doing so they could acquire the capability to attack the US and at the same time to prevent an unacceptable return blow. The achievement of such a capability would be tantamount to the achievement of military superiority over the US. From a military and technological point of view, then, a main factor determining Soviet decisions as to force levels will be their judgment as to whether the attainment of this capability is practicable. Their judgment will be influenced to a great extent by programmed improvements in US air defenses, the dispersal and alert status of retaliatory forces, and the dispersal and hardening of IRBM and ICBM launching sites. The structure of the forces would be influenced by the Soviet assessment of the effectiveness of missiles and bombers in various employments, and of their own capabilities in using these weapon systems.

30. Soviet military planners would probably feel that even though they had available substantial numbers of ICBMs and some submarine-launched missiles, it would still be desirable to introduce advanced intercontinental bombers into operational units. Late in the period of this estimate these could include chemical-powered aircraft capable of supersonic speed at high altitude or possibly subsonic nuclear-powered aircraft with long endurance at various altitudes, including very low altitude. They are likely to be equipped to launch improved air-to-surface missiles as well as bombs, and to be fitted with considerably improved defensive and other equipment. Some aircraft of either or both these types could probably be in operational units by mid-1963.

31. There is no question that by mid-1963 the Soviets could produce and put into operational units five or six hundred heavy bombers and tankers, should they desire this large a force of such subsonic aircraft, augmented by the advanced types mentioned in the previous paragraph. It seems to us more likely, however, that the Soviet heavy bomber and tanker force will remain smaller than this — say about two or three hundred — and that by about mid-1963 the USSR will be placing major reliance on ICBMs for intercontinental delivery of nuclear weapons.

32. We believe that the number of medium bombers in Soviet Long Range Aviation will probably decrease in the later years of the period. BULLs will probably have phased out entirely shortly after mid-1960. Supersonic "dash" medium bombers may become an important element in the force by mid-1963, but BADGERs will probably have continuing utility.

The "Missile Gap," 1957-61

Although, by the late 1950s, Western analysts were beginning to perceive patterns in Soviet strategic thinking, they still lacked enough information to plot Soviet actions with any degree of confidence. Thus, the bomber gap of the mid-1950s was followed almost immediately by a second, similar, analytical crisis, the "missile gap."

The first overt sign of a major Soviet ICBM program was a public statement by Soviet Premier Nikita Khrushchev on 23 April 1956, to the effect that the USSR was about to be the first country to develop an ICBM. Just over a year later this prophesy seemed to come true: on 26 August 1957 the Soviet news agency, TASS, announced the successful test of a "super long-distance, intercontinental, multistage, ballistic rocket."[11] On 4 October, shortly after testing of the US Atlas ICBM had begun, the Soviets managed to orbit their first satellite, Sputnik I, followed almost exactly one month later by Sputnik II.

The Soviet ICBM program did not, of course, appear overnight, but had been under way since the late 1940s. Western intelligence was aware that the Soviets had picked up some 400 scientists who had been involved in the German V-2 ballistic missile program at the end of World War II, although they missed the head of the program, Wernher von Braun, and the hard core of experts associated with German missile development. Little more was known, however. When German scientists were released to the West beginning in 1951, they could provide only limited information about the extent or success of Soviet missile programs.[12] Once again, lack of information was plaguing Western efforts to track Soviet progress in an area crucial to US national security. However, the first Estimate to treat the subject, NIE 11-6-54, contended that there was "conclusive evidence of a great postwar Soviet interest in guided missiles and indications that the USSR has a large and active research and development program," although there was little data on individual Soviet missiles under development or in production. It nonetheless concluded that a Soviet ICBM might be operational as early as 1960, but most probably not before 1963.[13] Concern over the lack of information and the possible consequences of a strategic surprise mounted over the next two years. By the end of 1955, DCI Allen Dulles was prepared to declare Soviet ICBMs a topic "of the highest priority, probably of even greater ultimate importance to our national security than atomic energy intelligence."[14]

[11] Wayne G. Jackson, *Allen Welsh Dulles as Director of Central Intelligence, 26 February 1953–29 November 1961*, V, p. 44, National Archives and Records Agency, RG-263.

[12] Freedman, p. 68.

[13] NARA RG-263 NIE 11-6-54 *Soviet Capabilities and Probable Programs in the Guided Missile Field*, 5 October 1954; pp. 1, 4. This Estimate, which deals with guided missiles of all kinds, was a major effort to exploit data available in the West—along with what intelligence there was on Soviet programs—to define the scope of Soviet efforts in this area.

[14] Jackson, p. 44.

Contributing to an atmosphere of crisis were continuing difficulties in the US test program (the first Titan ICBM blew up on its launcher in December 1958), contrasted to continuing Soviet bombast concerning their own successes. With deployment of US Atlas ICBMs only just getting under way (18 were operational in 1960) and Titan not due for deployment until 1962, the notion that the Soviets could achieve a decisive lead in the nuclear arms race was a particularly chilling one that the Soviets did their best to encourage. Late in 1958 a Soviet official had claimed that Soviet ICBMs were in series production; five days later, Khrushchev announced that Soviet ICBMs were capable of delivering a 5-megaton warhead to a range of 7,560 nautical miles. In February 1959 the Soviet leader warned that the Soviet Union had "organized the mass production of ballistic missiles" that would give it the ability to "deliver a blow to aggressors in any part of the world." The following November he repeated that malediction, noting that one Soviet factory had produced more than 250 ICBMs over the previous year.[15]

In the absence of concrete information to the contrary, Soviet statements (however hyperbolic) were difficult to dismiss entirely. Collection efforts were stepped up, while U-2 flights over the Soviet Union were now routinely targeted against suspected and known ICBM installations.

The situation improved somewhat beginning with the discovery of the Tyuratam ICBM test site, but not sufficiently for Western analysts to come to grips with the nature of the program. Although the events of the summer and fall of 1957 confirmed the existence of a continuing Soviet ICBM program, they had revealed nothing about the size or operational viability of the system. These proved to be the critical dimensions of the problem: the SS-6, the Soviet ICBM in question, was an enormous missile for its time, fully twice the size of its contemporaries, the US Atlas and Titan ICBMs. It used cryogenic fuel that could not be stored on board the missile and created nightmarish logistic problems for operational deployment. This made it so awkward to handle in the field that, despite its fundamental reliability and impressive record of successful launches, the Soviets opted to skip deployment of this first-generation missile in favor of developing its successor, the SS-7. Only four SS-6 launchers became operational. In consequence, the Soviet ICBM development program was delayed and extended, with fewer missiles deployed initially and at a much slower rate than might have been the case had they gone ahead with the SS-6. As a result, concrete evidence of the operational deployment of Soviet ICBMs (as distinct from the existence of an active test program) proved very difficult to come by.

Hopes of immediately obtaining such evidence were dashed on 1 May 1960, when Francis Gary Powers' U-2 was shot down over the Soviet Union, putting an end to plans for reconnaissance flights in the near future.

[15] Prados, p. 111.

Ironically, one of Powers' targets was a suspected ICBM base at Plesetsk; had he completed that mission, it is likely that he would have produced photographs of what was then the only operational ICBM launch facility in the Soviet Union.

Over the winter of 1960/61, collection breakthroughs—including the advent of the first photoreconnaissance satellites—occurred that compensated for the loss of U-2 coverage and provided the critical data that were needed to "close the missile gap."[16] For the first time, "good intelligence coverage" was possible "of . . . more than 50 percent of those portions of the USSR within which ICBM deployment [was] most likely." This "substantially augmented" coverage made it possible to identify operational deployments at five "confirmed or possible ICBM complexes."[17]

Second, in the spring of 1961 the West's agent in the Soviet General Staff, Lt. Col. Oleg Penkovskiy, was able to provide Western intelligence services with information revealing the true extent of the Kremlin's bluffing in the ICBM field. Asked to comment on Khrushchev's statements regarding Soviet ICBM tests, production, and deployment, Penkovskiy replied that it was all bluff. The purpose of these statements, Penkovskiy said, was "to force Western military government leaders and military people to do their planning on the assumption that the Soviet Union already had a tremendous military potential. . ."

> In reality it is only being developed. . . . The USSR does not have the capability of firing (even) one or two (ICBMs) . . . there are not hundreds even in a testing status. There may be only tens in that category. . . . Even now it may be possible that somewhere in the Far East or at Kapustin Yar there may be some missiles which could reach other continents and detonate with an atomic, even hydrogen explosion, but such launchings would be completely unplanned, uncontrolled, and certainly not of a mass variety. Of this I am entirely sure.[18]

The Soviets did not achieve initial operational capability with their four SS-6 launchers until mid-1960; by 1962, 36 launchers (mainly SS-7s) had been deployed.

[16] See Kevin C. Ruffner, ed.: *Corona America's First Satellite Program* (Washington, D.C: CIA Cold War Records Series, 1995).

[17] NIE 11-8/1-61 *Strength and Deployment of Soviet Long Range Ballistic Missile Forces*, 21 September 1961: pp. 11-12.

[18] Jackson, V. p. 130. Ominously, Penkovskiy added, "but in two or three years there will be a different picture."

4. NIE 11-5-57 *Soviet Capabilities and Probable Programs in the Guided Missile Field*

~~TOP SECRET~~

SOVIET CAPABILITIES AND PROBABLE PROGRAMS IN THE GUIDED MISSILE FIELD

THE PROBLEM

To estimate Soviet capabilities and probable programs in the field of guided missiles, including earth satellites, through 1966. [1]

FOREWORD

This estimate supersedes NIE 11-6-54, Soviet Capabilities and Probable Programs in the Guided Missile Field, 5 October 1954, and its supplement, NIE 11-12-55, Soviet Guided Missile Capabilities and Probable Programs, 20 December 1955. Although some new intelligence has strengthened our previous estimate that the USSR has an extensive guided missile program, intelligence on specific guided missile systems continues to be deficient. In making this estimate in a field where positive intelligence is minimal, we have employed three interdependent approaches: military requirements, scientific and technical capabilities, and economic capabilities. Throughout the entire estimative process, the fullest consideration has been taken of the available evidence of Soviet missile activity, US guided missile experience, and known and estimated Soviet capabilities in related fields.

This estimate is based on previous judgments that the USSR does not now intend to initiate general war deliberately and is not now preparing for general war as of any particular future date.

Except where noted otherwise, the operational capability dates given in this estimate are the earliest probable years during which one or more missiles could have been serially produced and placed in the hands of trained personnel of one operational unit, thus constituting a limited capability for operational employment. These dates are based on our estimate that a concerted and continuous native Soviet research and development program began in 1948.

Although considerable effort has been devoted to estimating a Soviet production and operational program for guided missile systems through 1966, the production quantities and time-phasing presented in Annex A represent only a possible Soviet program, but one which is considered both feasible and reasonable. [2]

[1] Unguided rockets are not included in this estimate.

[2] See the Director of Intelligence, USAF, footnote to Annex A, paragraph 1.

4. *(Continued)*

CONCLUSIONS

GENERAL CONCLUSIONS

1. We estimate that the Soviet guided missile program is extensive and enjoys a very high priority. *(Paras. 17, 27, 29–30, 50)*

2. We believe that the USSR has the native scientific resources and capabilities to develop during this period advanced types of guided missile systems, in all categories for which it has military requirements. *(Paras. 29–38)*

3. We estimate that the USSR has the industrial base and related industrial experience to series produce the missile systems it will develop during this period. However, in view of competing demands, the limited availabliity of electronic equipment will seriously restrict the extent and variety of Soviet guided missile production until about 1958. Thereafter, expanding electronics production will probably make this restriction much less severe. *(Paras. 45–48)*

4. We estimate that the USSR has requirements for various sizes of nuclear, high explosive (HE), and chemical (CW) warheads, and has the capability to develop them on time scales consistent with the missiles in which they would be employed. In view of competing demands, the availability of fissionable materials will impose limitations on the extent of Soviet nuclear warhead production during the period of this estimate. *(Paras. 39–42, 54, Annex A)*

SPECIFIC SOVIET CAPABILITIES AND PROGRAMS

Surface-to-Air Missiles

5. We estimate that surface-to-air missile systems have one of the highest priorities among current Soviet military programs. At Moscow, an extensive system of surface-to-air missile sites has been constructed, and all sites are probably now operational. This system can probably direct a very high rate of fire against multiple targets at maximum altitudes of about 60,000 feet and maximum horizontal ranges of about 25 n.m. *(Paras. 27–28, 32, 56–60)*

6. During the period 1958–1961, surface-to-air systems with increased range and altitude capabilities for static defense of critical areas, and with low and high altitude capabilities for defense of static targets, field forces, and naval vessels, could probably become available for operational employment. Sometime between 1963 and 1966, the USSR could probably have in operation a surface-to-air system of some capability against the ICBM. *(Paras. 61–67)*

7. We estimate that series production of surface-to-air guided missiles is now under way in the USSR, and that it will probably produce such missiles in large quantities. Nuclear warheads could now be incorporated into a limited number of surface-to-air missiles. We estimate that some percentage of surface-to-air mis-

4. *(Continued)*

siles will be so equipped during the period of this estimate. *(Paras. 19, 59–60, Annex A)*

Air-to-Air Missiles

8. Despite a lack of significant intelligence, we estimate that the USSR has pursued the development of air-to-air missiles, and that it could now have in operational use a 2–3 n.m. range missile capable of tail-cone attacks in good weather. It is probable that the USSR could have a 5 n.m. all-weather missile operational in 1958 and a 15–20 n.m. all-weather missile, capable of employing a nuclear warhead, in 1960. *(Paras. 68–70)*

Air-to-Surface Missiles

9. In 1955 the USSR could probably have had a 20 n.m. subsonic air-to-surface missile available for operational use. In 1956–1957 a 55 n.m. subsonic missile could probably be available, and there is some evidence that such a missile has reached at least final flight test stage. A 55 n.m. supersonic missile could probably be available in 1958. These missiles, designed primarily as antiship weapons, could also be employed against isolated and well-defined radar targets on land. In 1961, a 100 n.m. supersonic missile could probably be available for employment by heavy bombers. Each of these missile types could employ nuclear warheads. *(Paras. 71–74)*

Surface-to-Surface Ballistic Missiles (up to 350 n.m. range)

10. There is considerable evidence of Soviet development of short-range surface-to-surface missiles, and we estimate that the USSR could probably have had available for operational use in 1954 ballistic missiles with the following maximum ranges: 75 n.m., 175–200 n.m., and 350 n.m. These types could be equipped with nuclear warheads. However, the USSR would probably consider CW warheads desirable for certain specific purposes, and might employ HE in the two shorter-range types. *(Paras. 75–79, 81, Annex A)*

Surface-to-Surface Ballistic Missiles (700 n.m. and 1,600 n.m. ranges)

11. Evidence on Soviet development programs leads us to estimate that the USSR could probably have had a 700 n.m. maximum range ballistic missile available for operational use in 1956. We have firm evidence that in 1949 the USSR was interested in a 1,600 n.m. intermediate range ballistic missile (IRBM), and we believe it is a logical step in the Soviet development program. We estimate that the USSR is developing an IRBM, and that it could probably have such a missile in operation in 1959. Both these missile types would require nuclear warheads, although we do not exclude the possibility of CW use with the 700 n.m. missile for occasional special missions. We believe the USSR would rapidly acquire a considerable number of both the 700 n.m. and the 1,600 n.m. missiles. *(Paras. 80, 82, Annex A)*

Intercontinental Ballistic Missiles (ICBM: 5,500 n.m. range)

12. We have no direct evidence that the USSR is developing an ICBM, but we believe its development has probably been a high priority goal of the Soviet ballistic missile program. We estimate that the USSR could probably have a 5,500 n.m. ICBM ready for operational use in 1960–1961.[3] We believe that the

[3] Date predicated on first operational unit being equipped with prototype missiles.

4. *(Continued)*

USSR will seek to acquire a considerable number of ICBM's with nuclear warheads as rapidly as possible. *(Para. 84, Annex A)*

Submarine-Launched Surface-to-Surface Missiles

13. We believe the USSR would probably have developed cruise-type missiles initially, and there is some evidence pointing to the existence of Soviet submarines equipped to carry such missiles. The USSR could probably have had in operation in 1955 a subsonic turbojet missile capable of a maximum range of 500 n.m., and a supersonic missile capable of this range could probably be in operation in 1957. A supersonic cruise-type missile capable of ranges up to 1,000 n.m. could probably be operational in 1962. These missile types would require nuclear warheads. With a vigorous program, the USSR might achieve an operational submarine-launched IRBM system sometime during the period 1964–1966. *(Paras. 83, 85–89, Annex A)*

Earth Satellite

14. The USSR will probably make a major effort to be the first country to orbit an earth satellite. We believe that the USSR has the capability of orbiting, in 1957, a satellite vehicle which could acquire scientific information and data of limited military value. A satellite vehicle possessing substantial reconnaissance capabilities of military value could probably be orbited in the period 1963–1965. *(Paras. 90–91)*

DISCUSSION

I. SOVIET MILITARY REQUIREMENTS FOR GUIDED MISSILES

15. The Soviet guided missile program necessarily operates within the framework of current and future military requirements laid down by Soviet defense planners. While we have no direct evidence on the elements of this framework as it applies to missiles, we believe it would logically have been based on: (a) an appreciation of the USSR's present and probable future strategic and tactical situations; (b) an estimate of the types of attack that could be launched against the USSR in the foreseeable future; (c) operational requirements for which missile systems could be employed to replace or augment other weapons systems; and, finally, (d) an evaluation of the probable effectiveness of missiles *versus* other weapons systems to perform required missions.

16. The USSR has almost certainly been assisted in determining the scope and priorities of its missile programs by information on Western, including US, military programs. This information is probably complete enough to enable the USSR to judge approximately the time phases in the develoment, effectiveness, size, and composition of US and Allied offensive and defensive forces. Specifically, the Soviet leaders can probably judge such factors as the general size of nuclear stockpiles, the weapons systems into which nuclear warheads have been incorporated, the general progress of air defense programs, and the general characteristics and availability dates of offensive and defensive missiles.

Strategic and Tactical Considerations

17. Certain considerations which have played a role in Soviet military thinking in recent years make it plausible that the USSR should have given a high priority to the development of missiles. The Soviet leaders have heavily emphasized the development of their nuclear capability, and probably also believe that mis-

5. SNIE 11-10-57 *The Soviet ICBM Program*

~~TOP SECRET~~

~~CONFIDENTIAL~~

THE SOVIET ICBM PROGRAM

THE PROBLEM

To estimate the probable development timetable and characteristics of the Soviet intercontinental ballistic missile (ICBM), including the probable date of first operational capability, and to examine the factors likely to affect Soviet acquisition of a substantial nuclear delivery capability with the ICBM weapon system.[1]

CONCLUSIONS

1. ICBM development has an extremely high priority in the USSR, if indeed it is not presently on a "crash" basis. We believe that the USSR will seek to acquire a substantial ICBM capability as rapidly as possible.

2. We believe the USSR is concentrating on the development of an ICBM which, when operational, will probably be capable of carrying a high-yield nuclear warhead to a maximum range of about 5,500 nautical miles, with a CEP of five nautical miles or less at maximum range, and a system reliability of about 50 percent. The Assistant Chief of Staff, Intelligence, Department of the Army, believes that the USSR will adopt initially an operational ICBM of at least 3,800–4,500 nautical miles maximum range, and that it will further develop this weapon to the longer-range system indicated above.

3. The date at which the USSR will have a first operational capability with the ICBM will depend on many factors, apart from the over-all urgency of the program. These factors include the extent of technical success in missile testing and the availability of launching facilities, supporting equipment, and trained personnel to operate the system. We estimate that some time during the period mid-1958 to mid-1959, the USSR will probably have a first operational capability with up to 10 prototype ICBMs, with characteristics approximating those estimated in the first sentence of Conclusion 2.[2]

[1] For purposes of this estimate, a "first operational capability" is arbitrarily defined as a total of 10 prototype ICBMs in the hands of trained units at completed launching sites; a "substantial operational capability" is arbitrarily defined as a total of 500 ICBMs in the hands of trained units at completed launching sites.

[2] In the belief of the Assistant Chief of Staff, Intelligence, Department of the Army, this initial operational capability will be with an ICBM of at least 3,800–4,500 nautical miles maximum range.

5. *(Continued)*

~~TOP SECRET~~

4. ICBMs could probably be produced, launching facilities completed, and operational units trained at a rate sufficient to give the USSR an operational capability with 100 ICBMs about one year after its first operational capability date, and with 500 ICBMs about two or at most three years after first operational capability date.

