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INTELLIGENCE ASPECTS OF THE "MISSILE GAP"

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CONTENTS

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NATURE OF THE ISSUE

The "missile gap" crisis was a crisis in American confidence about the future adequacy of US power to deter Soviet aggressiveness. The issue was whether the defense programs of the Eisenhower administration in the late 1950's would extend America's superiority in strategic strength into the early 1960's, or whether instead the administration's policies were allowing the USSR to shift the strategic balance markedly in its own favor.

The "gap" or "lag" was often viewed in very simple terms--that is, the comparison between the number of nuclear-armed intercontinental ballistic missiles (ICBMs) the Soviets were expected to have operational in the ensuing few years and the number the US planned to have operational in those years. More sophisticated interpretations existed--for example, ones which added shorter range missiles into the balance, and ones which calculated how many US bases the Soviets might knock out in a surprise ICBM attack. In these as in the simpler interpretation, however, the nub of the issue was the expected relative strength of the two sides in ICBMs, the degree to which this would affect the overall strategic balance, and the effect on the American deterrent.

US intelligence was the authority responsible for estimating the Soviet side of the strategic equation. In a series of National Intelligence

Estimates (NIEs) issued in 1957-1960, the United States Intelligence Board (USIB) set forth the judgments which contributed to the "missile gap" crisis. These were issued as highly-classified documents within the Executive Branch and formed the basis for highly-classified briefings to Congressional Committees. As the controversy unfolded, much was said publicly by Administration officials, legislators, and newsmen about the nature of these estimates. Their terminology, methodology, and accuracy were all debated at length. So was the effect on the "missile gap" of adjustments made in the estimates from time to time.

Although the NIEs contributed to the "missile gap" crisis, US intelligence was not wholly responsible for it or for the public reaction to it. These aspects resulted from a comparison with US programs. Such a comparison, Allen Dulles pointed out repeatedly, was not within the purview of the intelligence community. "We are not in the business of passing upon whether there is such a thing as a 'missile gap'," he said in 1960. He was not in the business of revealing his estimates in public, either. But intelligence was caught in the middle in a major policy issue between a Republican Administration and a Democratic Congress in the years between Sputnik and the US Presidential elections. The public ventilation of this issue and of the NIEs was not the doing of intelligence.

On the other hand, there is no denying that the key fact about the NIEs of the period was that US intelligence was grossly overestimating Soviet ICBM prospects for the early 1960's. And intelligence did not learn the truth and correct its gross error until 1961.

THE ESTIMATES AND THE CHANGES IN THEM

During the years from 1957 through 1961, the USIB completed sixteen separate estimates dealing with Soviet ICBM development and deployment. This was an unusually large number of estimates to be made on one topic. The reasons included the difficulty of the problem, the uncertainties involved, and the critical nature of the subject.

The NIEs were ultimately the responsibility of the Director of Central Intelligence (DCI), the position held by Allen Dulles throughout the period. The estimates were not exclusively the work of the DCI or the CIA, however. As chairman of USIB, the DCI was joined by the other top intelligence officers of the government, both civilian and military, in considering and passing final judgment on draft NIEs.* The drafts were prepared by CIA's Board of National Estimates (BNE), then under Sherman Kent, on the basis of contributions invited from all agencies having competence in the subject matter. BNE coordinated these drafts

* During most of the period under consideration, the membership of USIB comprised the DCI and the intelligence officers of the Department of State, the Army, Navy, and Air Force, the Joint Staff of the JCS, the National Security Agency, the AEC and the FBI. The FBI member regularly abstained from NIEs on Soviet military programs. Late in 1961, the director of the newly-created Defense Intelligence Agency was added.

with representatives of the USIB member-agencies before submitting them to USIB for review and approval. For estimates of missile development and performance, BNE usually received a precoordinated contribution from the Guided Missile and Astronautics Intelligence Committee of USIB (GMAIC), whose members were technical missile specialists from each agency.

Numerous consultants from outside the intelligence community were also called on by the various agencies as they analyzed the data and prepared contributions to estimates. In 1957-1958, CIA alone used approximately 40 consultants from outside the intelligence community, largely from industry, the universities, and government, to help in analyzing various aspects of the missile problem. In addition, from 1958 onwards, the DCI empaneled a group of senior and respected outside experts under Mr. L. A. Hyland of Hughes Aircraft, to review the evidence periodically and to offer their judgment as to the reasonableness of the estimates being made on the status of the Soviet ICBM program.