~~TOP SECRET~~

6. NIE 11-5-58 *Soviet Capabilities in Guided Missiles and Space Vehicles*

~~TOP SECRET~~

SOVIET CAPABILITIES IN GUIDED MISSILES AND SPACE VEHICLES[1]

THE PROBLEM

To estimate Soviet capabilities and probable programs for the development of guided missiles and space vehicles, including earth satellites, through 1966,[2] and to analyze factors affecting Soviet operational capabilities in these fields.

FOREWORD

This estimate supersedes NIE 11-5-57, SOVIET CAPABILITIES AND PROBABLE PROGRAMS IN THE GUIDED MISSILE FIELD, 12 March 1957, and SNIE 11-10-57, THE SOVIET ICBM PROGRAM, 10 December 1957, as well as those paragraphs dealing with guided missiles (paras. 108 through 114) in NIE 11-4-57, MAIN TRENDS IN SOVIET CAPABILITIES AND POLICIES, 1957-1962, 12 November 1957. The new estimate, like its predecessors, is made in the light of our previous judgments that the USSR does not now intend to initiate general war deliberately and is not now preparing for general war as of any particular future date. It also assumes that through 1966 there will be no international agreements on the control of armaments or of outer space.

The estimate is intended primarily to reassess and update our estimates of probable Soviet missile development programs, missile characteristics, and first operational capability dates. Some discussion is provided on factors likely to affect Soviet acquisition of substantial operational capabilities with missile systems, and Soviet capabilities to place various arbitrarily-selected quantities of ICBMs in operational use are estimated. The reader is cautioned that Annex A of NIE 11-5-57 is no longer applicable.

For the most part, changes in estimated missile characteristics and first operational capability dates result from the accumulation over the past year of a considerable body of new evidence. Of the 13 missile systems estimated as probably available for operational use in 1958 or earlier, we now have direct evidence on the existence of nine; we also have direct evidence on Soviet development of an ICBM.

[1] ~~The title of this estimate, when used separately from the text, is classified CONFIDENTIAL.~~

[2] For comparability with earlier estimates on this subject, the terminal date chosen for this estimate is the same as that of its predecessor, NIE 11-5-57, SOVIET CAPABILITIES AND PROBABLE PROGRAMS IN THE GUIDED MISSILE FIELD, 12 March 1957.

6. *(Continued)*

For some of these systems the evidence is extensive, while for others we have only limited information relative to characteristics and components. Serious intelligence gaps remain, particularly with respect to the operational status of various systems. Furthermore, we do not have sufficient evidence available on which to base an estimate of the vulnerability of Soviet systems to specific electronic countermeasures.

In making this estimate in a field where positive intelligence remains limited, we have considered the available evidence in the light of estimated Soviet military requirements, known and estimated Soviet capabilities in related fields, and US guided missile experience. The entire study rests upon our belief, now well-supported by evidence, that a concerted and continuous Soviet research and development effort in guided missiles was underway by 1948.

For guided missiles, except where noted otherwise, the operational capability dates given are the earliest years during which we believe missiles could probably have been placed in the hands of trained personnel in one operational unit, thus constituting a limited capability for operational employment. We estimate that when they first become operational, the missile systems discussed herein will have a system reliability of 40–60 percent, and that improvement will occur thereafter.[3] For space flight activities, the dates given are the earliest *possible* time periods by which we believe each specific accomplishment could be achieved.

SUMMARY AND CONCLUSIONS

1. The USSR has continued to press ahead with its extensive guided missile research and development, generally along the lines indicated in our previous estimates. As a result of this effort, the USSR now has available for operational use a variety of missile systems. Soviet achievements in ballistic missiles have been especially impressive and have contributed to early successes in the USSR's space flight program. Substantial success in developing surface-to-air missile systems has also been achieved. Available evidence is not sufficient to indicate equal emphasis and similar success in other Soviet missile programs.

2. By itself, each of the guided missile or space programs estimated as a future development appears feasible both as to technical achievability and date attainable. However, some programs may be slowed or even halted by the competition of other missile or non-missile delivery systems, unforeseen development or production difficulties, rapidity of obsolescence, changing military requirements, and/or broad considerations of Soviet national policy. On the other hand, a significant advance in one or more of the programs might be possible if a scientific breakthrough is achieved.

3. *Surface-to-surface missiles.* We believe that the Soviet ballistic missile development program has emphasized reliability and simplicity, rather than minia-

[3] The term "system reliability" is here defined as the percentage of missiles which function according to specifications from missile launching to detonation in the target area, excluding malfunctions prior to launching.

6. *(Continued)*

turization or extreme refinement of design. System mobility appears to have been a basic consideration since the early developmental stages. In developing longer-range systems, maximum use has been made of proven components.

4. Since 1954 the USSR has probably had available for operational use ballistic missiles with maximum ranges of about 100 nautical miles (n.m.), 200 n.m. and 350 n.m. We believe that, depending upon various operational factors, nuclear, high explosive (HE) or chemical (CW) warheads would be used with these missiles.[*] In addition, the USSR probably now has operational a very short range anti-tank missile equipped with shaped-charge HE warhead.

5. An extensive Soviet program to develop a 700 n.m. ballistic missile is indicated by a long series of test firings, averaging about two per month since 1955. We estimate that this missile probably became operational in 1956. On the basis of about a dozen test firings over the past year, we estimate that the USSR will also probably have operational in 1958 a modification of the 700 n.m. missile, capable of an 1,100 n.m. range. Nuclear warheads would almost certainly be used in both these missiles, although we do not exclude the possibility of CW use in the 700 n.m. missile.

6. *Intercontinental ballistic missile (ICBM).* Since August 1957, the USSR has test fired at least four and possibly six missiles to a distance of approximately 3,500 nautical miles. We believe this represents the development of an ICBM system which, when first operational, will probably be capable of delivering a nuclear payload to a maximum range of about 5,500 n.m., with an accuracy (CEP) of 5 n.m. and a system reliability of about 50 percent. By the early 1960's reliability will probably be considerably improved. At the beginning of the period 1962–1966, the CEP could be about 3 n.m., and could be reduced to about 2 n.m. later in the period.

7. Available evidence is inconclusive as to the designed payload-carrying capacity of the Soviet ICBM, which we have previously estimated as about 2,000 pounds. Recent evidence and re-analysis may indicate that the USSR is developing an ICBM with a 5,000 pound payload. Serious logistical and operational problems are associated with missiles of the sizes necessary to deliver 2,000 or 5,000 pounds to a range of 5,500 n.m.; these problems would be greater in the case of the heavier payload. In the light of this consideration, we estimate that the Soviet ICBM is designed to carry a nuclear payload of about 2,000 pounds, although there is a possibility that it is designed to carry about 5,000 pounds.

8. The USSR will probably have a first operational capability with ten prototype ICBMs at some time during calendar 1959; the possibility should not be disregarded, however, that in the latter part of 1958 the USSR may establish an ICBM capability with missiles comparatively unproven as to accuracy and reliability.

9. We believe that Soviet planners intend to achieve a sizeable ICBM operational capability at the earliest practicable date, although we have no direct evidence on

[*] Estimated nuclear warhead capabilities for these and other missiles discussed in this estimate are given in Annex C (limited distribution under separate cover).

6. *(Continued)*

Soviet preparations for ICBM production and deployment. We estimate that the USSR has the technical and industrial capability to produce ICBMs, complete launching facilities, establish logistic lines and train troops at a rate sufficient to have an operational capability with 100 ICBMs [5] about one year after its first operational capability date (i.e. some time in 1960), and with 500 ICBMs [5] two or at most three years after first operational capability date (i.e. some time in 1961, or at the latest in 1962). This implies that the USSR could achieve an operational capability with ten or more, but less than 100 ICBMs by the end of 1959, depending upon when during the calendar year the first operational capability is achieved.

10. *Surface-to-air-missiles.* For several years the USSR has had in operational use a fixed surface-to-air system which we believe is now capable of employment against aircraft at ranges up to 20–30 n.m., with greatest effectiveness at altitudes of 30,000 to 60,000 feet. This system is known to be employed in a dense and costly complex of 56 sites around Moscow; targets of lesser importance will probably be provided with considerably less elaborate surface-to-air missile defenses. We believe the Soviets also have available for operational use a surface-to-air missile with similar characteristics, except for improved capability to intercept small, supersonic targets. It is probably suitable for employment either with the Moscow system or with a semi-mobile system.

[5] These numbers are selected arbitrarily in order to provide some measure of the Soviet capacity to produce and deploy ICBMs; they do *not* represent an estimate of probable Soviet requirements or stockpiles.

11. Neither of the above systems is likely to be effective against very low altitude attack. We therefore estimate that the USSR is developing and will probably have in operation in 1959–1960 a surface-to-air system with a maximum range of about 15 n.m., effective at altitudes from 50 feet to at least 40,000 feet. We estimate that for improved defense of critical areas, the USSR will probably have available in 1960–1961 a surface-to-air system with effectiveness at altitudes up to 90,000 feet and a maximum range of 75–100 n.m.

12. We estimate that in 1963–1966 the Soviets will probably achieve a first operational capability with a surface-to-air system of limited effectiveness against ICBMs. Such a system could possibly have some effectiveness against IRBMs. A surface-to-air system with limited capability to counter reconnaissance satellites could and possibly will be developed for use in 1960–1964; a more sophisticated system could be integrated with an anti-ballistic missile system at a later date.

13. *Air-to-air missiles.* Three short-range systems which employ HE warheads are now estimated as operational. Two are believed to have radar guidance with ranges of 5–6 n.m.; the other, with a range of up to 2½ n.m., is believed to use infrared guidance. Most currently operational Soviet fighter aircraft types could be modified to employ these missiles. In 1960 the USSR will probably have available a 15–20 n.m. air-to-air missile.

14. *Air-to-surface missiles.* The present operational system is capable of carrying a nuclear or HE warhead at subsonic speed to a range of about 55 n.m. against well-defined targets, such as ships. With dif-

6. *(Continued)*

ferent guidance, the system could be employed against land targets. We estimate that the USSR is probably developing and may now have operational an air-launched decoy to simulate medium or heavy bombers. We believe that the USSR will probably develop and have operational in 1960–1961 a supersonic missile with improved guidance and a range of at least 100 n.m., suitable for employment against a wide variety of targets.

15. *Naval-launched missiles.* The Soviet navy probably now has the capability to launch subsonic cruise-type missiles from a few converted submarines of conventional design, although there is little direct evidence of submarine-launched missile development in the USSR. We estimate that the current system could deliver nuclear warheads against land targets within about 200 n.m. of the launching submarine. These cruise-type missiles could be launched by a submarine only after surfacing. We believe, however, that in 1961–1963 the USSR will probably have a submarine-launched ballistic missile system available for first operational use in a prototype submarine of new design. This system will probably be capable of delivering a nuclear warhead from a submerged submarine to a range of about 1,000 n.m.

16. We estimate that during 1959–1960 the USSR will begin equipping its surface fleet with surface-to-air missiles having a maximum range of 20 n.m., with effectiveness at altitudes from 50 feet to at least 40,000 feet. A Soviet shipborne surface-to-air system for use against targets at higher altitudes and longer ranges will probably become available in 1960–1961. These systems, while primarily for air defense, could be modified for employment against surface targets. Late in the period of this estimate, the USSR will probably also have available a missile system for use in anti-submarine warfare.

17. *Soviet space programs.* We believe that the ultimate foreseeable objective of the Soviet space program is the attainment of manned interplanetary travel. The program is supported by extensive Soviet research efforts in a number of related fields, including rocket propulsion, electronics, space medicine, astrobiology, astrophysics and geophysics. Present activities appear to be directed toward the collection of scientific data and experience applicable to future space accomplishments, the ICBM program, and basic scientific research. Soviet requirements for space vehicles have probably been established for fairly specific scientific and/or military purposes in accordance with a planned step-by-step progression.

18. Soviet success in ballistic missile development and earth satellite launchings to date leads us to estimate a considerable Soviet capability for early accomplishments in space including: surveillance satellites, recoverable aeromedical satellites, lunar probes and impacts, lunar satellites and planetary probes to Mars and Venus (1958–1959); "soft landings" by lunar rockets and recoverable manned earth satellites (1959–1960); a manned glide-type high altitude research vehicle (1960–1961); heavy earth satellites and manned circumlunar flights (1961–1962); and manned lunar landings (after 1965). While each individual achievement appears feasible as to technical capability and earliest date attainable, we doubt that the USSR can accomplish all of these space flight activities within the time periods specified.

6. *(Continued)*

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6

SIMPLIFIED TABULAR SUMMARY [1]

Probable Soviet Guided Missile Development Program

Arbitrary Designation	Operational Date	Maximum Range	Payload Weight and Type	Design Altitude
Ground-Launched Ballistic Missiles				
SS-1 *	1954	100 n.m.	1,500 lbs. Nuclear, HE, CW	———
SS-2 *	1954	200 n.m.	2,000 lbs. Nuclear, HE, CW	———
SS-3 *	1954	350 n.m.	Up to 5,000-6,000 lbs. Nuclear, HE, CW	———
SS-4 *	1956	700 n.m.	Up to 5,000-6,000 lbs. Nuclear, poss. CW	———
SS-5 *	1958	1,100 n.m.	Up to 3,000 lbs. Nuclear	———
SS-6 ICBM *	1959	5,500 n.m.	2,000 lbs., poss. 5,000 lbs. Nuclear	———
Ground-Launched Anti-Tank Missile				
SS-a. t.	prior to 1958	6,000 yards	20-40 lbs. HE	———
Submarine-Launched Missiles				
SS-7 cruise-type	1955-56	200 n.m.	2,000 lbs. Nuclear	———
SS-8 ballistic	1961-63	1,000 n.m.	1,000 lbs. Nuclear	———
Ground-Launched Surface-to-Air Missiles				
SA-1 *	1954	20-30 n.m.	500-800 lbs.[2]	30,000-60,000 ft.
SA-2 *	1957	15-30 n.m.	500-700 lbs.[2]	20,000-60,000 ft.
SA-3	1959-60	15 n.m.	150-250 lbs.[2]	50 ft.-40,000 ft.
SA-4	1960-61	75-100 n.m.	500 lbs.[2]	Up to 90,000 ft.
SA-5	1963-66	limited effectiveness against ICBMs		
Shipborne Surface-to-Air Missiles				
SA-6	1959-60	20 n.m.	150-250 lbs.[2]	50 ft.-40,000 ft.
SA-7	1960-61	75-100 n.m.	500 lbs.[2]	Up to 90,000 ft.
Air-to-Air Missiles				
AA-1 *	1955-56	5 n.m.	70 lbs. HE	———
AA-2	1955-56	2½ n.m.	25 lbs. HE	———
AA-3	1958	6 n.m.	50 lbs. HE	———
AA-4	1960	15-20 n.m.	150 lbs.[2]	———
Air-to-Surface Missiles				
AS-1 *	1956-57	55 n.m.	3,000 lbs. Nuclear, HE	———
AS-2	1960-61	100 n.m.	3,000 lbs. Nuclear	———

[1] Detailed summaries of each missile category, including all estimated characteristics and other pertinent data, are presented in Tables 1-5 in Annex A. A summary of estimated Soviet capabilities in space flight is presented in Table 6.

[2] Nuclear warheads would increase the kill probabilities achievable with these missiles and will be required for effective use of the missiles under some conditions. However, HE warheads will be effective in most applications.

* Those missile types for which our estimates are supported by significant current intelligence are indicated by an asterisk following the missile designation.

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7. NIE 11-8-59 *Soviet Capabilities for Strategic Attack Through Mid-1964*

~~TOP SECRET~~

TABLE OF CONTENTS

~~TOP SECRET~~

7. *(Continued)*

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SOVIET CAPABILITIES FOR STRATEGIC ATTACK THROUGH MID-1964

THE PROBLEM

To estimate probable trends in the strength and deployment of Soviet long-range air and missile weapons systems suitable for strategic attack, through mid-1964.[1]

FOREWORD

The critical feature of this estimate is our judgment with respect to the force goals of the existing Soviet ICBM program. This judgment is based in part on calculations regarding Soviet ICBM requirements for various defined strategic purposes. These calculations are especially sensitive to possible differences between our assumptions and those actually made by Soviet planners with respect to two important factors:

a. The probable future performance characteristics of the improving Soviet ICBM.

b. The probable future development of the US nuclear retaliatory force.

We have assumed for the Soviet ICBM the performance characteristics estimated for it at various dates in NIE 11-5-59, "Soviet Capabilities in Guided Missiles and Space Vehicles," dated 3 November 1959, and in the USIB "Memorandum to Holders of NIE 11-5-59" dated 19 January 1960. Soviet planners may expect a better performance, in which case their estimates of the numbers required would be lower than ours. However, we would expect them to use conservative assumptions in making so vital a calculation.

With respect to Soviet targeting, we have assumed that existing approved US military programs will be carried out. Explicit information on these programs is presumably not available to Soviet planners, but we believe that they have

[1] "Strategic attack" as used herein is defined as nuclear attack against retaliatory forces and key war-making strengths in North America, as well as US and Allied retaliatory forces at sea and in overseas areas. The weapons systems primarily considered are heavy and medium bombers assigned to Long Range Aviation, related air-to-surface missiles, ground-launched missiles with maximum ranges of 700 nautical miles or more, and submarine-launched missiles. It is recognized that other delivery systems are available for use against targets at sea and overseas.

7. *(Continued)*

enough general information from open sources to be able to estimate them with fair accuracy. These US programs are, of course, subject to change—as is the Soviet ICBM program also. The present Soviet ICBM program, however, must be based on the present Soviet estimate of the probable future development of the target system.

It is beyond the scope of this estimate to consider what political or military courses of action the USSR might adopt if the development of its strategic attack capabilities were to be as estimated herein. Such matters will be considered in the forthcoming NIE 11-4-59, "Main Trends in Soviet Capabilities and Policies, 1959–1964."

CONCLUSIONS

1. The Soviet rulers probably regard their present strategic attack forces as capable of devastating US and Allied concentrations of population and industry, but incapable of preventing, by military action, the nuclear devastation of the USSR. (Para. 36)

2. The ICBM presents the best prospects of being able to deliver a heavy weight of attack within the least time after a decision to attack, and thereby to prevent the launching or reduce the weight of a US strategic attack on the USSR. Hence, we believe that the future development of Soviet intercontinental attack capabilities will be primarily a function of the development, production, and deployment of ICBMs. Soviet ICBM capabilities will be supplemented by the development of a submarine-launched missile capability and by the maintenance of a substantial long range bomber capability. (Paras. 40–43)

3. Our analysis leads us to believe that, if the US military posture develops as presently planned, the USSR will in 1961 have its most favorable opportunity to gain a decided military, political, and psychological advantage over the US by the rapid deployment of operational ICBMs. Even at that time, however, the proportion of US retaliatory forces which the Soviets could expect to destroy in a missile attack would depend not only on the number of missiles employed and their performance characteristics, but also, and critically, upon the degree of surprise attainable and upon the precision with which the initial salvo could be timed. Even if surprise were complete and timing perfect the USSR would have to expect retaliation from such US bombers as might be on airborne alert at the time of attack, from at least some of the US aircraft carriers and missile-launching submarines then at sea, and from any other US retaliatory forces that survived the initial salvo. After 1961 the numbers of semihardened and hardened US ICBM sites programmed to become operational would require a steep increase in the number of Soviet ICBMs to achieve comparable objectives against US retaliatory forces. (Paras. 45–52)

4. From an economic point of view the main determinant of the Soviet ICBM program is not so much the availability of resources, as the physical difficulty of rapidly building up production of missiles and particularly of launching facilities during the first year or two after IOC, and of training in a comparatively short time the personnel required to maintain and operate a large number of missiles. These difficulties set practical limits to the Soviet ICBM program. (Paras. 56–58)

5. Every present indication suggests that the Soviet ICBM program, while not a crash program, is designed to provide a substantial ICBM capability at an early date. The goal of the program is probably an ICBM force as large as Soviet planners deem necessary to provide a substantial deterrent and preemptive attack capability. In our view, this

7. *(Continued)*

would be consistent with the present deliberate and orderly tempo of the Soviet ICBM test-firing program, with current Soviet military doctrine, and with the USSR's observed policy of maintaining a balance among military capabilities designed to accomplish various missions.[2] (Para. 55)

6. We conclude that the probable Soviet ICBM program would provide on the order of 140–200 ICBMs on launcher in mid-1961. Within this range, the Assistant Chief for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations for Intelligence, Department of the Navy, estimate that the Soviet program is likely to be toward the low side. The Director of Intelligence and Research, Department of State, the Assistant Chief of Staff, Intelligence, USAF, and the Director for Intelligence, The Joint Staff, believing that Soviet planners would regard the advantages to be gained as justifying additional effort, estimate that the number of Soviet ICBMs on launcher is likely to be towards the high side of the 140–200 range. (Para. 61)

7. The military capabilities which the Soviets would acquire with this missile force would depend to a great degree upon the performance characteristics of the missile. By the end of 1960, however, the estimated Soviet ICBM force will constitute a grave threat to the principal US metropolitan areas, and will thus represent a powerful political and psychological weapon in international relationships. By 1961 it will present an extremely dangerous threat to SAC bomber bases, unhardened ICBM sites and command installations, although the degree of assurance the Soviets would have of being able to destroy US retaliatory forces would vary considerably depending on the performance characteristics of their ICBMs, and in any case would be subject to the qualifications in paragraph 3. (Para. 62)

8. The development of the Soviet ICBM force beyond 1961 would be likely to be affected by such considerations as the actual development of the target system to be attacked, the prospects for a greatly improved Soviet ICBM, and the prospects (on both sides) for an effective anti-ICBM, as well as by the general development of the world situation and of relations between the US and the USSR. Any figures for future years should be reviewed in the light of such considerations and of evidence on the actual progress of the Soviet ICBM program. Projecting our estimates of the present ICBM program (and assuming that if the USSR has approximately 200 ICBMs on launcher in mid-1961 production would substantially level off in the sub-

[2] The Assistant Chief of Staff, Intelligence, USAF, does not concur in the second sentence of paragraph 5. He does not believe that Soviet behavior, as we have observed it, warrants the judgment that their objectives would be satisfied by attainment of only substantial deterrence and pre-emptive attack capability. Rather, he believes that the Soviet rulers are endeavoring to attain at the earliest practicable date a military superiority over the United States which they would consider to be so decisive as to enable them either to force their will on the United States through threat of destruction, or to launch such devastating attacks against the United States that, at the cost of acceptable levels of damage to themselves, the United States as a world power would cease to exist. He further believes that such an objective could be attained by the development of their overall military capabilities which would include an operational ICBM force of about 250 (185 on launcher) by mid-1961, 500 (385 on launcher) by mid-1962, and 800 (640 on launcher) by mid-1963. It is generally agreed that the Soviets have both the technical and industrial capability to produce such a force; the physical difficulties thereby entailed will almost certainly not be the limiting factor.