All of this involved a considerable number of people--some hundreds in the analytical and estimating business, not considering those concerned with information collection and processing. And the process of making estimates in this field was so time-consuming that the BNE and agency representatives working on these NIEs were sometimes in

session for weeks at a stretch. One NIE, originally scheduled for completion in the latter part of 1959, proved so troublesome that it was not finally passed by USIB until February 1960. The time taken, however, is perhaps as good an illustration as any of the determination of BNE and the DCI to hear all relevant evidence and argument so as to arrive at the best estimate possible. Throughout the entire period, there was never any serious suggestion from any official or agency or consultant of the Executive Branch that any information or opinion failed to get a prompt, impartial hearing.

The estimates were heavily caveated in an effort to warn users that the evidence was fragmentary and inconclusive. Ranges of uncertainty of various sorts were employed, e.g. "probable" dates vs. "possible" dates, and spreads of high and low numbers. While these practises were not new, they were more frequently applied to the ICBM estimates than was usual in NIEs, and the estimates were thus quite complicated.

Another element of complication was the presence of a major dissent registered by at least one member of USIB in every estimate in the series from the beginning of 1960 onwards. Often several members registered separate dissents disagreeing with the USIB majority and also with each other. The most extreme case was the NIE issued on 1 August 1960, in which the DCI stood alone in his estimate of the

probable Soviet ICBM deployment program and two other alternative programs, with their adherents among members of USIB, were written into the text of the estimate.

Estimates of Soviet ICBM Deployment

The main elements in the NIEs contributing to the "missile gap" crisis were estimates of "when" and "how many." These questions were the sole ones in the simpler, numbers-matching version of the "gap" controversy. Questions of "how good" were vital to the more sophisticated version which sought to measure the Soviet threat against cities and SAC bases and the other targets of the deterrent forces of that time. These ICBM performance aspects of the NIEs will be discussed in later paragraphs.

The many complications in the ICBM estimates, the frequency of revisions, and the attempts to refine the terminology, make it difficult even in retrospect to compare successive estimates in the series. Even now there is the possibility of confusion which was voiced by critics of the Eisenhower Administration at the time. But in order to deal with such a large number of successive estimates, we must try to strip away the nuances and get at the impression they created about Soviet operational capabilities.

On this stripped-down basis, the NIEs of 1957-1961 fall into several groupings by time:

--In March 1957, before the first Soviet ICBM shots and the launching of Sputnik, USIB estimated that the USSR would probably have an initial operational capability (IOC) with a few ICBMs in 1960 or 1961. In very guarded terms it was estimated to be "feasible and reasonable" for the Soviets to acquire a "stockpile" of 100 operational ICBMs by the end of 1960, 500 by the end of 1962, and 1,000 by the end of 1965, assuming that IOC was at the earliest part of the spread date.

--In December 1957, in its first post-Sputnik estimate on ICBMs, USIB advanced the probable IOC date to mid-1958 to mid-1959. It indicated that the Soviets could have an "operational capability" with 100 ICBMs in the period mid-1959 to mid-1960, and with 500 in mid-1960 to mid-1961 or at most a year later.

--From May to December 1958 various adjustments were made which pushed the probable dates back. In December, the probable IOC date was given as 1959, the probable time period by which the Soviets could have an "operational capability" with 100 ICBMs was mid-1960 to mid-1961, and with 500 in 1962. The possibility was left open that the Soviets might have the 500 in 1961, but this possibility was rated unlikely.