It is the view of the Assistant Chief of Staff, Intelligence, USAF, that, while Soviet planners will undoubtedly feel that they will have attained a capacity for substantial deterrence and pre-emptive attack by mid-1962 or earlier, the real objective of the Soviet ICBM program is "decisive military superiority." He believes that the Soviets would not be content with conceptual levels of deterrence; they would realize the possibility of error in their own calculations and acknowledge the possibility of Western preemption of their deterrent capabilities. This latter contingency would weigh the more heavily if the Soviet leaders intended, as he believes likely, to exploit their capabilities in political offensives. In this event, their estimate of the likelihood of Western "desperate" acts would induce them to attempt attainment of total deterrence, i.e., "decisive military superiority."

7. *(Continued)*

sequent two years) the most likely number of Soviet ICBMs on launcher in mid-1962 would be 250–350 and in mid-1963 would be 350–450.[3] (Para. 63)

9. The USSR will have no serious difficulty in meeting its estimated requirements for 700 n.m. and 1,100 n.m. ballistic missiles. (Paras. 64–67)

10. On the basis of the foregoing conclusions, our numerical estimates of Soviet medium and heavy bombers in Long Range Aviation units, long and medium-range ballistic missiles, and missile-launching submarines are as shown in the following table: [4] [5]

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
Bombers					
Heavy	135	150	140	130	120
Medium	1,100	1,050	1,000	900	800
Missiles					
700 n.m.					
In Inventory	250	350	450	450	450
On Launcher	110	150	150	150	150
1,100 n.m.					
In Inventory	80	160	240	300	300
On Launcher	50	100	100	100	100
ICBM					
In Inventory	50	175–270	325–450	450–560	*
On Launcher	35	140–200	250–350	350–450	*

[3] The Assistant Chief of Staff, Intelligence, USAF, does not concur in this sentence. See his footnote to paragraph 5, above.

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
Submarines					
"Z" class [6]	4	4	4	4	4
"G" class [7]	9	15	18	18	18
Nuclear [8]	..	2	6	10	14

[4] Not estimated beyond 1963.

[5] Not estimated beyond 1963.

[6] Each "Z" class submarine would probably carry two missiles.

[7] Each "G" class submarine would probably carry about five missiles.

[8] The associated missile may not become available until 1963, in which case the missile used in the "G" class might be used in this submarine. Each submarine would probably carry 6–12.

DISSENTING VIEWS

[9] The Assistant Chief of Staff, Intelligence, USAF, does not concur in the numbers of heavy bombers and ICBMs estimated, believing they should be:

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
Heavy bombers	135	150	175	200	200
ICBM					
In Inventory	50	250	500	800	
On Launcher	35	185	385	640	

[10] The Assistant Chief of Staff for Intelligence, Department of the Army, does not concur in the numbers of heavy bombers estimated. In his view, future Soviet heavy bomber strength will approximate the following:

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
Heavy bombers	125	115	100	75	75

7. *(Continued)*

DISCUSSION

I. INTRODUCTION

11. Soviet decisions regarding the development of strategic attack capabilities are taken in the context of Soviet (not US) political and strategic concepts. Although we lack direct intelligence of Soviet intentions and programs for the future development of strategic attack forces, the conceptual context in which such plans are formed is generally well known.

12. Ruling circles in the USSR regard the world situation as one of constant, unremitting struggle between Communist and anti-Communist forces. Their faith requires them to prosecute the struggle by every expedient means. They believe that the courses of action which may be appropriate at any given time can be determined with scientific accuracy by Marxist calculation of the everchanging "relation of forces." They recognize, of course, the possibility of error through un-Marxist analysis of the situation. "Left deviation," or "adventurism," is the underestimation of opposing forces (or overestimation of Communist forces) which leads to the incurrence of unwarranted risks. "Right deviation," or "opportunism," is the reverse, which results in failure to take maximum practicable advantage of enemy vulnerabilities. Either deviation is not only a mistake, but a sin.

13. Military force is only one factor in the complex "relation of forces" to be calculated. Marxist analysis does not admit of the sharp distinction between military and political affairs which has been characteristic of much Western civil and military thought. Its central concept is power, and power includes, in addition to the military factor, political, psychological and economic elements, which are understood to be mutually reinforcing. Thus military forces are valued for psychological and political as well as strictly military potentialities.

14. The calculation of their military requirements in the context of the total relation of forces has led the Soviet rulers to maintain, at considerable economic cost, large and diversified forces. Strategic attack forces are only one element in this total military requirement, and, up to the present at least, have been allocated a comparatively small proportion of total Soviet military expenditures.

15. In the present world relation of forces, the Soviet rulers almost certainly calculate that the only military contingency they have to fear would be a massive US nuclear attack on the USSR. They would regard the provocation of such an attack as wildly "adventuristic." Consequently, they are deterred from pursuing courses of action which, in their estimation, involve serious risk of producing that result. But they evidently consider that the US is in large measure deterred from delivering such an attack. They attribute this deterrence to psychological and political as well as military factors in the total relation of forces. Moreover, from the Soviet point of view, mutual deterrence from nuclear strategic attack is not a stalemate, but an opportunity to press more vigorously psychological, economic, and political forms of attack, and possibly even to engage in some limited forms of military action.

16. The Soviet rulers, however, are not content to maintain the present relation of Soviet to US military power. They are bound to endeavor to change this relationship to their advantage. In their estimation, the greater their relative military strength, the greater will be their political opportunities, without actual recourse to general war. They would consider themselves guilty of "right deviationism" if, with the advent of intercontinental ballistic missiles, they did not attempt to achieve a military advantage over the US. From their point of view, it would be desirable to attain a superiority so decisive as to enable them either to dictate terms to the US or, if necessary, to attack the US without receiving unacceptable damage in return. At the same time, however, they must exercise care to avoid provoking a US preventive attack.

7. *(Continued)*

17. Even if a "decisive military superiority" should prove unattainable, Soviet conceptions of security requirements call for provision against the contingency of nuclear war resulting from accident, or miscalculation, or US desperation. In the Soviet view, the more successful the USSR may be in pressing its political and psychological attack, the more acute the danger of a desperate US military reaction may become. Consequently, the security of the Soviet state and society requires a capability to destroy the US nuclear attack forces prior to launch—or at least the capability to reduce the weight of such an attack to the maximum feasible extent by a combination of offensive and defensive measures. In this connection, Soviet military literature has developed a concept of pre-emptive attack—that is, an attack with immediately available forces designed to seize the strategic initiative from an enemy who is himself preparing imminently to attack.[6]

II. THE DEVELOPMENT OF SOVIET STRATEGIC ATTACK CAPABILITIES TO DATE

18. During World War II the USSR did not develop an effective long range attack capability. Nevertheless, the USSR was quick to perceive the strategic significance of nuclear weapons, long range bombers (the B–29), and ballistic missiles (the V–2), toward the close of the war. It immediately launched urgent programs to achieve for itself capabilities in these fields. Of necessity, its initial efforts were directed toward the achievement of strategic dominance in Eurasia. As the only feasible military counter to US strategic attack capabilities at that time, it also devoted a major effort to the development of air defense. From the first, however, the USSR almost certainly had the objective of developing an effective strategic attack capability against the continental US.

[6] This concept is distinguished from preventive attack—that is, an attack deliberately planned, prepared, and initiated for the purpose of destroying an enemy's attack capabilities before they have been fully developed.

Long Range Aviation

19. In 1946 the USSR established Long Range Aviation as an independent operational command directly subordinate to the Ministry of Defense. The BULL piston medium bomber, a copy of the US B–29, was produced for the equipment of this force. The BULL, however, can have been regarded only as a convenient means of meeting an urgent interim requirement. Even while the buildup of BULL strength was in progress, the BADGER jet medium bomber was under urgent development. It went into large-scale production in 1954. The transition from BULLs to BADGERs in operational units proceeded steadily thereafter, in accordance with a smooth and orderly program. BULL strength was substantially maintained for several years, however, while the BADGER buildup was in progress. This overlap appears to reflect a desire to retain an established capability until an improved capability designed to supersede it had also become well established. As a result, Long Range Aviation reached a peak strength of nearly 1,400 BULL and BADGER medium bombers in 1957–1958. Since then BULLs have been phased out more rapidly: the mid-1959 medium bomber strength of Long Range Aviation is estimated to have been 225 BULLs and 1,050 BADGERs. The production of BADGERs has now ceased. Thus, when the last BULL has been phased out of Long Range Aviation in 1960, the net result will be the replacement of BULLs by BADGERs on virtually a one-for-one basis.

20. These medium bombers are best suited for operations in and near Eurasia. They are capable of reaching targets in the US if need be, but with few exceptions only on one-way missions.[7] For a more satisfactory capability against the US, the USSR required a heavy bomber. To meet this requirement, the BEAR turboprop and BISON jet heavy bombers were developed concurrently with each other and with the BADGER. There are indications that large-scale production of heavy bombers

[7] For a graphic presentation of possible target coverage by particular bomber types from forward staging bases, with and without refueling, see Annex E.

7. *(Continued)*

was intended. However, BEAR production ceased after the completion of about 60 aircraft. Cumulative BISON production reached about 115 in mid-1959. It has been marked by numerous modifications of the aircraft and by low and fluctuating production rates. During the fall of 1959, the rate of production appears to have been one or two a month.

21. Some of the delays in BISON production were manifestly due to deficiencies discovered in the aircraft, but we believe that there has also been a Soviet change of mind about the heavy bomber program. Disappointment in the performance of the BEAR and BISON, consideration of concurrent and prospective improvements in the air defense of North America, and growing confidence in the development of an effective Soviet ICBM appear to have resulted in a Soviet decision to forego the rapid buildup of a heavy bomber force. Soviet heavy bomber strength is now about 80 BISONs and 40 BEARs in operational units.

22. The deployment of Soviet Long Range Aviation and the locations of forward staging areas in the Soviet Arctic are shown in Annex E. The estimated optimum performance characteristics of the BULL, BADGER, BISON, and BEAR are shown in Annex D.

23. The USSR has not developed a specific tanker aircraft to meet its inflight refueling requirement, but has developed such a capability through the conversion of BISON and BADGER bombers for use as tankers. All of the BISON regiments and about half of the BADGER regiments probably have this capability. The use of bombers as tankers would, of course, reduce the number available for use as bombers in any single attack.

24. Within the limitations of its bomber aircraft, Soviet Long Range Aviation is now a proficient force, although its training, basing and maintenance standards fall below those of the US Strategic Air Command. Its deployment and home base structure are adequate to support large-scale operations launched directly from these bases against Eurasian and peripheral targets. Its capabilities against the US are limited by the difficulty of staging through Arctic bases. In recent years, somewhat more realistic and larger scale training exercises have been conducted, and the scope and magnitude of Arctic operational training has increased. Electronic equipment for navigation, bombing, and ECM has been improved. Storage and loading facilities for nuclear weapons are probably now available at all home bases and some Arctic staging bases; we believe that crews have been trained in the handling, loading, and delivery of these weapons.

Naval and Tactical Aviation

25. In addition to those in Long Range Aviation, some 290 BADGERs have been assigned to Soviet Naval Aviation. These naval BADGER units are specially trained and equipped to attack naval targets: e.g., carrier task forces at sea. There are also some 120 BADGERs assigned to Soviet Tactical Aviation. In addition to medium bombers, Tactical and Naval Aviation are equipped with numerous light bombers whose range permits them to attack many targets in Eurasia and its periphery.

Air-to-Surface Missiles

26. The only Soviet air-to-surface missile now operational (AS–1) is a subsonic type with a range of 55 n.m. This missile was designed to deliver a 3,000 pound warhead against ships at sea. We estimate that about six BADGER regiments, two of them in Long Range Aviation and the remainder in Naval Aviation, are now equipped with these missiles and trained in their use. Assuming that unit holdings now average two AS–1 missiles per assigned aircraft, the present allocation to operational units would be some 350 missiles.

Ground-Launched Ballistic Missiles [8]

27. Through a well conceived program conducted with high priority since shortly after World War II, the USSR has developed

[8] For a more extensive discussion of missile characteristics and of our bases for estimation, see NIE 11–5–59, "Soviet Capabilities in Guided Missiles and Space Vehicles," dated 3 November 1959.

7. *(Continued)*

a family of short, medium, and long range surface-to-surface ballistic missiles. We estimate that a Soviet ballistic missile (SS–4) capable of delivering a 3,000 pound warhead to a maximum range of 700 n.m. with a CEP of 1–2 n.m. has been available for operational use since 1956. On the basis of available intelligence, we cannot judge the present scale of production. We have not identified any units equipped with such missiles, although there are indications that the USSR is deploying this type of weapons to East Germany. Considering the length of time available for their production and deployment in conjunction with Soviet requirements (see Section V, below), we believe that in mid-1959 the USSR probably had an operational inventory of some 150 SS–4 missiles and about 75 launchers.

28. We estimate that another ballistic missile (SS–5) capable of delivering a 3,000 pound warhead to a maximum range of 1,100 n.m. with a CEP of two n.m. became available for operational use in late 1958 or early 1959. A small number of such missiles were probably deployed by mid-1959.

29. The SS–4 is road mobile; the SS–5 may be road or rail mobile. Annex B shows the ranges of these missiles from positions near the borders of the USSR itself and of the Soviet Bloc.

30. The USSR is currently test firing an ICBM which we believe is capable of delivering a 6,000 pound warhead to a maximum range of 5,500 n.m. if employed with a heatsink nosecone.[9] Available evidence is believed adequate to gauge the general progress but not the precise timing of the Soviet program to develop an operational ICBM system. We believe, however, that for planning purposes it should be considered that Soviet achievement of an initial operational capability (IOC) with a few—say, 10—series produced ICBMs will have occurred by 1 January 1960.

[9] A reduction in warhead weight would permit an increase in range; use of an ablative nosecone would permit a heavier warhead or extended range.

31. We have no direct evidence of Soviet ICBM deployment concepts or of the intended nature of operational launching sites. In other Soviet ballistic missile systems, mobility has been stressed as a basic design consideration. The Soviet ICBM could be rail mobile, with multiple prepared launching positions consisting of little more than a concrete slab on a special spur track. Such a system would reduce vulnerability by making launching sites difficult to find and identify, and by rendering uncertain the location of the launching unit at any given time. In any case, whether the Soviet ICBM force employs fixed sites, or rail-mobility, or a combination of the two, it will be essentially dependent on the Soviet rail net.

32. In recent years there have been increasing indications of Soviet interest in developing a capability to launch guided missiles from submarines. We estimate that in a first effort, about two "W" class submarines were modified to launch, while surfaced, two subsonic cruise-type missiles (SS–7) capable of delivering a 2,000 pound warhead to a range of 150–200 n.m. with a 2–4 n.m. CEP. In a later effort, about four "Z" class submarines have been modified (by enlarging the sail) probably to launch two ballistic missiles each. These probably could not be launched while the submarine is submerged but it has not yet been determined whether the submarine would have to be fully surfaced, or only partially surfaced. We have no specific information to permit identification of missiles for this purpose, but we believe that compatible missiles may be capable of delivering a 2,000 pound warhead to a range of 200 n.m. (or less likely of 350 n.m.) with an operational CEP of 1 to 3 n.m. The most recent development is the appearance of a new class of conventionally-powered submarine—designated "G" class by US Intelligence—six of which are probably now in operation with the Fleet. Although the evidence in this case is not so convincing as in the case of the modified "Z" class, we evaluate the "G" class as probably having ballistic missile launching capabilities. Their very large sail, considerably higher and longer than that of the modified "Z" class, suggests

7. *(Continued)*

that they could each carry about five 350 n.m. missiles, although shorter or even longer range ballistic missiles are less likely possibilities. The warhead weight could be 2,000 pounds and the CEP under operational conditions 1 to 3 n.m.

Nuclear Weapons [10]

33. By an extensive series of tests begun in August 1949, the USSR has demonstrated its ability to provide high-yield nuclear weapons suited to the various delivery systems discussed in this estimate. On the basis of accuracy and payload, the ballistic and submarine-launched missiles considered will require nuclear warheads for effective employment under all but limited and special circumstances. We believe that in general the USSR will equip its ICBMs and submarine-launched missiles with warheads of the maximum yield attainable within the limits of its nuclear and missile technology. Warheads for 700 and 1,100 n.m. ballistic missiles, however, will probably be produced in a range of yields in order to provide operational flexibility, i.e., to permit selection of yield in accordance with the weapon effects desired at the time of attack.

34. We believe that nuclear bombs of high and medium yields are now the primary armament of Soviet Long Range Aviation, and that they have been provided to BADGERs of Naval and Tactical Aviation as well. Air-to-surface missiles employed against ships at sea could employ either HE or nuclear warheads of medium or low yields.

35. Considering the estimated availability of fissionable materials and the level of Soviet nuclear weapons technology, we believe that at present the USSR has sufficient nuclear weapons for a major attack by long range air and missile weapons systems, including sufficient nuclear warheads for its operational submarine launched missiles and ground-launched ballistic missiles of 700 n.m. range and greater.

[10] For a complete discussion of this subject including the yields to be expected from the bombs and warheads associated with particular delivery systems, as well as the estimated availability of fissionable materials in the USSR, see NIE 11-2-59, "The Soviet Atomic Energy Program," dated 16 June 1959 (Limited Distribution).

Soviet Evaluation of Current Capabilities

36. The Soviet rulers probably regard their current strategic attack forces as:

a. Adequate to deliver a devastating attack on US and Allied concentrations of population and industry;

b. Incapable of preventing, by military action, the nuclear devastation of the USSR.

37. From the political point of view, however, the Soviet rulers evidently consider that they have recently achieved a substantially increased deterrent against nuclear attack, and that this achievement marks a very important shift in the global "relation of forces." In their own minds (and in general world opinion) this shift is attributed primarily to their emerging capability with long range missiles, the effectiveness of which is assumed to have been demonstrated by the Sputnik and Lunik shots. Whatever their military values, the Soviets evidently regard ICBMs and medium range missiles as psychological and political weapons of first importance.

III. BROAD CONSIDERATIONS AFFECTING THE FUTURE COMPOSITION OF SOVIET STRATEGIC ATTACK FORCES

38. It is evident that the Soviet authorities do not regard increased numbers of their present bombers as the means of meeting their strategic attack requirements. The production of BEARs and BADGERs has stopped; the production of BISONs is minimal. The problem, then, is to estimate the relative extent to which the Soviets are seeking to meet these requirements through the development and production of improved bombers, of missile launching submarines, and of long range ballistic missiles.

39. As Western air defense continues to improve, time and vulnerability factors are rendering manned bombers progressively less adequate for most Soviet strategic attack missions. The improvements in Soviet bomber

7. *(Continued)*

weapons systems estimated for the next several years are not likely to alter this basic trend. An attacking bomber force could inflict appalling damage upon US concentrations of population and industry, paying to air defense the price of admission. However, because of US early warning capabilities and alert procedures, Soviet planners could not expect attacking bombers to reach US strategic attack force bases in time to prevent the launching of a large-scale nuclear retaliatory attack upon the USSR.

40. The missile-launching submarine could provide an effective means of attack on selected targets in the US. We believe that the USSR is developing such a capability and would use it in any strategic attack. The number of Soviet submarines that could be deployed in launching position off US coasts without undue risk of forfeiting strategic surprise would depend on the established pattern of their operations. At present, the number that could be so deployed is very small. It could be increased over the coming years. Soviet planning, however, does not appear to contemplate delivery of the main weight of an attack by this means.

41. Because the ICBM presents the best prospect of being able to deliver a heavy weight of attack within the least time after a decision to attack, we believe that the future development of Soviet intercontinental attack capabilities will be primarily a function of the development, production, and operational deployment of ICBMs. The initial limitations of the Soviet ICBM, in terms of reliability, accuracy, and numbers, will diminish as the weapon system is improved and as production and deployment proceed. Soviet programming of forces for strategic attack will be calculated in terms of an improving ICBM system.

42. Nevertheless, we expect the bomber strength of Long Range Aviation to remain fairly constant during the next year or two, although it will probably decline toward the end of the period. The USSR has a substantial investment in the aircraft, skilled personnel, and base structure of its present bomber force. These assets are not likely to be discarded. Observed Soviet military practice suggests that Long Range Aviation will be maintained as an effective force in being at least until an ICBM capability has become well established.

43. Even after a formidable ICBM capability has been established, the USSR will have a continuing requirement for manned bombers, though in lesser numbers. For some time to come, the bomber will be capable of delivering heavier payloads with greater accuracy than can the ICBM. It will continue to be indispensable in certain types of missions: e.g., against targets of uncertain location.

IV. INTERCONTINENTAL BALLISTIC MISSILES

44. Soviet planners would consider that any substantial Soviet ICBM capability would have important psychological and political effects, including a major deterrent effect on the US, and that these effects would increase with the size of the Soviet ICBM force. The crux of our problem is to estimate how much effort and sacrifice the USSR will make, and how rapidly, to build up its ICBM force in order to: (a) achieve a calculated military capability to destroy US nuclear retaliatory forces prior to launch, and (b) exploit its ICBM capability through political and other nonmilitary methods.

45. As an approach to this problem, we have calculated the approximate numbers of Soviet ICBMs that would be required on launcher in the USSR to give Soviet planners high assurance of being able to inflict severe damage on the bases and fixed installations associated with US nuclear retaliatory forces: SAC operational air bases, ICBM sites, naval bases, and command installations beyond the range of Soviet 1,100 n.m. missiles.[11] We have confined our analysis to the period 1960–1963, beyond which projections of Soviet ICBM characteristics and US target systems become much more uncertain.

[11] For a detailed analysis see Annex A. The estimated characteristics of the Soviet ICBM are given in Table B of that Annex.

7. *(Continued)*

46. Our analysis leads us to believe that in 1961 the USSR would have its most favorable opportunity, through a rapid deployment of operational ICBMs, to gain a decided military, political, and psychological advantage over the US. On the basis of an initial Soviet operational capability on 1 January 1960, it is highly unlikely that the USSR could deploy during 1960 a sufficient number of ICBMs to provide high assurance of being able to destroy a strategically significant proportion of the US nuclear retaliatory forces prior to launch. On the other hand, after 1961 the number of semihardened and hardened US ICBM sites programmed to become operational would result in a steep increase in Soviet requirements, despite the estimated improvement in the performance characteristics of the Soviet ICBM. Moreover, as the period advanced the US nuclear retaliatory force structure would presumably include airborne alert, increasing numbers of missile-launching submarines and possibly also some mobile intercontinental missiles, systems generally untargetable for ICBM attack. In these circumstances, a crucial question for this estimate is whether the Soviet rulers would consider it feasible to establish in 1961 an operational ICBM force which, in conjunction with other Soviet forces, would give the USSR such a military advantage as would enable it to impose its will on the US.

47. In this connection, Soviet planners would recognize that the ICBM weapon system is inherently limited to employment against targets whose precise locations are known in advance. In evaluating the strategic effect of an ICBM attack on such fixed installations, they would have to take into account the mobility of the forces based thereon and their reaction times. They would recognize that Soviet achievement of a capability to destroy air and naval bases could be considerably offset by US maintenance of sizable air and naval forces, airborne and at sea.

48. The planned fast reaction times of US nuclear retaliatory forces would require a high initial salvo capability in any ICBM force designed to be able to attack them prior to launch. For this reason, we assume that the USSR would provide launchers to accommodate approximately 75 percent of the ICBMs in its operational inventory, that is, the percentage of missiles expected to be serviceable at any given time. We also assume that Soviet ICBMs rated as reliable on launcher will actually leave the launcher within minutes of the scheduled time. The improbability of so precise a performance in so complex an operation is a factor which would tend to increase the number of ICBMs required on launcher, or conversely, to reduce Soviet assurance of being able to accomplish the desired effect with a given number of ICBMs.

49. Since the accuracy, reliability, and warhead yield of the Soviet ICBM are not precisely known, we have used as a basis for calculation two sets of performance characteristics, one the "best" and one the "worst" that can be derived from our estimate on this subject.[12] Calculations made on this basis are set forth in some detail in Annex A. It is emphasized that our estimate of the characteristics for the Soviet ICBM does not correspond directly with either the "best" or the "worst" characteristics used for these calculations. (For a summary of our actual estimate, see footnote (a) to Table B in Annex A.) Accordingly, the illustrative calculations that follow cannot be directly correlated with the

[12] "Best" Missile

	1 January 1960	*Mid-1963*
CEP (n.m.)	3	1.5
In Flight Reliability (percent)	75	85

"Worst" Missile

	1 January 1960	*Mid-1963*
CEP (n.m.)	5	2.5
In Flight Reliability (percent)	55	70

(See USIB Memorandum to Holders of NIE 11-5-59, dated 19 January 1960. For the CEP of the best missile for 1963 we are using 1.5 n.m. In the Memorandum for Holders, it is stated that "probably not later than during 1963, the operational CEP for an all-inertial system could be reduced to about 2 n.m., and the operational CEP of the radio-inertial system would be somewhat better.")

7. *(Continued)*

capabilities of the probable Soviet ICBM program which appears in paragraph 61.

50. On the basis of the "best" missile characteristics of the 1961 Soviet ICBM a program to provide 225 ICBMs on launcher in mid-1961 would give the USSR a very high assurance of being able to inflict severe damage on SAC operational air bases, unhardened command and control installations, and unhardened ICBM sites beyond the range of 1,100 n.m. missiles. On the basis of the "worst" missile characteristics of the 1961 Soviet ICBM, a program to provide 470 ICBMs on launcher would give the same levels of assurance of these results.

51. If the USSR were to exercise this attack capability, however, it would still have to expect retaliation from bombers then on airborne alert, from all or some of the few semihardened and hardened ICBM sites then operational, and from aircraft carriers and missile-launching submarines then at sea. Moreover, even at high levels of statistical assurance, a small proportion of the targeted US retaliatory capabilities would remain after the original salvo.

52. If the Soviets were to raise their sights higher and seek to provide a very high degree of assurance of severe damage on hardened and semihardened as well as on unhardened ICBM sites and air and naval bases, the requirements in mid-1961, still assuming complete surprise, would be 480 "best" ICBMs on launcher or 1,340 "worst" ICBMs on launcher. It can be seen that the needs rise steeply with the number of hardened and semihardened sites considered for attack, and that the amount of assurance gained per additional missile falls off sharply.

53. Any force goal of the magnitude of 480 ICBMs on launcher by mid-1951 could be realized only through a crash program requiring diversion of resources from other programs to which the Soviet rulers have attached great importance, and a high level of activity that would tend to stimulate US countermeasures. There is no indication that such a Soviet effort is now underway. The Soviet leaders would probably take into account that the US might, by adopting such measures as a continuous airborne alert, or a marked acceleration of the construction of hardened ICBM sites, nullify a large part of the advantage they had expected from their numbers of missiles.

54. Finally, the assumption of complete strategic and tactical surprise underlying the above calculations must be subject to some degree of discount by the Soviet rulers. They would have to expect that any tentative warning, even any suspicion, that they intended to attack the US, would lead to an augmentation of US capabilities for deriving further warning, as well as to a heightened alert of SAC and other US retaliatory forces. For as long as the alert posture could be maintained, a substantial proportion of these forces could be placed in a position which would enable them to avoid missile attack. Thus the Soviet rulers would have to consider that in any period of unusual tension between the US and USSR the vulnerability of US forces to attack would almost certainly be diminished. With all these factors in mind, we conclude that the Soviet leaders would be unlikely to take the measures necessary to achieve a force goal of the magnitude of 480 ICBMs on launcher by mid-1961.

55. Every present indication suggests that the Soviet ICBM program, while not a crash program, is designed to provide a substantial ICBM capability at an early date. The goal of the program is probably an ICBM force as large as Soviet planners deem necessary to provide a substantial deterrent and pre-emptive attack capability. In our view, this would be consistent with the present deliberate and orderly tempo of the Soviet ICBM test-firing program, with current Soviet military doctrine, and with the USSR's observed policy of maintaining a balance among military capabilities designed to accomplish various missions.[13]

56. Regarding the scope of a program of even this more limited sort, the many uncertainties in available knowledge require that we allow for a wide range of possibilities. For

[13] The Assistant Chief of Staff, Intelligence, USAF, does not concur in this paragraph. See his footnote to paragraph 5 of the Conclusions.

7. *(Continued)*

example, calculations could allow for the existence and operation of one or more plants. On the assumption that one large final assembly plant is already in operation and building up to a peak production rate of 15 ICBMs per month, with a program for the construction of launchers and associated equipment and facilities already begun, and building up to a peak completion rate of nine launchers per month, the following would result:

ICBMs	*Mid-1960*	*Mid-1961*	*Mid-1962*	*Mid-1963*
Produced	60	230	410	560
In Inventory	50	175	325	450
On Launcher	35	140	250	350

57. This would be a vigorous program, but one which, in conjunction with other major military programs, could be carried out without appreciable hindrance to presently planned Soviet industrial and construction programs.[14] Its accomplishment would require highly effective planning, operations, and coordination in order to produce ICBMs and ground equipment, to construct launching facilities, and to train operating personnel in relatively short periods of time. We have made no allowance for serious breakdowns, bottlenecks, or other interruptions, although we recognize that such delays are usual in programs of this nature. If such difficulties occurred, the number of missiles and launchers would lag behind the schedule set forth.

58. To expand this ICBM program appreciably in the early years would introduce considerably greater, though not insurmountable, difficulties. A larger number of missiles could be provided by bringing a second large final assembly plant into production. Deliveries from this plant to operational units would probably begin 6 to 9 months after initial operational deliveries from the first plant. This interval would be the minimum lag consistent with obtaining satisfactory production from the second plant. Assuming a reasonably rapid production buildup, use of the two plants could increase the number of ICBMs about as follows:

ICBMs	*Mid-1960*	*Mid-1961*	*Mid-1962*	*Mid-1963*
Produced	60	350	550	700
In Inventory	50	270	450	560
On Launcher	35	200	350	450

The production of these missiles, however, would have little significance without a corresponding launcher construction program, including production of related ground support, launching, and guidance equipment. Even if the sites were unhardened, to provide the required launching facilities by mid-1961 up to 100 should be under construction simultaneously by the last half of 1960, presumably at widely dispersed sites. Furthermore, the task of training operating and maintenance personnel would be difficult to accomplish on this scale so soon after attaining an initial operational capability.

59. The military capabilities represented by these two ICBM programs depend greatly upon the operational characteristics of the ICBM which is produced. By way of illustration, the following table shows the statistical level of assurance of inflicting severe damage on SAC operational air bases which would be given by the programs in mid-1961:

	"Best" Missile	*"Worst" Missile*
200 missiles on launcher in mid-1961	95 percent	70 percent
140 missiles on launcher in mid-1961	85 percent	55 percent

It should be emphasized that this is merely an example; we do not attempt to estimate what the Soviet strategic concept for the employment of ICBMs would be, or what degree of assurance Soviet planners would consider necessary. Moreover, as noted earlier, the proportion of US retaliatory forces destroyed (as distinguished from the number of SAC bases hit) would depend on the degree of surprise achieved, and the precision with which the attack was timed.

60. In deciding on the magnitude and pace of its ICBM program, Soviet planners would take into account their other weapons systems

[14] For a detailed treatment of the economic aspects of this ICBM program, together with the other Soviet programs for strategic attack forces estimated in this paper, see Annex C.

7. *(Continued)*

for strategic attack—notably, long range bombers and missile-launching submarines. They would recognize that, in addition to the damage which could be inflicted in specific target areas, there would be millions of casualties and widespread denials from fallout. We believe that they would regard the capabilities represented by either ICBM program as constituting a substantial deterrent and preemptive attack capability.

61. We conclude that the probable Soviet ICBM program would provide on the order of 140–200 ICBMs on launcher in mid-1961. Within this range, the Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations for Intelligence, Department of the Navy, estimate that the Soviet program is likely to be toward the low side. The Director of Intelligence and Research, Department of State, the Assistant Chief of Staff, Intelligence, USAF, and the Director for Intelligence, The Joint Staff, believing that Soviet planners would regard the advantages to be gained as justifying additional effort, estimate that the number of Soviet ICBMs on launcher is likely to be towards the high side of the 140–200 range.

62. As stated above, the military capabilities which the Soviets would acquire with this ICBM program would depend greatly upon the performance characteristics of the missile. However, by the end of 1960, the Soviets could with no more than 50 ICBMs on launcher—whether with the best or worst performance characteristics—have a high assurance of detonating an ICBM over each of the 25 principal US metropolitan areas. Thus they will possess a political and psychological weapon of great consequence in every international relationship. By 1961, the estimated Soviet program will present an extremely dangerous threat to SAC air bases.

63. The development of the Soviet ICBM force beyond 1961 would be likely to be affected by such considerations as the actual development of the target system to be attacked, the prospects for a greatly improved Soviet ICBM, and the prospects (on both sides) for an effective anti-ICBM, as well as by the general development of the world situation and of relations between the US and the USSR. Any figures for future years should be reviewed in the light of such considerations and of evidence on the actual progress of the Soviet ICBM program. Projecting our estimates of the present ICBM program (and assuming that if the USSR has approximately 200 ICBMs on launcher in mid-1961 production would substantially level off in the subsequent two years) the most likely number of Soviet ICBMs on launcher in mid-1962 would be 250–350 and in mid-1963 would be 350–450.[15]

V. MEDIUM RANGE BALLISTIC MISSILES

64. Within the range of the Soviet 700 n.m. (SS–4) and 1,100 n.m. (SS–5) ballistic missiles, the distinction between strategic and tactical targets is slight. During the next five years, existing Western strategic and tactical air and missile bases in areas peripheral to the Bloc will be augmented by additional deployment of ground launched surface-to-surface missiles, a few of which may be in hardened sites by the end of the period. Factors of timing and security, as well as the programmed improvement in Western air defenses, will make it increasingly desirable that an initial Soviet attack against these peripheral retaliatory capabilities be delivered primarily with medium range ballistic missiles. Numerous bombers, as well as shorter range missiles, will be available throughout the period for use in initial or follow-on attacks as needed and for other related missions.

65. We believe the Soviets will seek to deploy SS–4 and SS–5 missiles and launchers in sufficient quantities so that, in an initial salvo, they would have 70–90 percent assurance of inflicting severe damage on Western retaliatory air bases and unhardened missile sites within range. Considering the potential target coverage of these missiles when launched from Soviet territory (see Annex E), we calculate that for this purpose the USSR would need to have on launcher in 1960 about 110 SS–4 missiles plus an equal number of SS–5

[15] The Assistant Chief of Staff, Intelligence, USAF, does not concur in the last sentence of this paragraph. See his footnote to paragraph 5 of the Conclusions.

7. *(Continued)*

missiles, all equipped with high-yield warheads. As both missile characteristics and the target system changed, the required number of SS–4 missiles on launcher would increase to about 150 in 1962 and after, while the SS–5 requirement would decrease to 100 or less from 1961 on.[16]

66. As in the case of the ICBM system, the major problems in building operational capabilities with medium range ballistic missiles lie in the preparation of launching facilities, establishment of logistic support, and activation and training of units, rather than in the production of the missiles themselves. We estimate that with relatively modest SS–4 and SS–5 programs, the Soviets could meet the calculated requirement for an initial attack against land-based retaliatory targets within 700 n.m. of the USSR from about 1960 on, and against such targets within 1,100 n.m. from about 1961 on. The following numbers of missiles on launcher are therefore estimated as comprising a Soviet initial salvo capability over the next five years:

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
SS–4 (700 n.m.)	110	150	150	150	150
SS–5 (1,100 n.m.) ...	50	100	100	100	100

67. The initial salvo capability estimated above represents only part of a larger Soviet need for medium range ballistic missiles. It is probable that the USSR is also producing such missiles for subsequent use in the initial phase of a general war and for employment in later phases of a sustained conflict. (They would probably allocate warheads of less than maximum yield to these purposes.) Assuming that to meet these needs as well as those of an initial salvo the USSR produces and deploys three SS–4 and SS–5 missiles per launcher, we estimate that a reasonable buildup in medium range ballistic missiles from present strengths would result in total operational inventories as shown in the table below. Should changing circumstances require somewhat greater numbers of missiles or even launchers, their production and deployment by 1964 would not present serious difficulties to the USSR.

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
SS–4 inventory[17] ...	250	350	450	450	450
SS–5 inventory[17] ...	80	160	240	300	300

VI. LONG RANGE AVIATION

Medium Bombers

68. The history of the BULL and BADGER suggests that hitherto the Soviets have estimated their standing requirement for medium bombers in Long Range Aviation at about 1,100 aircraft. As medium and long range ballistic missile units become an increasingly effective operational force, this requirement will tend to diminish. We estimate that the medium bomber strength of Long Range Aviation will gradually decline to about 800 in mid-1964.

69. Following a rapid buildup in 1958, the number of BADGERs in Naval and Tactical Aviation has recently tended to level off. We estimate that in mid-1960 the BADGER strength of these components will be about 350 and 120, respectively. It will probably not decline during the period, and there is a possibility that it will be increased through reassignment of BADGERs from Long Range Aviation. The medium bombers of Tactical and Naval Aviation, together with their light bombers, will contribute to Soviet capabilities for attack on naval task forces and Eurasian targets, rather than on targets in the US.

70. We consider it possible that the USSR will develop a medium bomber capable of supersonic dash. On the basis of present indications, such a bomber would be unlikely to be-

[16] Calculations were made in a manner comparable to that employed to derive ICBM requirements, using characteristics estimated for the Soviet missile systems in NIE 11–5–59, and planned and programmed Western retaliatory forces. The considerations set forth in paragraph 48 would apply here also.

[17] Operational inventories include missiles on launcher given in paragraph 66, plus additional missiles per launcher for purposes other than initial salvo. Total production of these missiles would be larger to provide for training, replacement, test firing, etc.