--In November 1959 and February 1960, the estimated IOC date was changed to 1 January 1960. This date was held thereafter. The ICBM program as a whole was described as not a "crash" program. The basis for measuring the threat was changed to "ICBMs on launcher," and the probable number of operational Soviet launchers was then estimated successively as follows:

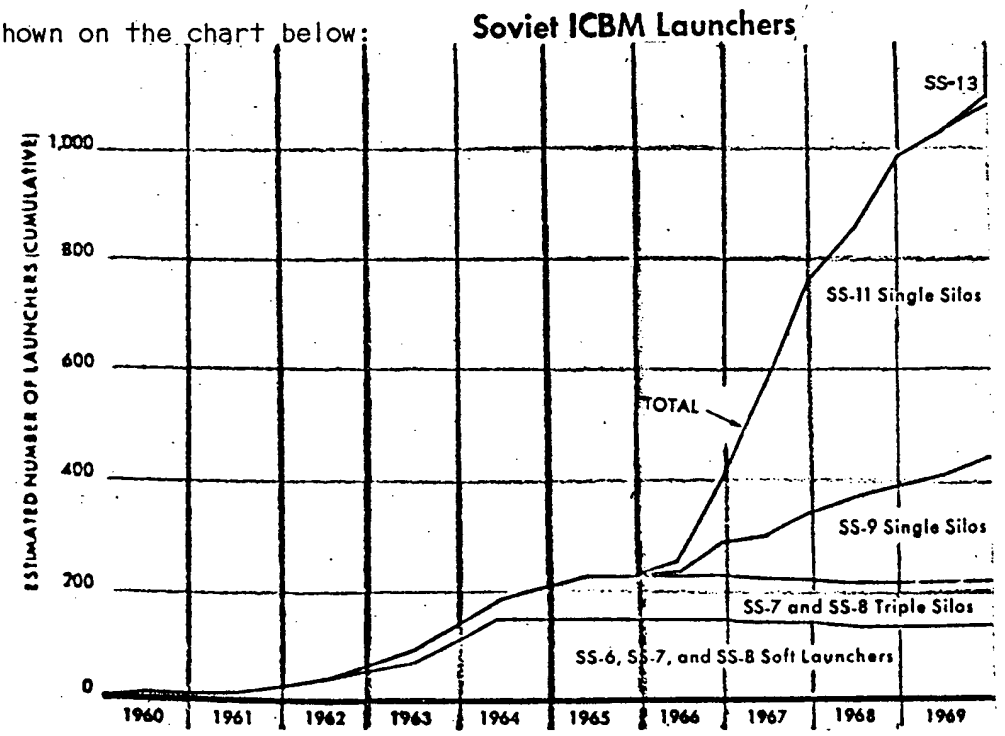
Estimate Made	For Mid-1960	For Mid-1961	For Mid-1962	For Mid-1963
February 1960				
CIA or USIB Majority	35	140-200	250-350	350-450
(Spread of dissents)			(to 500)	(to 800)
August 1960				
CIA or USIB Majority	30	150	270	400
(Spread of dissents)	(a few-35)	(50-200)	(125-450)	(200-700)
June 1961				
CIA or USIB Majority		50-100	100-200	150-300
(Spread of dissents)		(a few-125)	(50-300)	(100-550)
September 1961				
CIA or USIB Majority		in Sept. 10-25	little more than 10-25	75-125
(Spread of dissents)		(to 50)	(to 100)	(to 250)

In the table above, it should be noted that as a general rule Air Force produced dissenting estimates higher than those of the CIA or USIB majority, whereas Army was usually on the low side. Army was sometimes joined by Navy. The Joint Staff and the State Department sometimes estimated on the high side.

The foregoing summary shows that the estimates of December 1957 and 1958 were the most alarming from the point of view of "how many"

and "how soon." The worst case presented by these estimates was that the Soviets might be capable of having 500 ICBMs ready to employ as early as mid-1960 or the beginning of 1961. The general trend was to back off from the initial alarming post-Sputnik estimates. The transition in measuring-sticks from "operational ICBMs" to "ICBMs on launcher" made it very difficult to compare the estimates made before and after 1959, but the estimators' intention was to make relatively gradual adjustments when changing the numbers and dates in each of the NIEs through August 1960. No very marked change in the impression of the threat occurred until US intelligence discovered that the Soviet deployment program bore no resemblance to the existing estimates. That discovery resulted in the sharp downward revision of the estimates in 1961.