7. *(Continued)*

come available for operational use until 1962 or later. Its performance characteristics might be as shown in Annex D. If it is introduced into operational units, a total of 100 or so might be provided for highly specialized uses.[18]

Heavy Bombers

71. We estimate that Soviet heavy bomber strength will increase to about 150 in 1961, but that it will gradually decline thereafter, to about 120 in mid-1964. This estimate is based on the belief that no more than two BISONs per month will be produced over the next year or so, and that their production will then cease.[19] [20]

[18] The Assistant Chief of Staff, Intelligence, USAF, believes that the Soviets have a positive requirement for a bomber with supersonic dash capability for employment by Long Range Aviation, primarily in the advance wave(s) of strategic bomber strikes. Considering recent reports and sighting of new bomber types, and historical and continuing Soviet interest in the bomber as a strategic weapon delivery system, and the accepted technical capability of the USSR to develop and produce a supersonic dash bomber, the Assistant Chief of Staff, Intelligence, USAF, believes that the introduction of a supersonic dash bomber into operational units is likely by 1962.

[19] The Assistant Chief of Staff, Intelligence, USAF, believes that the Soviets will have a requirement for a larger heavy bomber force during the period of this estimate than that estimated above. He believes that the level and type of activity of the present Soviet heavy bomber force as well as the continued production of BISON bombers indicate a further buildup. He further believes that BISON-type bombers will be produced at the rate of two or more per month over the next few years.

[20] The Assistant Chief of Staff for Intelligence, Department of the Army, cannot concur in this estimate of an increase in operational heavy bomber strength, which would reflect an increase of 25 percent within the next year and a half over the current estimated strength of about 120 (paragraph 21.) This nonconcurrence is based on the following factors:

a. The trend in annual BISON production has been downward since the peak production year of 1957; the increase to 150 implies a general reversal of this trend.

b. The total of 150 presumably would include the same 40 BEARs now estimated to be in operational units, an aircraft which will then have been out of production for over four years. Thus, the increase estimated has either to assume a still greater BISON production rate or to assume that no BEARs are withdrawn or otherwise go out of service in the next year and a half. The former assumption would suggest an even sharper reversal of observed trends, while the latter assumption is hardly reasonable.

c. The apparent conflict with production trends referred to above could presumably be overcome and the force increased by adding bombers which have been produced but are not now in operational status. However, such action would also reverse a longstanding practice for no apparent reason, unless, contrary to our estimates, the Soviets associate special significance with the date, mid-1961.

d. The apparent emphasis on a buildup of Long Range Aviation heavy bomber strength, implied by a 25 percent increase, conflicts with judgments elsewhere in this NIE (paragraph 38) that the Soviets do not regard increased numbers of their present bombers as the means of meeting their strategic attack requirements and that they will commence a substantial buildup with ICBM's during the same period.

Based on analysis of the foregoing factors, the Assistant Chief of Staff for Intelligence, Department of the Army, concludes that Soviet heavy bomber strength probably will remain relatively unchanged over the next year and a half, and then, with the probable cessation of BISON production and increasing age of the BEAR, will decline rather rapidly. In his view, future heavy bomber strength will approximate the following:

Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
125	115	100	75	75

72. A better than marginal improvement over present Soviet heavy bombers could be achieved by the development of a nuclear powered aircraft. Such a bomber could derive tactical advantages from its virtually unlimited range and its concomitant ability to make very low altitude penetrations. Although there are indications of Soviet interest in nuclear-powered aircraft, no specific Soviet program directed toward the development of such an aircraft has yet been identified. We believe that the Soviets have such a program underway, but believe it unlikely

7. *(Continued)*

that they will have any nuclear-powered bombers in operational status within the period of this estimate.[21]

73. In sum, we estimate the operational strength of Soviet Long Range Aviation, including BISON and BADGER tanker-bombers, will be about as shown over the next five years:

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
Heavy Bombers[22][23]					
BISON and BEAR	135	150	140	130	120
Medium Bombers[a]					
BADGER ..	1,100	1,050	1,000	900	800
Total	1,235	1,200	1,140	1,030	920

[a] There might be a few supersonic "dash" medium bombers in 1962, perhaps increasing to 100 or so in 1964, in which case we would expect a corresponding decrease in the number of BADGERs.

Air-to-Surface Missiles

74. There may be some further increase in the number of BADGER regiments equipped with the currently available subsonic air-to-surface missile (AS–1), but its limited range and utility argues against its production and deployment in large numbers. On this basis, we estimate that an operational inventory of some 500 will be maintained during the early 1960's. A portion of these missiles will probably be equipped with nuclear warheads of low and medium yields, the remainder employing HE.

75. The USSR has need of an improved air-to-surface missile, for use against well-defended targets on land as well as against ships at sea. We believe that such a missile (AS–2) is now under active development, and that it will probably become operationally available in 1961. It will probably be capable of delivering a 3,000 lb. warhead to a range of at least 350 n.m. at supersonic speed (Mach 1.5–2). This missile would presumably be designed to be carried by any medium or heavy bomber operational during the period 1961–1964. Assuming the replacement of AS–1 and an allocation to heavy bombers, we estimate that by mid-1964 some 600 or more AS–2 missiles will have been supplied to operational units. High yield nuclear warheads will probably be provided for those missiles intended for use against land targets. Medium and low yield nuclear warheads, and possibly HE warheads, are likely to be allocated for antiship use.

76. In the absence of evidence, but on the basis of operational desirability and technical feasibility, we estimate that the USSR may now have available air-launched decoys to simulate medium or heavy bombers. Such decoys could be carried along with a bomb load.

VII. SUBMARINE-LAUNCHED MISSILES

77. We believe that the USSR is proceeding with the development of submarines expressly designed to launch missiles and of improved missiles for them to employ. In view of operational considerations, the most desirable new system would be a nuclear-powered submarine capable of launching, while submerged, ballistic missiles of at least 500 n.m. range. On the basis of Soviet technical capabilities, we estimate that in 1961–1963 the USSR could have available for operational use a submarine-launched ballistic missile (SS–9) capable of delivering a 1,000 lb. warhead to a range of 500–1,000 n.m. with a CEP of 2–4 n.m. Present indications are that the Soviet nuclear-powered submarine program is sufficiently far

[22] The Assistant Chief of Staff, Intelligence, USAF, believes that in view of the tactical and psychological advantages of a nuclear-powered bomber, the state of Soviet aviation and nuclear technology and the evident Soviet interest in the development of such an aircraft that a small number of nuclear bombers may appear in operational status by the end of the period of this estimate.

[23] The Assistant Chief of Staff, Intelligence, USAF, believes that this table should read:

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
Heavy Bombers ..	135	150	175	200	200

[24] For the view of the Assistant Chief of Staff for Intelligence, Department of the Army, see his footnote to paragraph 71.

7. *(Continued)*

advanced so that the SS–9 missile could be incorporated as soon as the missile becomes available. A nuclear-powered submarine could probably carry 6–12 such missiles.

78. In the absence of direct evidence, but considering the potential value of the weapon system, we have assumed an active current development program which would make a nuclear submarine/ballistic missile system ready for operational use in 1961. Thereafter, in a reasonable construction program, the Soviets could probably introduce a few such submarines into operational units annually, while continuing the construction of nuclear submarines equipped with torpedoes.[24] On this basis, we estimate that about 14 nuclear-powered submarines equipped with 500–1,000 n.m. missiles will be operational in 1964. With proper operating procedures and alternate crews, a considerable portion of this number—perhaps half—could be deployed off US coasts at all times, should the Soviets so desire.

79. The foregoing weapon system is complicated and expensive, and will probably increase in number relatively slowly. In the next few years, the USSR will therefore probably build a limited number of new, conventionally powered submarines designed to launch ballistic missiles. The capability acquired through such an interim program would probably be retained to supplement Soviet strength in nuclear-powered missile submarines. The USSR would probably also retain converted missile submarines during a buildup in new submarines. We believe a reasonable allocation of missiles (excluding those for training and other noncombat purposes) would provide a number sufficient for about two combat patrols per submarine.

80. On the basis of the preceding discussion (see also paragraph 32) we project as follows the numbers of ballistic missile-launching submarines and their missiles, in Soviet operational units, through mid-1964:

Missile subs Missiles allocated	*Mid-1960*	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1964*
Nuclear-powered	..	2	6	10	14
500–1,000 n.m.[25]	..	24–48	72–144	120–240	168–336
Conventional ("G")	9	15	18	18	18
350 n.m.	90	150	180	180	180
Converted ("Z")	4	4	4	4	4
200 n.m.	16	16	16	16	16

[24] For a fuller discussion of estimated Soviet capabilities and programs for nuclear-powered submarines, see the forthcoming NIE 11–4–59, "Main Trends in Soviet Capabilities and Policies, 1959–1964."

[25] This missile system (SS–9) may not be available until as late as 1963, in which case the missile used in the "G" class might be used in this submarine.

7. *(Continued)*

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ANNEX A

CALCULATIONS OF SOVIET ICBM REQUIREMENTS

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7. *(Continued)*

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ANNEX A

CALCULATIONS OF SOVIET ICBM REQUIREMENTS

1. As an aid toward the estimation of the force goal of the present Soviet ICBM program, we have made calculations of the numbers of Soviet ICBMs that would be required, in each of the years covered by this estimate, to provide high assurance of being able to accomplish certain specific strategic purposes. We have considered three illustrative cases, as follows:

Case A: The number of ICBMs required to provide at least 90 percent assurance of being able to inflict severe damage on SAC operational air bases, unhardened US ICBM sites, and unhardened command installations beyond the range of 1,100 n.m. missiles. This concept would leave other targets (e.g., naval bases and semihardened and hardened targets) to attack by missile-launching submarines and bombers.

Case B: To provide at least 90 percent assurance of being able to inflict severe damage on semihardened and hardened as well as unhardened US nuclear retaliatory force targets, including naval bases.

Case C: To provide at least 50 percent assurance of being able to inflict severe damage on hardened US retaliatory force targets and a 70 percent assurance with respect to others, leaving naval bases to attack by other means.

2. Since the accuracy, reliability, and warhead yield of the Soviet ICBM are not precisely known, we have used as a basis for calculation two sets of performance characteristics, one the "best" and one the "worst" that can be derived from the USIB "Memorandum to Holders of NIE 11-5-59," dated 22 January 1960. It is emphasized that our estimate of the characteristics for the Soviet ICBM does not correspond directly with either the "best" or the "worst" characteristics used for these calculations. (For a summary of our actual estimate, see footnote (a) to Table B in this Annex.) Accordingly, the illustrative calculations that follow cannot be directly correlated with the capabilities of the probable Soviet ICBM program which appears in paragraph 61.

3. In introducing the numbers derived from these calculations, we must draw particular attention to the essential distinction between the effect of the detonation of a single Soviet ICBM on a target and the number of ICBMs required to give Soviet planners a desired level of *assurance* of being able to achieve that effect. It is with the latter order of numbers that Soviet planners would be concerned in establishing Soviet ICBM force goals.

4. As noted in the Foreword, our calculations are especially sensitive to possible differences between our assumptions and those actually made by Soviet planners with respect to the future performance characteristics of the Soviet ICBM and to the future development of US retaliatory forces. In any case, we must emphasize that the numbers resulting from our calculations are to be regarded only as approximations. Soviet planners, if they have made similar calculations, have undoubtedly arrived at somewhat different numbers. On the whole, however, we believe that their orders of magnitude would be the same as ours.

5. The target systems against which we have calculated Soviet ICBM requirements consist exclusively of fixed installations: SAC operational air bases, ICBM sites, naval bases, command installations. An inherent limitation of the ICBM is that it can be employed only against targets the precise locations of which are known in advance. In evaluating the

7. *(Continued)*

strategic effect of an ICBM attack on such fixed installations, Soviet planners would have to take into account the mobility of the forces based thereon and their reaction times. For example, the primary object of an ICBM attack on a SAC base would be the destruction of bombers prior to take off, but only such bombers as were present on the ground at the time of the attack could be destroyed. Similarly, an attack on naval bases could have no immediate effect on aircraft carriers and missile-launching submarines at sea. Soviet planners would have to consider that Soviet achievement of an ICBM capability to destroy air and naval bases could be considerably offset by US maintenance of sizable air and naval forces airborne and at sea.

6. In any case, the planned fast reaction times of US nuclear retaliatory forces would require that a Soviet ICBM attack be delivered in an initial salvo. For this reason, we have assumed that the USSR would provide sufficient launchers to accommodate all the ICBMs expected to be in commission at any given time. Our calculations have also assumed that Soviet ICBMs rated as reliable on launcher will actually leave the launcher within minutes of the scheduled time.[26] We are unable to quantify any allowance which should be made for the improbability—for technical or other reasons—of so precise a performance in so complex an operation. It is a factor which would tend to increase the number of ICBMs on launcher required, or conversely, to reduce the Soviet assurance of being able to accomplish the desired effect with the numbers of ICBMs indicated.

[26] This assumption presupposes advance preparations to maximize readiness.

7. With respect to US ICBMs, our calculations take into account only the Atlas and Titan programs. Soviet requirements are likely to be increased, beginning in about 1963, by the growing but as yet uncertain number of hardened Minuteman sites becoming operational. To this extent, the Soviet ICBM requirements which we show for mid-1963 are low.

8. With these cautionary observations, we present in Table A the numbers of Soviet ICBMs which we calculate would be required in each of the cases specified in paragraph 1, through mid-1963.

9. As indicated above, Case A leaves naval bases, hardened and semihardened installations to attack by means other than ICBMs. The greatest portion of the Case A requirement therefore comprises the ICBMs needed on launcher to achieve at least 90 percent assurance of inflicting severe damage on SAC operational air bases alone. The on launcher requirement against these bases would be as follows:

	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*
"Best" Missile	[			]
"Worst" Missile	[			]

10. It is clear that as the Soviet ICBM is improved, the number required to achieve a stipulated effect against a relatively static target system will decline, as in Case A. At the same time, however, the overall US nuclear retaliatory force base structure will be growing, dispersing, and hardening, with a resultant steep increase in overall Soviet ICBM requirements, as in Case B.

7. *(Continued)*

METHODOLOGY

11. There follows a detailed explanation of the method whereby the numbers given in paragraph 9 and Table A were calculated.

Basic Data

12. Three types of data were used to calculate Soviet requirements for ICBMs in operational inventory through the period of this estimate. These are:

a. the characteristics and performance of the Soviet ICBM weapon system under operational conditions;

b. the target systems which we believe the Soviets would consider appropriate to particular strategic purposes, as set forth in paragraph 1;

c. the appropriate degree of assurance of attaining a given level of damage on these target systems, as set forth in paragraph 1.

13. The characteristics of the weapon system which bear most heavily on the number of Soviet ICBMs needed to accomplish certain military objectives are accuracy, warhead size, reliability, and in-commission rate. Values for these characteristics used in the calculations are shown in Table B.

14. The improving weapon characteristics thus described have in both cases the effect of decreasing the number of ICBMs required to inflict a given level of damage on a given target. During the time period under consideration, the increase in accuracy reduces the number of weapons required to fall in the area of certain targets. The growth of the on launcher and in-flight reliabilities decreases the number of missiles on launcher required per missile arriving in the target area. Improvement in the in-commission rate reduces the number of spare missiles in operational inventory per launcher.

Requirements Against US Retaliatory Bases

15. One basic military target system was used in calculating ICBM requirements, although some types of targets were omitted for certain variations of strategic attack, as indicated in para. 1. The basic military target system includes all installations, beyond the range of Soviet 1,100 n.m. missiles, which possess an immediate retaliatory capability against the USSR. According to present US plans and programs, these targets will increase rapidly in number and change markedly in character throughout the period of this estimate. By 1962, US ICBM launching sites will begin to constitute a major element of the target system. Moreover, since most such sites becoming operational in 1961 and after will be hardened and dispersed, they will be increasingly difficult to destroy. The following summary of the basic military target system for ICBM attack illustrates its changing character:

Type of Target	*Number of Aiming Points*			
	1960	*1961*	*1962*	*1963*
Unhardened ICBM Sites ..	3	9	9	9
Semihardened ICBM Sites .	0	9	36	36
Hardened ICBM Sites	0	3	33	90
SAC Operational Bases	55	63	63	63
Naval Bases	10	10	10	10
Command and Control Installations	4	4	4	4

The foregoing list does not include improved ICBMs now in relatively early stages of research and development, which may begin to be deployed in hardened sites and possibly mobile units as well in the 1962–1963 period. Soviet planners would have to take into account the possibility that these would cause a further sharp increase in requirements.

16. The number of weapons required is also a function of the desired degree of advance assurance that a given level of damage will be inflicted on a specific target. The degree of assurance, say 90 percent, of inflicting a given level of damage on a single target expresses the likelihood that in a large number of such attacks, at least 90 percent of the time the target will receive such damage. In any given attack the target might be subjected to a lesser level of damage or might receive far more damage than intended. The effect of reducing the degree of assurance is to reduce the number of missiles necessary to accomplish the objective. For example, if the degree of assurance against the targets con-

7. *(Continued)*

sidered in Case B were reduced from 90 to 70 percent, the number of missiles required on launcher would be cut in half; if assurance were reduced from 90 to 50 percent, the number of missiles required on launcher would be cut to a third.

17. The criterion of severe damage was used in the calculations of requirements for the target systems discussed. This criterion, as used by US military planners, calls for the following damage on various types of targets:

Type of Target	
Unhardened ICBM Site	Overturning erected missiles, causing severe damage to nearby above ground facilities.
Semihardened ICBM Site	[redacted]
Hardened ICBM Site	[redacted]
Airbases	Damage to parked aircraft so as to require depot repair and moderate to severe damage to above ground facilities.

18. The following procedure was used to calculate the numbers of ICBMs and launchers required in each year from 1960 to 1963:

a. using the estimated accuracy, yield, and reliability of the Soviet ICBM, calculate the numbers of ICBMs required on launcher to attain the stipulated degree of assurance that severe damage will be inflicted on a single target of each type;

b. multiply each of these numbers by the number of targets of each type in a given target system;

c. total these products to obtain the numbers of ICBMs required on launcher for the entire target system;

d. using the estimated in-commission rate, calculate the size of the operational inventory needed to meet the on launcher requirement at any given time;

e. allowing a minimal additional quantity of missiles (15–20 percent) for testing, training and quality control, and to account for major maintenance and normal attrition, calculate the required total production of ICBMs.

19. It should be emphasized that the numbers of missiles required for a given year, as calculated below, are for an operational weapon system with the characteristics estimated for the particular year. In any given year, some of the missiles in operational inventory will have been produced in earlier years. If all operational missiles were not modernized to attain the characteristics estimated for the year under consideration, a greater number would be required to accomplish the objective under consideration. Moreover, to the extent that the training and proficiency of the operating crews had not reached the standards implied in the estimated characteristics of the weapon system, a greater number of missiles would be required.

Requirements Against US Metropolitan Areas

20. We have also considered the number of ICBMs which would be required to give Soviet planners high assurance of being able to deliver a devastating ICBM attack on US concentrations of population, industry, communications, and government facilities. We find that about 35 percent of the total US population and about 60 percent of US defense manufacturing facilities are concentrated in 25 urban-industrial areas. Beyond this number of metropolitan areas, the concentration of population and industry falls off rather sharply. These 25 principal urban-industrial areas are:

New York	Baltimore
Chicago	Washington
Los Angeles	Buffalo
San Francisco	Milwaukee
Philadelphia	Cincinnati
Detroit	Hartford
Cleveland	Akron
Pittsburgh	Flint
Boston	Dayton
St. Louis	Youngstown
Minneapolis	Toledo
Indianapolis	Houston
Providence	

If the Soviets desired at least 70 percent assurance of detonating one ICBM over each of these metropolitan areas, the on launcher requirement for a single salvo would be no more than 50 from 1960 on.

7. *(Continued)*

TABLE A

	"BEST" MISSILE [a]				"WORST" MISSILE [a]			
	Mid-1960	*Mid-1961*	*Mid-1962*	*Mid-1963*	*Mid-1960*	*Mid-1961*	*Mid-1962*	*Mid-1963*
CASE A [b]								
On Launcher	[							]
In Inventory [c]								
Produced								
CASE B [b]								
On Launcher	[							]
In Inventory								
Produced								
CASE C [b]								
On Launcher	[							]
In Inventory								
Produced								

[a] See paragraphs 1 and 12 of this Annex.

[b] For definitions, see paragraph 1 of this Annex.

[c] In this table, the numbers of ICBMs "in inventory" are those which would need to be assigned to operational units in order to have the required numbers on launcher at any given time. The relationship between missiles in inventory and on launcher reflects the in-commission rate, estimated in NIE 11-5-59 to increase from 70 percent at IOC to about 80 percent in 1963. The total number of ICBMs produced would include the additional missiles required for testing, t aining, and quality control, and to allow for major maintenance and normal attrition. We have assumed a minimal additional quantity for these purposes (15-20 percent).