For purposes of comparison, the actual growth of the Soviet force of operational ICBM launchers as seen from the vantage point of 1968 is shown on the chart below:



Estimates of Soviet ICBM Performance

The NIEs also estimated the effectiveness of Soviet ICBMs, as they did for all other weapon systems. The general trend in this aspect of the US assessment was to improve the estimated performance characteristics of the Soviet system as time passed, evidence accumulated, and more was learned about Soviet and US experience in testing ICBMs. The estimate of Soviet operational ICBM accuracy was first put at about 5 n.m. CEP at IOC and was improved gradually until in August 1960, it was estimated at 2 1/2-3 n.m. for a radio-inertial version at IOC. Warhead weight, estimated at about 1,500 pounds in March 1957, was raised to 2,000 and then 5,000 and finally, from November 1959 onwards, to 6,000 pounds or more.

Estimates of Soviet ICBM reliability were more complicated. They were more heavily dependent on the deployment scheme to be used by the Soviets and on training methods and standards, which US experience showed could vary greatly. In general, as the estimators learned more about the complexities of big missiles, and especially the problems involved in building an operational force, they became more cautious with respect to the reliability figures they presented. They introduced more factors and incorporated ranges and spreads. The reliability of Soviet ICBMs was given as a flat 50 percent in 1957. By 1959 it was broken down into in-commission rate, on-launcher reliability, and in-flight reliability, each of them given as a spread figure depending on conditions. A combined spread of 42-64 percent was estimated in 1961 for that year.

Estimates of Soviet Force Effectiveness

The estimates of missile performance, such as accuracy and reliability, were normally contributed by the technical specialists of the GMAIC committee. Though sometimes hotly debated by BNE and the USIB representatives, these estimates were almost always accepted with little or no alteration after they left the technical subcommittee. Once accepted, however, they influenced BNE and the representatives in their judgment about the number of ICBMs the USSR would find it worthwhile to have, which was also called Soviet "requirements." As indicated above, the DCI considered that comparative or net estimates involving judgments about the effectiveness of US forces were beyond the purview of intelligence. But Soviet requirements for ICBMs to be employed against US targets could be calculated without regard for US force effectiveness. Because the ICBM was unstoppable, its effects against fixed targets like the bases of US deterrent forces could be calculated solely as a function of its performance and the physical character of the targets themselves.

So in 1960 and early 1961, in an effort to make more realistic forecasts of Soviet ICBM programming, US intelligence made calculations of the threat ICBMs would pose to US fixed targets of various kinds. The calculations showed that surprisingly small numbers of ICBMs having the performance characteristics credited to them would be sufficient theoretically to destroy the major cities of the US and the SAC bases and other soft targets which then housed the great bulk of our retaliatory

systems. It also appeared that the time period during which the US base structure would be highly vulnerable would be quite brief, because of the planned advent of hardened US facilities.

The numerical forecasts made by CIA and the USIB majority were not slavishly geared to these "requirements" calculations, which were only one of many inputs to the estimates. Indeed, the estimators concluded that for a number of reasons such theoretical calculations should not be thought to represent, in the Soviet mind, an opportunity to build forces which could permit them to attack the US without receiving unacceptable damage in retaliation. This was spelled out quite clearly in NIE 11-4-59 of February 1960. On the other hand, in that NIE as well as the accompanying NIE 11-8-59, the estimators made it equally clear that they thought the Soviet force would probably soon be a major factor in the strategic and political competition between the USSR and the US. Their key judgments made on this question in the two NIEs were that "long-range missiles will enable the USSR to overcome its inferiority to the US in nuclear strategic attack capabilities," and further, that "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." NIE 11-8-59 went on to show how the probable growth of the Soviet force would soon put in jeopardy the principal US cities and would, in 1961, constitute "an extremely

dangerous threat" to soft US deterrent force bases.

Thus although these NIEs quite pointedly stated that the USSR would not expect to build forces which would nullify the US deterrent, they did spell out the probable Soviet force effectiveness for the critical 1961 time period in a manner which was directly relevant to the "missile gap" issue in its more sophisticated form. The conclusions drawn were the logical consequence of examining what were considered to be reasonable and probable Soviet deployment programs.