7. *(Continued)*

TABLE B *

Characteristic	"BEST" MISSILE IOC	Mid-1960	Mid-1961	Mid-1962	Mid-1963	"WORST" MISSILE IOC	Mid-1960	Mid-1961	Mid-1962	Mid-1963
CEP (n.m.)	3	2.7	2.2	1.8	1.5	5	4.5	3.7	3	2.5
Warhead (lb) ▸	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
In Commission (percent)	70	72	75	78	80	70	72	75	78	80
Reliability On Launcher (percent)	80	82	85	88	90	80	82	85	88	90
In Flight (percent)	75	77	80	83	85	55	58	62	66	70

* Values for the "best" and "worst" characteristics are derived from NIE 11-5-59 and the USIB "Memorandum to Holders of NIE 11-5-59," dated 19 January 1960; the figures for mid-1960, mid-1961, and mid-1962 have been interpolated. The actual estimate of accuracy and inflight reliability, as contained in the above mentioned Memorandum, may be summarized as follows:

Accuracy

a. Radio-inertial guidance—3 n.m. CEP at IOC; somewhat better than 2 n.m. in 1963.

b. All-inertial guidance—5 n.m. CEP at IOC; about 2 n.m. in 1963. All-inertial guidance will probably be incorporated in 1960-1962, after which the probable Soviet ICBM force is likely to include both radio-inertial and all-inertial guidance systems, with an increasing proportion of the latter system.

(footnote) The Assistant Chief of Staff for Intelligence, Department of the Army, continues to perceive no justification in presently available intelligence for the changes reflected in the above characteristics and believes the accuracy for the radio-inertial system at IOC should be 3-5 n.m. CEP; for the all-inertial system in 1963, 2.5 n.m. CEP.

Inflight Reliability

Estimated to be 55-75 percent at IOC; 70-85 percent in 1963. The Assistant Chief of Staff for Intelligence, Department of the Army, and the Assistant Chief of Naval Operations, Department of the Navy, believe the reliabilities lie at the lower end of the ranges in both years. The Assistant Chief of Staff, Intelligence, USAF, believes the reliabilities lie at the upper ends.

▸ Warhead yields as estimated for this weight in NIE 11-2-59, assuming no further nuclear testing, were used in calculating ICBM requirements.

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ANNEX B

SCALE OF ECONOMIC EFFORT FOR CERTAIN ICBM PROGRAMS

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7. *(Continued)*

ANNEX B

SCALE OF ECONOMIC EFFORT FOR CERTAIN ICBM PROGRAMS

1. This Annex analyzes ICBM programs which would meet the requirements identified in the main text as Case B (at least 90 percent assurance against all retaliatory force targets) and Case C (at least 50 percent assurance against hardened targets and at least 70 percent assurance against others). It considers the economic impact of production and deployment programs which would meet these requirements in mid-1961 and in mid-1963, and compares them with the ICBM program estimated as probable in Section IV of the main text.

2. An assessment of the economic impact of the several ICBM programs considered in this estimate requires the consideration of more than one dimension of the problem. Table A of this Annex summarizes four economic aspects of each program:

a. production of missiles;
b. provision of launching facilities;
c. provision of military personnel on site;
d. monetary costs.

Missile Production

3. As indicated in NIE 11-5-59, we estimate that series production of ICBMs and other system equipment is already underway in the USSR. For purposes of these calculations, we have in all cases assumed that the first series produced missile was delivered early in the final quarter of 1959. Missile production for these programs is based upon an ICBM final assembly facility which had been engaged in prior production of ICBM vehicles for development and test purposes. Thus, in the probable program this facility is assumed to have begun its missile buildup from a going rate of three per month and to reach a peak delivery rate of 15 per month 12 months later, providing about 100 missiles in the first year and 180 per year thereafter.

4. In other programs, where larger outputs were required, a peak rate of 25 missiles per month was assumed under the same conditions and reached in the second year.[27] Most of the larger programs required more than one of these plants, and it is assumed for the purposes of Table A below that all of these plants started production at the same time.

5. In actual practice, however, the Soviets would almost certainly not begin series production of ICBMs (or any other weapons) at more than one plant simultaneously. A second plant might lag the first by 6-12 months. Since only one facility could gain from being the producer of development and test hardware, the follow-on facilities would not start production until the problems of series output had been solved by the lead plant. The postulated multiplant programs would merely lead to a duplication of the initial production engineering problems. Therefore even more plants would probably be required to meet these larger programs. Soviet practice in multifacility programs can be

[27] The 25 missile per month peak rate was considered as maximum for a single facility. This assumption was based upon industrial requirements in the production of a multistaged vehicle with a mass ratio at least as great as the US Titan.

Table A SCALE OF ECONOMIC EFFORT FOR CERTAIN ICBM PROGRAMS

	M-1961						M-1963					
	Case B		Case C		Probable		Case B		Case C		Probable	
	Best	*Worst*	*Best*	*Worst*	*Upper*	*Lower*	*Best*	*Worst*	*Best*	*Worst*	*Upper*	*Lower*
Cumulative Number of ICBMs in Operational Inventory	640	1800	300	670	270	175	2040	5360	680	1820	560	450
Number of Missile Plants												
Peak rate of 10–15 per month	...	...	...	...	2	1	...	...	...	...	2	1
Peak rate of 20–25 per month	3	8	1–2	3	...	...	3	8	1	3	...	...
Peak Missile Production	58	160	28	60	25	15	70	180	23	62	25	15
Cumulative Number of Launchers	480	1340	230	500	200	140	1630	4300	550	1450	450	350
Peak Monthly Launcher Completion	38	110	18	39	13	9	50	130	17	45	13	9
Military Personnel (thousands)	27	75	13	28	11	8	91	240	31	82	25	20
Cumulative ICBM System Cost[a] (billion dollars)	6.7	19	3.2	7	3.3	2.4	25	66	8.3	22	9	7
Cumulative ICBM System Cost[a] (billion rubles)	30	84	14	31	16.	11	110	280	36	97	39	31
Annual Strategic Attack Expenditures[b] (billion rubles)	40	81	28	41	29	25	51	120	23	46	19	19

[a] Excludes cost of nuclear warheads and cost of modernization of previously produced ICBMs.

[b] Expenditures for fiscal year, assuring other elements of Soviet strategic attack capabilities are as estimated in main text.

7. *(Continued)*

illustrated by the following source-time relationships in the BADGER program:

Production Source BADGER PROGRAM	*Production Date Initiated*	*Peak Rate (per month)*	*Months to Reach Peak*
Plant #22, Kazan	Aug 1953	20	8
Plant #1, Kuybyshev	Jun 1954	15	14
Plant #64, Voronezh	Jan 1955	10	12

6. In estimating a production program, a change in estimated IOC date could result in substantial changes. For example, in the probable program about 25–50 additional missiles could be available on launcher by mid-1961 if the IOC date were estimated to occur three months earlier. However, when applied to the probable program such a change could be offset by logistic pipeline lag as well as the assumption that no major problems occur at any point in the production program resulting in schedule slippage.

7. For each of the final assembly plants in the program there would have to be a large number of subsidiary plants to supply specialized components and subassemblies. Furthermore, a large number of other plants would be required to supply the ground support and ground guidance equipment necessary for the operation of the weapon system. In many respects the supply of this ground equipment is more of an economic burden than the missiles themselves; missiles represent only about 10–15 percent of the initial cost of establishing an operational capability with ICBMs.

Launching Facilities

8. The number of launching facilities is a good measure of the amount of activity involved in a given ICBM program. This is not so much because the launcher as such is so expensive, but more because this is a simple way of representing all the facilities, other than the missiles themselves, which are necessary to an operational weapon system. The other facilities which are subsumed under this measure are the ground guidance facilities, test, checkout and maintenance equipment, fueling and storage facilities, housing and general purpose equipment.

9. These facilities, including launchers, comprise the major initial costs of establishing an operational ICBM system and are the pacesetting factor in a deployment program. In the case of fixed installations, hard or soft, the orderly activation of launching facilities would require the efficient scheduling and completion of large-scale construction projects in widespread locations. In the case of a rail mobile system the primary problems would lie in the scheduled construction of special cars, installation of the necessary equipment, and orderly activation of complete missile trains; the construction of fixed facilities would be a lesser part of the effort but would still have to be scheduled into the entire program.

10. Since we do not know the Soviet deployment concept, the present analysis includes two extremes which we believe are likely to encompass the actual cost and effort involved in activating Soviet launching facilities. Launching facilities for the probable program are assumed to be fixed and hardened, costing $11 to $12 million per launcher and requiring a total construction time of 15 to 18 months each. Facilities for the other programs are assumed to be fixed and unhardened, costing $8 to $9 million per launcher and requiring a total construction time of 6 to 9 months each. Guidance facilities are assumed to be radio-inertial, and the net cost of a missile system using radio-inertial guidance is somewhat more than if all-inertial were employed. Costs are based on US plans and limited US experience, adjusting where possible for differences between Soviet and US prices, procurement methods, pay scales, etc.

11. The preliminary US studies available on rail mobile systems are inadequate to form a basis for economic analysis. We believe the cost and effort involved in activating such systems would fall somewhere between that required for soft and hard fixed systems, probably closer to the hard than the soft. However, the major impact would be on the railroad equipment industry rather than the construction sector of the economy. Semi-

7. *(Continued)*

hardened fixed systems would likewise fall between the two systems we have analyzed. Thus we believe that the total cost and implied effort shown in the table may be somewhat overstated in the case of the probable program, and may be somewhat understated in the case of the other programs.

Personnel

12. The number of military personnel required to operate, service, and guard ICBM sites is not large when compared with the total strength of the Soviet armed forces. However, a large portion of the operating and support personnel would have to be specially trained. This would require individual and unit training on a schedule consistent with the completion of launching facilities. Soviet experience with shorter range ballistic missiles should facilitate this training.

Total Cost

13. The total cost for establishing and operating the probable ICBM program through mid-1963 would amount to between 30 and 40 billion rubles, exclusive of the cost of nuclear warheads and research and development. This implies an average annual expenditure of 8–10 billion rubles: less than one percent of Soviet GNP. While this percentage appears negligible, economic aggregates of this type are too broad to reflect the physical effort and difficulties involved in implementing large programs for a single weapon system.

14. To appreciate the impact of the probable program on the Soviet economy, a comparison with some nonmilitary programs is useful. In the past seven years the USSR invested some 40 billion rubles in its ferrous metallurgical industry (iron mining and steel making); it plans to increase its crude steel output by 65 percent by investing about 100 billion rubles in this industry in the Seven-Year Plan Period, 1959 through 1965. Thus the average annual investment in this major industry was about 6 billion rubles in the past and is planned to be about 14 billion rubles in the future. Investment in the machine building, chemical and railroad industries are planned for the future at annual rates of 14 to 17 billion rubles per year each. The probable ICBM program in this estimate would imply average annual expenditures of about 8–10 billion rubles on the ICBM system alone, more than half the planned rate for investment in the entire ferrous metallurgical industry of the USSR.

15. The last line in the table illustrates the effect of the three ICBM programs on expenditures for strategic attack in FY–1961 and FY–1963, assuming that other elements of the Soviet strategic attack capability are as estimated in the main text. As a point of reference, these expenditures are estimated to be about 14 billion rubles in 1959. The probable program implies that these expenditures would be about 25–30 billion rubles in FY–1961 and about 19 billion in FY–1963.

16. In summary, the probable program is sizable in terms of the economic effort implied in activating and equipping the launching units especially during the first two years after IOC. The economic strain implicit in larger programs is not so much a matter of their financial cost as of the magnitude and pace of the physical activities required to produce missiles and ground equipment, to construct launching facilities, and to train operating personnel in a relatively short period of time. Even the accomplishment of the probable ICBM program through 1961 will require highly effective planning, operations, and coordination among selected subsectors of the Soviet economy. Although it is likely that a multitude of unforeseen, minor bottlenecks will appear, the probable program assumes that no major delays will be encountered.

7. *(Continued)*

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ANNEX C

ECONOMIC ASPECTS OF PROBABLE STRATEGIC ATTACK PROGRAMS

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7. *(Continued)*

ANNEX C

ECONOMIC ASPECTS OF PROBABLE STRATEGIC ATTACK PROGRAMS

Expenditures for Strategic Attack Programs

1. This Annex sets forth the expenditures we believe the USSR has incurred in recent years in providing forces for strategic attack, and the future expenditures implied by the programs estimated as probable in this paper.[25] We estimate that during 1955–1959, average annual Soviet expenditures for programs directly related to strategic attack were about 15 billion rubles. The probable programs estimated in this paper will result in increased outlays for strategic attack, with an average annual expenditure of about 20–22 billion rubles during 1960–1964 (see Table A).

TABLE A

AVERAGE ANNUAL EXPENDITURES FOR SOVIET STRATEGIC ATTACK PROGRAMS, 1955–1964 [a]

(Billion 1955 rubles)

	1955–1959	1960–1964
Total Strategic Attack	15.5	20.4
Personnel	1.3	1.6
Operations and Maintenance	2.5	5.3
Procurement	7.2	6.2
Aircraft and A–S Missiles [b]	6.3	0.8
Submarine-launched Missiles [c]	0.4	2.1
Long range S–S Missiles [d]	0.5	3.3
Construction	0.9	2.6
Nuclear Weapons [e]	3.6	4.9

[a] Figures are rounded. Totals are derived from unrounded data and do not always agree with those based on rounded components.

[b] Includes cost of continued procurement of BISON and air-to-surface missiles and support equipment.

[c] Includes cost of submarine-launched missiles, conversion of existing submarines and procurement of new missile-launching submarines.

[d] Includes cost of SS–4, SS–5, and SS–6 (ICBM) missiles, guidance and support equipment. Costs reflect the lower limit of the probable Soviet ICBM program. In addition, the 1960–1964 entry for construction includes 2.2 billion rubles for constructing on-site facilities for these missile systems.

[e] Expenditures for nuclear weapons for strategic purposes are derived from the illustrative allocations of nuclear materials in NIE 11–2–59. The caveats appearing on pages 63–65 of that estimate apply.

Shifts in Composition

2. Important shifts in the composition of expenditures for strategic attack programs will probably take place. Expenditures related to long range aircraft were responsible for nearly all strategic attack expenditures during the historical period, but will decline sharply in relative weight in the projection period. Procurement of these aircraft including air-to-surface missiles, which represented about 40 percent of cumulative strategic attack expenditures in the historical period, is projected to drop to about four percent of the total. Expenditures for personnel, operations and maintenance, and construction related to aircraft will take diminishing proportions of expenditures for these categories.

[25] Programs which are estimated only as possible have not been included in this Annex. Note also that the analysis in this Annex reflects the lower limit of the ICBM program estimated as probable in Section IV of the main text.

3. Procurement and installation of ground-launched missile systems will increase as a share of strategic attack expenditures from 5 percent in the historical period to about 30 percent in the projection period. At the same

7. *(Continued)*

time, the share for submarine systems will increase from about 3 percent to about 10 percent. Operating and maintaining missile systems are relatively costly, and ground-launched and submarine systems are responsible for nearly all of the absolute increase in the operations and maintenance category shown in Table A.

The General Scope of the Major Categories

4. The expenditures for strategic attack forces in this Annex include only direct expenditures made for the following: (a) personnel of Long Range Aviation, long range surface-to-surface missile units and missile launching submarines; (b) operations and maintenance costs for units; (c) procurement of major weapons and of supporting equipment for units using the weapons; (d) construction and maintenance of airfields and missile installations; and (e) nuclear weapons. BADGERs subordinate to Tactical and Naval Aviation have been included with aircraft of Long Range Aviation for costing purposes only.

Ground-Launched Missiles

5. The basis for scheduling the production and deployment of Soviet ICBMs resulted from an analysis of actual and planned US practices modified by what is known and assumed concerning Soviet practice. In light of the estimate that by 1 January 1960 a few series produced ICBMs will probably be operational, and of the discussion in the main text of this estimate, a reasonable production program was postulated which would provide 350–450 ICBMs on launcher in 1963 together with a reasonable additional quantity of missiles (25 percent)[a] to account for maintenance, training, production testing and normal attrition. The production program involves a buildup to a peak rate of about 25 ICBMs per month by the end of 1960.

6. The production buildup employed in this analysis and reflected in the main text is somewhat different from that employed in previous estimates, in which we considered that an IOC would be established with prototype ICBMs and that series production would begin at IOC date. The present analysis takes into account the estimate, in NIE 11–5–59, that series production would have begun prior to IOC date. Assuming the concurrent scheduling of launching facilities, crews, and logistic support, this change results in a more rapid buildup of operational capabilities in the months following IOC date than was indicated in previous estimates.

7. For purposes of costing the probable ICBM program, hardened fixed sites were assumed; if the Soviet system is rail mobile, the total cost of the program would be about the same or somewhat less, but much of the initial cost now allocated to construction would shift to rail mobile equipment and operational costs would be higher. Construction of launching facilities was scheduled for that portion of the operational inventory expected to be in commission at any given time. It should be noted that these launching, guidance and support facilities would average $11 to $12 million per launcher and account for about 75 percent of the initial costs in the estimated ICBM program. The initial costs of this entire program average about $14 million per missile on launcher.

8. Production of SS–4 and SS–5 missiles was scheduled on a basis similar to that for the ICBM, at peak rates of nine and seven missiles per month respectively. The costing of the SS–4 was based on a road mobile system; that for the SS–5 on rail mobility. About 80 percent of the total estimated ruble cost of these weapon systems is incurred by the ICBM program.

[a] A 15 percent margin between operational inventory and production for operational purposes was used in the requirements examined in Annex A. Such a margin is minimal; the 25 percent margin applied to the probable program is more reasonable, although still on the low side.

7. *(Continued)*

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ANNEX D

PERFORMANCE CHARACTERISTICS OF SOVIET LONG RANGE BOMBERS

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ESTIMATED SOVIET LONG RANGE AIRCRAFT PERFORMANCE UNDER AN OPTIMUM MISSION PROFILE[a]

(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)

	CURRENT MODELS					POSSIBLE FUTURE DEVELOPMENTS[d]	
	BULL	BADGER	BADGER[b] 1959	BISON 1958	BEAR	BISON[b] 1960	MB 1962–1964[c]
Combat Radius/Range (n.m.)							
a. 25,000 lb bombload	....	....	....	2,750/5,200	4,450/8,450	2,950/5,600	....
one refuel[e]	....	....	....	3,700/7,000	....	3,950/7,500	....
b. 10,000 lb bombload	1,850/3,350	1,600/3,100	1,800/3,400	3,000/5,800	4,850/9,500	3,200/6,300	1,770/3,500[h]
one refuel[e]	....	2,300/4,200	2,400/4,600	4,000/7,800	....	4,300/8,500	2,400/4,700[h]
c. 3,300 lb bombload	2,050/3,700	1,800/3,600	2,000/3,900	3,100/6,100	5,050/10,000	3,300/6,600	1,950/4,050[i]
one refuel[e]	....	2,500/4,800	2,650/5,200	4,150/8,200	....	4,450/8,900	2,900/6,000[i]
Speed Altitude (kts/ft)							
a. Maximum Speed at optimum altitude (kts/ft)[f]	350/30,000	550/13,200	555/14,200	535/18,800	500/25,000	535/18,800	1,150/35,000[j]
b. Target Speed/Target Altitude (kts/ft)[f]	310/30,000	475/40,800	475/42,300	460/43,400	425/43,200	460/43,400	1,150/55,000[j]
Combat Ceiling (ft)[f]	36,500	45,400	46,600	46,500	42,000	46,500	50,000[j]
Terminal Target Altitude (ft)[g]							
a. 25,000 lb bombload	....	....	....	54,200	48,400	54,200	....
b. 10,000 lb bombload	41,500	50,000	52,500	55,800	49,700	55,800	59,500
c. 3,300 lb bombload	42,000	51,500	54,300	56,500	50,300	56,500	60,500

[a] It should be noted that these estimates are computed from aircraft dimensions as determined by photographic analysis and estimated airplane, engine, and other basic flight parameters. Because of the limitations of this method, the results are occasionally susceptible to significant errors. There are, for example, reliable indications that BISON altitude capabilities may be considerably less than those estimated above.

[b] Improvements of BISON and BADGER aircraft are based on normal expected improvements in the engines through the 1960 period.

[c] The Assistant Chief of Staff, Intelligence, USAF, believes that the introduction of a supersonic dash bomber into operational units is likely by 1962.

[d] The Assistant Chief of Staff, Intelligence, USAF, believes that by 1964 the USSR may have a few subsonic nuclear powered bombers in operational status.

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

[f] For 10,000 lb bombload unless otherwise indicated.

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

[h] Capable of carrying 350 n.m. air-to-surface missile (AS-2) with approximately 10 percent degradation in radius/range capability.

[i] Includes 500 n.m. "dash" at Mach 2.0.

[j] For 3,300 lb bombload.

8. NIE 11-8-60 *Soviet Capabilities for Long Range Attack Through Mid-1965*

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SOVIET CAPABILITIES FOR LONG RANGE ATTACK THROUGH MID-1965

THE PROBLEM

To estimate probable trends in the strength and deployment of Soviet air and missile weapon systems suitable for long range attack, through mid-1965. The weapon systems considered are heavy and medium bombers, related air-to-surface missiles, ground-launched missiles with ranges of 700 nautical miles or more, and submarine-launched missiles.

CONCLUSIONS

1. Since the adoption of NIE 11–8–59, "Soviet Capabilities for Strategic Attack Through Mid-1964," dated 9 February 1960, we have made an extensive re-examination of all available evidence bearing on Soviet production and deployment of ICBMs. The conclusions resulting from this re-examination are, in brief (*Paras. 13–14*):

a. Soviet series production of ICBMs probably began in early 1959, but we have no direct evidence of the present or planned future rate of production.[1] [2]

b. As yet, we can identify no ICBM-related troop training activities, nor can we positively identify any operational launching site, as distinguished from the known test range facilities.

c. We still estimate a Soviet initial ICBM operational capability with a few—say 10—series produced missiles as of 1 January 1960.[3] [4]

2. Since there is insufficient direct evidence to establish the scale and pace of

[1] Series production means production of missiles of like type in accordance with a planned buildup rate. The date of commencement of series production is defined as the date of completion of the first missile in the series.

[2] The Assistant Chief of Staff for Intelligence, Department of the Army, believes that there is no evidence to indicate that ICBMs have been produced in the Soviet Union in numbers larger than are required by the continuing R & D activities. He therefore believes that this conclusion is misleading in that it may be interpreted to imply that ICBMs for operational deployment or inventory started to become available in 1959. See his footnote to paragraph 13 a.

[3] The Assistant Chief of Staff for Intelligence, Department of the Army, believes that as of 1 January 1960 the Soviets had only an emergency capability to launch a few ICBMs against North America. These ICBMs probably would have had to have been launched from R & D facilities. However, he believes that, for planning purposes, it is prudent to assume that the IOC had occurred by 1 January 1960.

[4] The Assistant Chief of Naval Operations for Intelligence, Department of the Navy, believes that there is insufficient information to judge that, as of 1 January 1960, the conditions for IOC (that is, the date at which a few—say 10—series produced ICBMs could have been placed in the hands of one or more trained units at existing launching facilities) had been met.

8. *(Continued)*

the present Soviet ICBM production and deployment program,[5] we have based our estimate in part on various indirect forms of evidence and on argument and analysis deduced from more general considerations. These latter include such things as the strategic ideas which appear to govern Soviet military policy, our appreciation of the strategic capabilities which Soviet military planners might expect to derive from given numbers of ICBMs, our general knowledge of Soviet military production practices, and our sense of the tempo at which the present program is being conducted. *(Para. 15)*

3. The Soviets have strong incentives to build a substantial ICBM force. The ICBM provides them for the first time with an efficient means of delivering a heavy weight of attack on the US. What we know of Soviet strategic ideas suggests that the ICBM is thought of primarily in terms of deterrence, and of preemptive or retaliatory attack should deterrence fail, rather than primarily in terms of the deliberate initiation of general war. These terms, however, provide no quantitative definition of Soviet ICBM force goals.[6] *(Paras. 16–23, 29)*

4. As an approach to an appreciation of Soviet ICBM requirements, we have computed the numbers of Soviet ICBMs on launchers theoretically required for an initial salvo designed to inflict severe damage on SAC bomber bases and other installations directly related to immediate US nuclear retaliatory capabilities. Uncertainty regarding the inputs, and the sensitivity of the computations to variations in the assumptions made with respect to them, render the numerical results too various to provide a reliable basis for estimating Soviet ICBM force goals. Moreover, regardless of the results of any corresponding Soviet calculations, there are operational factors (such as Soviet problems in achieving simultaneity of salvo, and the mobility of US retaliatory forces) which would tend to reduce their confidence in their ability, with any given number of ICBMs, to destroy or neutralize US retaliatory forces through attack on fixed installations such as bomber bases.[6][7] *(Paras. 24–29, including footnotes to para. 28b, and Annex A)*

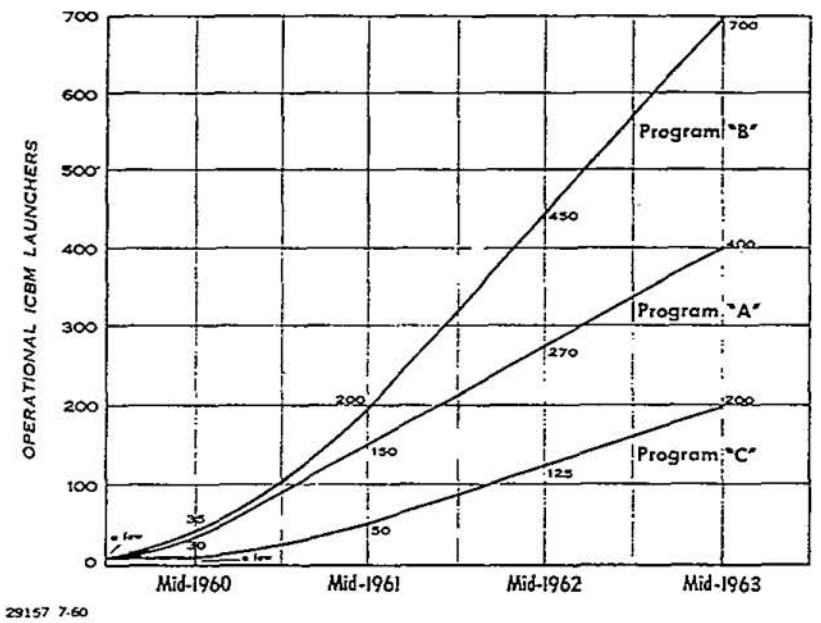
[5] The Assistant Chief of Staff for Intelligence, Department of the Army, believes that the direct evidence upon which to base an estimate of present Soviet ICBM strength is of major significance. He believes that much of this evidence constitutes negative indications and, therefore, that its rejection as insufficient leads to unrealistic overestimation. See his footnote to paragraph 15.

The Assistant Chief of Staff, Intelligence, USAF, does not concur in Conclusions 3 and 4. He believes that Soviet military doctrine, history, and behavior warrant the judgment that the USSR will strive to achieve a capability for decision which has as its basis the exploitation or application of military force, and he does not believe that the Soviets would be content with conceptual levels of pre-emptive attack and deterrence. Thus, he believes that the Soviet rulers would endeavor to achieve a military superiority over the US and would direct Soviet planners to assess those military requirements which would enable them either to force their will on the US through threat of destruction or to launch such a devastating attack that the US as a world power would cease to exist.

The Assistant Chief of Staff for Intelligence, Department of the Army, believes that operational considerations which extend beyond the computations of the number of ICBMs required to inflict severe damage on certain static targets would prohibit Soviet military planners from accepting with confidence any calculation that a certain number of ICBMs would be sufficient, in conjunction with the operations of other Soviet forces, to reduce the weight of a US retaliatory attack to an acceptable level. See his footnote to paragraph 29.

8. *(Continued)*

5. We have also examined the tasks and problems involved in the production and deployment of ICBMs through the elaboration of three illustrative Soviet programs. They represent the range of judgments, based on the direct and indirect evidence available to us, regarding the scale and tempo of Soviet effort. These illustrative programs are summarized, in the chart below, in terms of the numbers of operational ICBM launchers [8] which each would provide. (*Paras. 30–42, and Annex B*)



6. With reference to the illustrative programs presented above, the members of the United States Intelligence Board have concluded as follows (*Para. 43*): [9]

a. The Director of Central Intelligence considers that program "A" should be regarded as the nearest approximation of the actual Soviet program.

b. The Assistant Chief of Staff, Intelligence, *USAF*, believes that program "B" approximates the most likely Soviet program.

c. The Director of Intelligence and Research, Department of *State*, the Assistant to the Secretary of *Defense*, Special Operations, and the Director for Intelligence, *The Joint Staff*, believe that through 1961 the Soviet program is likely

[8] The number of launchers is a good measure of the amount of activity involved in a given ICBM program, since it includes all of the facilities, in addition to the missiles themselves, which are necessary to the operational weapon system. Included are ground guidance facilities; test, checkout, and maintenance equipment; fueling and storage facilities; and housing and general purpose equipment.

[9] For a more extended expression of some of these views, see footnotes to paragraph 43.

8. *(Continued)*

to fall towards the high side of the range defined by illustrative programs "A" and "B," and, in the light of factors discussed in paragraph 8, they consider that in the 1962–1963 period it will continue to grow within the "A"–"B" range.

d. The Assistant Chief of Staff for Intelligence, Department of the *Army*, and the Assistant Chief of Naval Operations for Intelligence, Department of the *Navy*, believe that illustrative program "C" most nearly approximates the actual Soviet program.

7. It is notable that the potential threat posed by programs "A" and "B" is substantially the same through 1960. Before the end of the year, either would provide a capability to inflict massive destruction on the principal US metropolitan areas. At the beginning of 1961, either would provide sufficient ICBMs and launchers to threaten the SAC operational air base system. Thereafter, the threat posed by program "B" would increase more rapidly than that of program "A." By about mid-1961, program "B" would provide Soviet planners with a high assurance of being able to severely damage most of the SAC air base system in an initial salvo, whereas program "A" would reach this point late in the year. The considerably smaller program "C" would provide a capability to inflict massive destruction on the principal US metropolitan areas sometime in 1961. *(Para. 44)*

8. The present Soviet ICBM program is, of course, subject to change as the period progresses. Soviet planning for the period beyond 1961 will be substantially affected by the actual development of US retaliatory forces, the prospects for a greatly improved Soviet ICBM, and the prospects, on each side, for an effective defense against ICBMs, as well as the general development of the world situation and of relations between the US and the USSR. Our estimates for future years must be reviewed in the light of such developments and of such additional evidence as we may obtain regarding the actual progress of the Soviet program. They must therefore be regarded as highly tentative. For these reasons, we have not projected even a tentative estimate beyond 1963.[10] *(Para. 45)*

9. We continue to estimate that with relatively modest programs in 700 and 1,100 n.m. ballistic missiles the Soviets will acquire, by 1960 or 1961, a force of medium range missiles capable of seriously threatening the major Western landbased retaliatory targets within their range. *(Paras. 46–51)*

10. We estimate that the USSR now has a limited capability to launch ballistic missiles from about a dozen long range, conventionally-powered submarines. The Soviets will probably increase this force gradually over the next year or two, and then introduce a weapon system capable of delivering ballistic missiles against land targets from a submerged nuclear-powered submarine. While we believe the Soviets would employ submarine-launched missiles against selected US targets, their planning does not appear to contemplate delivery of the main weight of an attack by this means. *(Paras. 65–70)*

[10] The Assistant Chief of Staff, Intelligence, USAF, believes that, despite the difficulties engendered by consideration of the factors enumerated, an estimate beyond 1963 can be made. He believes that, lacking contradictory information, the rates of increase shown in program "B" should be continued through 1965.

8. *(Continued)*

11. The announced Soviet force reductions will probably bring some reduction in Long Range Aviation strength, but in 1965 the USSR will probably still retain a substantial bomber force. Even after a formidable ICBM capability has been established, the USSR will require long range bombers for a variety of purposes, including attacks on difficult land targets, reconnaissance, and operations against carrier task forces at sea. Air-to-surface missiles will be available in increasing quantity. The Soviets will probably introduce a new medium bomber capable of supersonic "dash," and we estimate that they are developing a long range, supersonic cruise-type vehicle, but BISONs and BADGERs will remain the most numerous of Soviet long range aerodynamic delivery vehicles. (*Paras. 52–64*)

12. Our numerical estimates of Soviet heavy and medium bombers in Long Range Aviation, medium range ballistic missiles, and missile-launching submarines are set forth in the following table:

	Mid-1960	Mid-1961	Mid-1962	Mid-1963	Mid-1964	Mid-1965
Bombers and Tankers [11]						
Heavy	135	150	140	130	120	100
Medium [a]	1,100	950	800	800	800	750
Ballistic Missiles						
700 n.m.						
Operational Inventory	250	350	450	450	450	450
Launchers [12]	110	150	150	150	150	150
1,100 n.m.						
Operational Inventory	80	160	240	300	300	300
Launchers [12]	50	100	100	100	100	100
Missile Submarines						
"Z" Class [b]	4	4	4	4	4	4
"G" Class [c]	9	14	18	18	18	18
Nuclear [d]	0	0	2	6	10	14

[a] Probably including a few new supersonic "dash" bombers in 1961, building up to perhaps 100 by 1963–1964.
[b] Each "Z" class submarine would probably carry two missiles.
[c] Each "G" class submarine would probably carry about six missiles.
[d] Each nuclear-powered submarine would probably carry 6–12 missiles.

[11] The Assistant Chief of Staff, Intelligence, USAF, believes that the numbers of bombers and tankers, should read:

	Mid-1960	Mid-1961	Mid-1962	Mid-1963	Mid-1964	Mid-1965
Bombers and Tankers						
Heavy	135	150	175	200	200	200
Medium [a]	1,100	1,000	950	900	800	800

[a] Probably including a few new supersonic "dash" bombers in 1961, building up to some 300 in mid-1965.

[12] The Assistant Chief of Staff, Intelligence, USAF, believes that each operational missile would be provided with a launcher.

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9. NIE 11-8-61 *Soviet Capabilities for Long Range Attack*

~~TOP SECRET~~

SOVIET CAPABILITIES FOR LONG RANGE ATTACK

THE PROBLEM

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

ASSUMPTION

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

CONCLUSIONS

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

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

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

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

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

9. *(Continued)*

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

3. We estimate that the probable Soviet force level in mid-1961 is in the range of 50–100 operational ICBM launchers, together with the necessary operational missile inventories and trained crews. This would probably involve the present existence of 10 to 15 operational ICBM site-complexes. This estimate should be regarded as a general approximation. The major bases for it are our sense of the tempo of the program and our judgment as to the relationship between what we have detected and what we are likely to have missed. We estimate that the program will continue to be deliberately paced and will result in force levels about as follows: 100–200 operational launchers in mid-1962, 150–300 in mid-1963, and 200–400 in mid-1964. Some of the launchers activated in the 1963–1964 period will probably be for a new and improved ICBM system.[4] [5] [6] *(Paras. 42–46)*

4. Soviet force goals for the period beyond 1963–1964 will probably be affected significantly by such developments as US acquisition of numerous hardened and mobile missiles and other improved capabilities, by Soviet development of antimissile defenses, and also by intervening political developments. We are unable to predict what the Soviet judgment will be as to the responses appropriate to these developments. Indeed, it is likely that the Soviet leaders themselves have not yet come to a definite decision as to force goals for 1965–1966.[7] *(Paras. 36, 41, 47, 118)*

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

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

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

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

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

9. *(Continued)*

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

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

7. Long Range Aviation now comprises about 1,000 medium bombers and tankers and about 150 heavy bombers and tankers.[‡] Taking into account a complex of operational factors, but excluding combat attrition,[**] we estimate that at present the Soviets could put about 200 bombers over North America on two-way missions in an initial attack.[10] Medium bombers of Long Range Aviation, together with several hundred such bombers in other Soviet air components, are suited primarily for missions against Eurasian and peripheral targets. A new medium bomber with supersonic "dash" capabilities is now entering service. Air-to-surface missiles are available for medium and heavy bombers. The large Soviet manned bomber forces will probably decline gradually in numerical strength, but five years hence the Soviets will probably still supplement their missile forces with medium and heavy bombers for both weapon delivery and reconnaissance. *(Paras. 83–97)*

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

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

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

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

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

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

Footnotes continued on top of next page.

9. *(Continued)*

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

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

DISCUSSION

I. ROLE OF THE LONG RANGE STRIKING FORCES

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

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

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

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

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

9. *(Continued)*

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

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

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

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

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

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

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

10. NIE 11-8/1-61 *Strength and Deployment of Soviet Long Range Ballistic Missile Forces*

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NATIONAL INTELLIGENCE ESTIMATE

NIE 11-8/1-61

STRENGTH AND DEPLOYMENT OF SOVIET LONG RANGE BALLISTIC MISSILE FORCES*

(SUPPLEMENTS NIE 11 - 8 - 61)

THE PROBLEM

To estimate current Soviet operational strength in ICBM's and other ground-launched ballistic missiles with ranges of 700 n.m. or more, to identify present areas and methods of deployment, and to estimate the probable trends in strength and deployment over the next few years.

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* NIE 11-8/1-61 revises and updates the estimates on this subject which were made in NIE 11-8-61: "Soviet Capabilities for Long Range Attack", TOP SECRET, 7 June 1961. [ ] The new estimate is issued [ ] so that the reader can fully appreciate the quantity and quality of information on which it is based.

A brief summary of this estimate, [ ] will be included in the forthcoming NIE 11-4-61: "Main Trends in Soviet Capabilities and Policies, 1961-1966", now scheduled for completion in December 1961. In that estimate, the treatment of ground launched missiles will be incorporated into a summary of the entire Soviet long-range attack capability, including bombers, air-to-surface missiles, and submarine-launched missiles. For our current estimates on these latter elements of the long range striking force, see NIE 11-4-61, Annex A: "Soviet Military Forces and Capabilities", 24 August 1961, TOP SECRET, paragraphs 16-23.

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CONCLUSIONS

1. New information, providing a much firmer base for estimates on Soviet long range ballistic missiles, has caused a sharp downward revision in our estimate of present Soviet ICBM strength but strongly supports our estimate of medium range missile strength.

2. We now estimate that the present Soviet ICBM strength is in the range of 10 - 25 launchers from which missiles can be fired against the US, and that this force level will not increase markedly during the months immediately ahead. 1/ We also estimate that the USSR now has about 250-300 operational launchers equipped with 700 and 1,100 n.m. ballistic missiles. The bulk of these MRBM launchers are in western USSR, within range of NATO targets in Europe; others are in southern USSR and in the Soviet Far East. ICBM and MRBM launchers probably have sufficient missiles to provide a reload capability and to fire additional missiles after a period of some hours, assuming that the launching facilities are not damaged by accident or attack.

3. The low present and near-term ICBM force level probably results chiefly from a Soviet decision to deploy only a small force of the cumbersome, first generation ICBMs, and to press the development of a smaller, second generation system. Under emergency conditions the existing force could be supplemented somewhat during the first half of 1962, but Soviet ICBM strength will probably not increase substantially until the new missile is ready for operational use, probably sometime in the latter half of 1962. After this point, we anticipate that the number of operational launchers will begin to increase significantly. On this basis, we estimate that the force level in mid-1963 will approximate 75-125 operational ICBM launchers. 2/

1/ The Assistant Chief of Staff, Intelligence, USAF, does not concur in this sentence. See his footnote following the Conclusions.

2/ The Assistant Chief of Staff, Intelligence, USAF, does not concur in paragraph 3. See his footnote following the Conclusions.

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4. In addition to 700 and 1,100 n.m. missiles now available, the USSR will probably have a 2,000 n.m. system ready for operational use late this year or early next year. The USSR's combined strength in these missile categories will probably reach 350-450 operational launchers in the 1962-1963 period, and then level off.

5. Soviet professions of greatly enhanced striking power thus derive primarily from a massive capability to attack European and other peripheral targets. Although Soviet propaganda has assiduously cultivated an image of great ICBM strength, the bulk of the USSR's present capability to attack the US is in bombers and submarine-launched missiles rather than in a large ICBM force. While the present ICBM force poses a grave threat to a number of US urban areas, it represents only a limited threat to US-based nuclear striking forces. 3/

3/ The Assistant Chief of Staff, Intelligence, USAF, does not concur in paragraph 3 and the last sentence of paragraph 5. See his footnote following the Conclusions.