THE EVIDENCE AND ITS INTERPRETATION, 1957-1960

A fundamental fact about the estimates of 1957-1960 is that the estimators were having to employ inadequate evidence and had an inadequate basis for its interpretation. As to the evidence itself, the Soviet security system was the principal reason for its inadequacy. The Soviets made special efforts to guard their missile developments from Western observation. In the early years, they kept German missile scientists in ignorance of the Soviet program while they were being milked of their experience, so that when returned to Germany they would have no information. Khrushchev once admitted that even the names of Soviet missile engineers were classified. These extraordinary Soviet measures did not prevent US intelligence from monitoring test range activities by radar and other technical means. But intelligence was for a long time quite unable to penetrate into Soviet strategic planning and technical design or in

finding ways to search the vast territory of the USSR for production and deployment locations. In 1957-1960 US Intelligence was in fact quite myopic--it could see missile test activity but could not see the other aspects of the missile program which were going on around the testing.

As to a base for interpretation, Intelligence suffered from the newness of missiles and from the lack of US experience with them. Americans in 1957 were unable to answer such questions as what materials of what weights were required to protect an ICBM nosecone on re-entry. Differing answers were forthcoming from US designers when asked whether fixed or mobile deployment was most desirable. And sharp conflict was generated by questions dealing with the utility of missiles for various purposes, because the US was itself debating their strategic role.

The Historical Context

In these circumstances, the historical context had an unusually great influence on the judgments made by the estimators. The historical context always has an important bearing on the making of estiamtes, even in the military and technical fields, because in the final analysis the NIEs are about human decisions, their causes and their consequences. But when direct evidence on the actual path of events and decisions is sparse, the estimator must rely more heavily on the general appearance of the surrounding terrain. Several elements of the historical context

had considerable influence on the estimators as they addressed themselves to the ICBM problem in the late 1950's:

--Sputnik, though accurately forecast by intelligence, had nevertheless been jolting in its implications about Soviet missile capabilities and technical prowess generally.

--The US had committed itself very heavily to deterrence by threat of massive retaliation against the territory of the USSR itself, and it was logical to believe that the Soviets wished urgently to acquire counteracting capabilities of their own.

--The Soviets had an acknowledged capability to build a large intercontinental bomber force, and earlier in the decade had begun what was believed to have been a program to build one, but this program had been curtailed presumably in favor of missiles.

--The Soviets were known to have developed short and medium range ballistic missiles, and they were believed to have deployed them extensively enough so that they could now focus on ICBMs.

--There was a general sense of intensified Soviet competition with the US in many fields, fostered by the ebullient Khrushchev and highlighted by expressions of alarm from US observers outside the intelligence community, including critics of the Administration in Congress and elsewhere.

All of these factors influenced the estimators to give credence to the elements of evidence suggesting an early and urgent Soviet ICBM buildup. Conversely, in these circumstances the estimators were very slow to conclude that an absence of information meant an absence of activity. Thus the context had a considerable bearing on the initial post-Sputnik overestimate and made each downward adjustment, however minor, a matter of lengthy argument and soul-searching.

The historical context also pushed the estimators into what in retrospect seems like overprecision and over-refinement in light of the meager evidence available at the time. The middle and late 1950's were years of sharply climbing weapon system costs and of rapidly lengthening R&D lead-times. US defense planners sought to overcome these problems to some degree by putting much pressure on intelligence to come up with finite predictions against which they could plan. They were especially insistent in the missile field, where everyone was learning and the strategic implications were critical and the Soviets seemed to have a leg up on the US. The estimators responded as best they could, and in the circumstances they tended to resolve their uncertainties in the direction of prudence.*

Test Range Evidence

[redacted] intelligence, [redacted] provided continuous monitoring of the Tyuratam test range

* See Allen Dulles, The Craft of Intelligence, pp. 164 ff., [redacted]

during the entire period under consideration. From the first ICBM test in August 1957, this evidence was good enough to tell promptly when an ICBM had been fired, and usually whether or not it had been generally successful. Coverage of the test range also provided an opportunity to accumulate, though very gradually, evidence about the performance and configuration of the system. Some hints about its likely deployment method--at least that it would be heavily dependent on the Soviet rail network--were derived from U-2 photography of the rangehead beginning in the same month as the first ICBM firing.