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Position on ICBM force levels of the Assistant Chief of Staff, Intelligence, USAF:

1. The Assistant Chief of Staff, Intelligence, USAF believes that the Soviets had about 50 operational ICBM launchers in mid-1961 and that they will have about 100 in mid-1962 and about 250 in mid-1963. In his view, the early availability and high performance record of the first generation ICBM indicates the probability that, by mid-1961, substantial numbers of these missiles had been deployed on operational launchers. Four considerations weigh heavily in this judgment:

a. The continuance of [ ] firings of the first generation ICBM;

b. The feasibility of adapting the type "C" pad - now identified as being deployed in the field - for use with the first generation system;

c. [ ]

d. The USSR's current aggressive foreign policy indicates a substantial ICBM capability.

2. In view of the time that has passed since the first generation system became suitable for operational deployment, now over 18 months, the Assistant Chief of Staff, Intelligence, USAF believes that about 50 operational launchers in mid-1961 is likely, even though the Soviets may have elected to await development of second generation missiles before undertaking large-scale deployment.

3. The Assistant Chief of Staff, Intelligence, USAF believes that the force now deployed constitutes a serious threat to US-based nuclear striking forces.

4. As to the future, the Assistant Chief of Staff, Intelligence, USAF believes that the Soviets will continue to deploy first generation missiles, as an interim measure until the second generation missiles become available. He believes that the Soviets would prefer this approach to acceptance of an inordinate delay in the growth of their ICBM capabilities. Once the second generation system has become operational, which could be in early 1962, he believes that deployment will be accelerated, with first generation missiles being withdrawn from operational complexes and replaced by the new missiles. It is evident from their test program that the Soviets feel obliged to increase the tempo of their efforts. The Assistant Chief of Staff, Intelligence, USAF believes that this sense of urgency, plus the gains realizable from experience will result, in the next year or two, in a launcher deployment program more accelerated than that indicated in the text.

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DISCUSSION

6. The requirement to revise our estimates on Soviet long range ballistic missile forces stems from significant recent evidence [ ] the 1961 activities at the Soviet ICBM and space vehicle test range has provided information on the new types of ballistic vehicles now being developed and on the pace and progress of the development programs. [ ] the first positive identification of long range ballistic missile deployment complexes, [ ] excellent guidance as to Soviet deployment methods, [ ] useful evidence on the general status and organization of long range missile forces. Therefore, although significant gaps continue to exist and some of the available information is still open to alternate interpretations, the present estimate stands on firmer ground than any previous estimate on this critical subject.

ICBM Development

7. The test-firing program from the Tyuratam CBM and space launching rangehead has been much more intensive in 1961, and has at the same time suffered many more failures, than in any other period in its four year history. Thirty-nine launching operations were undertaken between January and 17 September 1961. 4/ Of these, 13 involved either first generation ICBMs or space vehicles using essentially the same booster. All but one of these 13 were generally successful. The other 26 operations involved new vehicles not previously observed in range activities. Of these, only about half resulted in generally successful

4/ A more recent launching operation on 19 September 1961, which resulted in a failure, cannot as yet be categorized as to type of vehicle.

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firings which reached the vicinity of the instrumented impact areas. Of the last seven operations involving new vehicles, however, six have been generally successful. (See Figure 1.)

8. One of the new vehicles (called Category B by US intelligence) is probably a second generation ICBM; the other (Category C) may be a competitive ICBM design or a special vehicle to test ICBM and space components. Both are tandem staged, that is, the upper stage is ignited at altitude as in the case of Titan, rather than at launch as in the case of Atlas and the first generation Soviet ICBM. Our data are sufficient to show that both of the new vehicles are liquid propelled, but not to establish whether the propellants are storable or non-storable. Some aspects of [ ] performance of the upper stage of the Category B vehicle are similar to those of the 2,000 n.m. missile, which was tested intensively at Kapustin Yar for some months preceding the Category B operations at Tyuratam. The vehicles fired to a distance of 6,500 n.m. into the Pacific on 13 and 17 September 1961 were probably Category B vehicles. Some relationship seems to exist between the upper stages of the Category C vehicle and Venus probes. Despite this apparent relationship with space vehicles, it was a Category C firing which immediately preceded Khrushchev's remark to McCloy last July, that a "new ICBM" had been launched successfully. No further details are known about the configuration, propulsion, guidance, range, or payload of the new vehicles. 5/

9. The 1961 tests confirm our previous estimate that the Soviets would develop a new ICBM system, and we continue to believe that a major requirement for such a system is a missile which can be more readily handled and deployed than their original ICBM. This belief is supported by a reliable clandestine source who learned, in 1960 or early 1961, that the Soviet leadership desired an ICBM using higher-energy fuel which

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5/ We have taken note of Soviet statements concerning a 100 megaton weapon. We do not believe that present Soviet capabilities include a missile warhead with 100 megaton yield or a ballistic vehicle capable of delivering such a warhead to intercontinental ranges. We will examine this matter in fuller detail in an early estimate.

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would require less bulk. In order to be flight tested in early 1961, design work on a new missile was certainly underway in 1958. Nuclear tests appropriate to the development of lighter warheads were conducted in 1957 and 1958; the current nuclear testing program may serve further to prove the warhead design.

10. Although the flight-test failures in the first half of 1961 probably set back the Soviet schedule for development of second generation missiles, it is clear from the test range activities that the R&D program has been pursued with great vigor. The recent successes with the Category B vehicle, and the probable firing of such vehicles to 6,500 n.m. after only about 8 months of testing to Kamchatka, suggest that the initial difficulties with this system may now have been largely overcome. Moreover, it is probable that one or both the new vehicles have borrowed components or at least design techniques from proven systems, thereby aiding the R&D program. We believe that the program will continue to be pursued with vigor, and that a smaller, second generation ICBM will have been proven satisfactory for initial operational deployment in the latter half of 1962.

11. Thus we believe that the first generation system will be the only Soviet ICBM system in operational use for the months immediately ahead and probably for about the next year. Despite its inordinate bulk and the other disadvantages inherent in a non-storable liquid fueled system, the first generation system is capable of delivering a high yield nuclear warhead with good accuracy and reliability against targets anywhere in the US. (For a summary of its estimated operational characteristics, see Figure 2.) Test range launchings of first generation missiles (now called Category A) continued from January through July. [

] These latest Category A firings were normal, [

] Firings 16 hours apart could reflect

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the training of operational crews for launching second salvos, but it cannot be determined whether these firings were from a single pad. Accuracy could not be determined, but reliability continued high. 6/

Utilization of Launching Pads

12. Soviet ICBM capabilities at present depend in part, and in the near future will depend in considerable measure, upon whether or not the deployment complexes now being discovered [ ] can be used to fire first generation missiles, or whether they cannot become fully operational until a second generation missile becomes available. The first generation missile is obviously compatible with massive, fully rail-served launchers similar to those at Tyuratam Areas A and B. But the launchers at confirmed field complexes, whose construction began only in late 1959 or thereafter, resemble the simplified pair of pads at Tyuratam Area C, where missiles are transported to the pad by road and some of the support equipment is mounted on vans. (For artists' conceptions of the launchers at Tyuratam and a layout of the rangehead, see Figures 3-5.)

13. From our examination of the 1961 test firing program, the physical dimensions of various items at Areas A and C, and the requirements for handling and firing the first generation missile, we conclude that the simplified Area C was designed for a new and smaller missile now being test fired. Although it is technically feasible for the Soviets to adapt the rail-based first generation missile to road served launchers of the type at Area C, it would be necessary to redesign much of the check-out, handling, erecting, and fueling equipment. This redesigned equipment would differ from both that at Area A and that designed for use with the

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6/ To date we have no firm evidence to indicate that the Soviets have experimentally investigated the decoy problem in ICBM flights to Kamchatka. [ ] We believe that the Soviets can and will provide decoy protection, should they deem it necessary.

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new missile. Such action might have been taken as an interim measure if a long delay in the advent of the second generation system had been anticipated well in advance.

ICBM Deployment

14. [ ] over the past three months, we have positively identified three ICBM complexes under construction. Two are near Yur'ya and Yoshkar-Ola, in a region several hundred miles northeast of Moscow, and the third is near Verkhnyaya Salda in the Urals. The paired, road-served pads at these complexes closely resemble those at Tyuratam Area C. Near Kostroma, in the same general region but closer to Moscow, [ ] we believe this is possibly a fourth complex similar to the others. [ ] Plesetsk, farther to the northwest, [ ] was too limited either to confirm or rule out this location as an ICBM deployment complex. (The locations of presently known and suspected areas of ICBM deployment activities are shown in Figure 9.)

15. The new evidence confirms that the present Soviet deployment concept involves large, fixed complexes, with multiple pads and extensive support facilities. The identified deployment complexes are served by rail spurs which provide their major logistic support. The complexes are highly vulnerable to attack. For example, although the Yur'ya complex is quite large, the entire installation is soft and each pair of pads is separated from its neighbor by only 3-4 n.m. [ ] For active defense against aircraft, SA-2 surface-to-air missile sites are being installed near the complexes.

16. At Yur'ya, the confirmed complex whose construction appears most advanced, eight launchers in four pairs were observed in various

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stages of construction in mid-1961 (see Figure 6). Considerations of logistics and control, together with evidence from the MRBM program and other factors, lead us to believe that eight is the typical number of launchers for this type of complex. 7/ Each pair of launchers has checkout and ready buildings which are probably capable of housing a missile for each pad; however, the extent of the support facilities strongly suggests that additional missiles are to be held there to provide a reload or standby capability. The designed salvo capability of the complex is apparently to be eight missiles. There would be at least 5 minutes delay between groups of four missiles if the system is radio-inertial (as is the first generation ICBM) and if one set of guidance facilities is provided for each pair of launchers. A second salvo might be attempted after some hours, assuming the launching facilities were not damaged by accident or attack. Although we have no direct evidence on this matter, we believe it might be feasible to prepare a second salvo in 8-12 hours.

17. On the basis of evidence dating back to 1957 and other more recent information, we have estimated that Plesetsk is an ICBM complex with rail-served launchers designed to employ the first generation ICBM. The installation at Plesetsk (see Figure 7) is even larger than the Yur'ya complex. Although the presence of ICBM launchers has not been confirmed, there are SAM sites, several very large support areas, and numerous buildings, including what appears to be housing for some 5,000 to 15,000 persons. [ ] evidence is inadequate to establish the number of launchers which may be at Plesetsk. We believe that the number may be as few as two, but four or more is also possible. An ICBM complex involving this much equipment, investment, and personnel would probably have a reload of at least one missile per pad. Based on

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7/ The Assistant Chief of Staff, Intelligence, USAF, believes that this typical number may be larger than eight. He agrees, however, that if guidance facilities are provided for each pair of launchers, the sequence of launching would be as described in the text.

Tyuratam experience, we estimate the time to prepare a second salvo at about 16 hours. 8/

18. The new evidence gives a better measure of the timing of some ICBM deployment activities. Based on its size, the extent of its facilities, and its present state of construction, the Yur'ya complex must have been started in the autumn of 1959, concurrent with or very shortly after the start of construction at Tyuratam launch Area C. Yur'ya is probably one of the earliest complexes of its type. Construction and installation of equipment will probably be completed some time early in 1962. The similar complex at Yoshkar-Ola is many months behind Yur'ya; the evidence is less conclusive with respect to Kostroma and Verkhnyaya Salda, but what can be seen is apparently in the early stages of construction. From the evidence, therefore, we have reasonably firm indications that at least two years were used for the construction of even the simpler ICBM complexes, although this may be reduced to about 18 months as experience is gained.

Adequacy of Recent Intelligence Coverage

19. [ ] since mid-1960, our coverage of suspected deployment areas in the USSR has been substantially augmented. [ ] Soviet missile test range installations, [ ] are now known to bear a close resemblance to deployment sites in the field. On the basis of this activity, combined with other information and analysis, we now estimate that we have good intelligence coverage of [

8/ The Assistant Chief of Naval Operations (Intelligence), Department of the Navy, believes that evidence of ICBM deployment at Plesetsk is indeterminate but that, in the aggregate, it points against such deployment.

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more than 50 percent of those portions of the USSR within which ICBM deployment is most likely. 9/

20. Of the five confirmed or possible ICBM complexes Yur'ya, Plesetsk, and Verkhnyaya Salda were previously suspected We previously had not suspected Yoshkar-Ola or Kostroma.

21. many previously suspected areas did not contain ICBM complexes as of the summer of 1961. Four areas remain under active consideration as suspected locations of ICBM deployment activity (see Figure 9). Past experience indicates that some or all of the areas now under active consideration may prove to be negative, and conversely, that deployment activity may now be under way in other unsuspected areas.

9/

10. *(Continued)*

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Probable ICBM Force Levels 10/

22. We believe that our coverage of both test range activities and potential deployment areas is adequate to support the judgment that at present there are only a few ICBM complexes operational or under construction. While there are differences within the intelligence community as to the progress of the Soviet program to date and the precise composition of the current force, we estimate that the present Soviet ICBM capability is in the range of 10-25 launchers from which missiles can be fired against the US. The low side of this range allows for the possibility that the Soviets could now fire only a token ICBM salvo from a few launchers, located at the Tyuratam rangehead and an operational complex, perhaps Plesetsk. The high side, however, takes into account the limitations of our coverage and allows for the existence of a few other complexes equipped with first generation missiles, now operational but undetected.

23. The Soviet system is probably designed to have a refire capability from each launcher. The USSR may therefore be able to fire a second salvo some hours after the first, assuming that the launching facilities are not damaged by accident or attack.

24. The reasons for the small current capability are important to an estimate of the future Soviet buildup. The first generation system, designed at an early stage of Soviet nuclear and missile technology, proved to be powerful and reliable but was probably too cumbersome to be deployed on a large scale. One or more first generation sites may have been started but cancelled. [

] The urgent development of at least one second generation system probably began in about 1958, and an intensive firing program is now underway concurrent with the construction of simplified deployment complexes.

10/ The Assistant Chief of Staff, Intelligence, USAF, does not concur in the estimate of ICBM force levels. For his position, see his footnote following the Conclusions.

10. *(Continued)*

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We therefore believe that in about 1958 the Soviet leaders decided to deploy only a small force of first generation ICBMs while pressing toward second generation systems.

25. The net effect of this Soviet decision, together with whatever slippage is occurring in the development of second generation systems, has been to produce a low plateau of ICBM strength. Under emergency conditions the existing force could be supplemented during the first half of 1962 by putting some second generation ICBMs on launcher at one or two completed complexes before the weapon system has been thoroughly tested. However, the Soviets could not have very much confidence in the reliability, accuracy and effectiveness of such a force. In any event, operational ICBM strength will probably not increase substantially until the new missile has been proved satisfactory for operational use, probably some time in the latter half of 1962. Alternatively, the possibility cannot be excluded that second generation ICBMs could be proved satisfactory for operational use somewhat earlier in 1962, possibly as soon as the first simplified complex is completed. After this point, we anticipate that the number of operational launchers will begin to increase significantly.

26. We continue to believe, for the many reasons adduced in NIE 11-8-61, that the Soviet leaders have desired a force of several hundred operational ICBM launchers, to be acquired as soon as practicable over the next few years. In addition to the complexes known to be under construction, it is probably that work is under way on other undiscovered complexes and that the construction of still others is scheduled to begin soon. Taking account of this probability, together with our present intelligence coverage and our information on site activation lead-time, we estimate that the force level in mid-1963 will approximate 75-125 operational ICBM launchers. The high side of this range allows for eight complexes of eight launchers each under construction at the present time, with four more scheduled to begin by the end of the year; it would

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require site activation time to decrease to about 18 months by the end of the year; it builds from a present force level of about 25 operational launchers. The low side of the mid-1963 range would be achieved if six complexes were now under construction, two more were begun by the end of the year, and the present force level were only about 10 launchers.

27. As noted in NIE 11-8-61, Soviet force goals for the period to 1966 will be increasingly affected by developments in US and Soviet military technology, including the multiplication of hardened US missile sites, the possible advent of more advanced Soviet missiles which can better be protected, and by developments in both antimissile defenses and space weapons. The international political situation will also affect Soviet force goals, and there is a good chance that the Soviet leaders themselves have not yet come to a definite decision. We have not been able as yet to review, in the light of the new evidence, these and other considerations pertaining to the probable future pace of the Soviet ICBM program. Therefore we are unable to project a numerical estimate beyond mid-1963. Considering the problems involved in site activation, however, we believe that a rate of 100 or possibly even 150 launchers per year beginning in about 1963 would be feasible. To accomplish such a schedule, the USSR would have to lay on a major program of site construction within the next year, which we believe would be detected

[ ]

Medium and Intermediate Range Ballistic Missiles

28. [ ] confirms the large-scale deployment of 700 and 1,100 n.m. ballistic missiles in western USSR. [ ] approximately 50 fixed sites with a total of about 200 pads suitable for launching these MRBMs have been firmly identified in a wide

belt stretching from the Baltic to the southern Ukraine. [ ] we are virtually certain that there are about 10 additional sites [ ] Taking account of indicators pointing to still other locations [ ] we estimate with high confidence that in the western belt alone there are now about 75 sites with a total of about 300 launch pads, completed or under construction. (For known and estimated site locations in this area, see Figure 9.)

29. The new information does not establish whether individual sites are fully operational, nor does it reveal which type of missile each is to employ. [ ] approximately three-quarters of the identified sites appeared to be complete or nearly so, some were under construction, and the evidence on others is ambiguous. Construction has probably been completed at some sites [ ] the installation of support equipment and missiles could probably be accomplished relatively quickly thereafter, perhaps in a period of some weeks. Three basic site configurations have been observed, all of them bearing a strong resemblance to launch areas at the Kapustin Yar rangehead (see Figure 8). Any of the three types could employ either 700 or 1,100 n.m. missiles, whose size and truck-mounted support equipment are virtually identical. The sites could not employ ICBMs, but one type might be intended for the 2,000 n.m. IRBM which has been under development at Kapustin Yar.

30. On the basis of the new evidence and a wealth of other material on development, production, training and deployment, we estimate that in the western belt alone the USSR now has about 200-250 operational launchers equipped with 700 and 1,100 n.m. ballistic missiles, together with the necessary supporting equipment and trained personnel. From these launchers, missiles could be directed against NATO targets from Norway to Turkey. On less firm but consistent evidence, about 50 additional

launchers are believed to be operational in other areas: in the Transcaucasus and Turkestan, from which they could attack Middle Eastern targets from Suez to Pakistan; and in the southern portion of the Soviet Far East within range of Japan, Korea, and Okinawa. [ ] the presence of some sites in Turkestan and in the Soviet Far East, north of Vladivostok.

31. On this basis, we estimate that the USSR now has a total of about 250-300 operational launchers equipped with medium range ballistic missiles, the bulk of them within range of NATO targets in Europe. This is essentially the same numerical estimate as given in NIE 11-8-61, but it is now made with greater assurance.

32. Contrary to our previous view that MRBMs were deployed in mobile units, we now know that even though their support equipment is truck-mounted, most if not all MRBM units employ fixed sites. Like the ICBM complexes, these are soft, screened from ground observation by their placement in wooded areas, and protected against air attack by surface-to-air missile sites in the vicinity. The systems are probably designed so that all ready missiles at a site can be salvoed within a few minutes of each other. Two additional missiles are probably available for each launcher; a second salvo could probably be launched about 4-6 hours after the first. There is some evidence that after one or two salvos the units are to move from their fixed sites to reserve positions. Their mobility could thus be used for their immediate protection, or they could move to new launch points to support field forces in subsequent phases of a war.

33. The Soviet planners apparently see a larger total requirement for MRBMs and IRBMs than we had supposed. While the rate of deployment activity in the western belt is probably tapering off after a vigorous three-year program, some sites of all three basic types are still under construction. There will therefore be at least some increase in force levels in the coming months. The magnitude of the buildup thereafter will depend largely on the degree to which the 2,000 n.m. system is deployed,

and whether or not it will supplement or replace medium range missiles.

34. With the advent of the 2,000 n.m. IRBM, probably in late 1961 or early 1962, the Soviets will acquire new ballistic missile capabilities against such areas as Spain, North Africa, and Taiwan. To this extent at least, they probably wish to supplement their present strength. They may also wish to deploy IRBMs or MRBMs to more northerly areas within range of targets in Greenland and Alaska. Moreover, evidence from clandestine sources indicates that the Soviet field forces are exerting pressure to acquire missiles of these ranges. In general, however, we believe that the future MRBM/IRBM program will emphasize changes in the mix among the existing systems, and later the introduction of second generation systems, rather than sheer numerical expansion. Taking these factors into account, we estimate that the USSR will achieve 350-450 operational MRBM and IRBM launchers sometime in the 1962-1963 period, and that the force level will be relatively stable thereafter.