From the data on the first firings from Tyuratam in the fall of 1957 (two ICBMs and two earth satellites, all successful), combined with knowledge of the firm foundation the Soviets had acquired through developing and extensively testing shorter range missiles at Kapustin Yar, it was concluded that the USSR was making maximum use of proven components and had already largely solved most major ICBM component problems. The December 1957 estimate rested in part on this conclusion, and also on the belief that the Soviets would seek to acquire a substantial ICBM capability as rapidly as possible, would conduct a rapid program of some 20-50 tests in the very near future, and had a very high priority if not "crash" program to deploy the system.

The adjustments made in the estimates in both 1958 and 1959 were based very largely on test-range evidence. Throughout that period the

test range was virtually the only source of what Allen Dulles called "hard" evidence on ICBMs--that is, evidence known to be true as opposed to such things as Soviet statements. Although the Soviet program suffered some test-flight failures, reliability was generally good. The pace of testing was much slower than originally expected, however. The estimators concluded that the ICBM program was not a "crash" program, but was "orderly" instead. The estimated IOC date was pushed back, eventually to 1 January 1960. This was the time when the Soviets had in fact accomplished about 20 successful ICBM shots, plus a number of space launchings.

During this period, the intelligence analysts had to do some wrestling with the problem of negative evidence from the test range, i.e., the apparent absence of successful test firings, especially in the latter part of 1958. A series of inquiries was made in order to be sure that there was no significant chance of either undetected shots from Tyuratam or the existence of other ICBM test ranges. At one point, Senator Stuart Symington, the Senate's leading expert in air and missile matters, challenged the credibility of the DCI's testimony in briefings to the Senate. He did not believe that the number of test-firings was as small as Mr. Dulles was reporting. In mid-1958, he wrote a letter to the President alleging that there was intelligence information to indicate many more test firings and other evidences of Soviet accomplishment.

This too resulted in a lengthy investigation, which finally showed the Senator's allegations to be unfounded.

The test-range data, while clearly indicating a powerful and reliable Soviet ICBM and space booster, also pointed to potential logistic and operational problems because of its very large size and non-storable propellants. By the end of 1959, the NIEs acknowledged that the gross weight of the vehicle might be 500,000 pounds or more, instead of 300,000 pounds as originally estimated. The estimators mentioned the possibility that the Soviets would experience deployment problems with the first-generation system, but they failed to draw any corresponding conclusions about the size and pace of deployment.

In 1959 and 1960, the NIEs correctly forecast a smaller, follow-on ICBM having less bulk and greater flexibility than the first-generation system, but again without drawing any particular implications about force programming. The Soviets actually began building a launch facility for a second-generation system in 1959, and it was first photographed while still under construction by a U-2 mission in April 1960. US monitoring systems collected evidence of the test-firing program from its inception in late 1960 or early 1961. As late as June 1961, however, the estimators could not tell whether the new facility was for a new ICBM or a simplified deployment method for the original system. Technical analysis of the radar

and other monitoring data did not clarify the issue either.*

By September 1961 it had become clear that not just one but two different follow-on systems were under test at Tyuratam, and it was also clear that the programming of the Soviet force buildup had been very significantly affected.

Production and Deployment Evidence

As of 1 January 1960, the estimators concluded on the basis of test-range data that the Soviet system was ready for operational use, but they were in the awkward position of having also to say that "the hard evidence at hand does not establish whether or not series production of ICBMs has actually begun, nor does it confirm the existence of operational launching facilities."** The estimates made on Soviet ICBM deployment at that time did not, as is usual in "order-of-battle" assessments, begin with a firm base of information and understanding about the current situation, from which future projections are then made. The estimators' interpretations began instead with the judgment that the ability of US intelligence to collect information on ICBM production and deployment was inadequate. Thus "hard" evidence could not be relied on as the basis for an estimate, nor could the absence of such evidence be taken as reflecting an absence of activity. This

* NIE 11-8-61, paragraphs 26 and 29, [redacted]

** NIE 11-5-59, paragraph 72.

judgment was strongly supported by the various consultants the DCI and USIB called in to appraise the evidence and hear the arguments. In November 1958, for example, the Hyland Panel reported to the DCI that it found "the quantity and quality of the total evidence available to be dangerously unsatisfactory. In particular is the situation true regarding evidence on production facilities, training and deployment.'

In 1957-1960, therefore, the estimators had to try to bring to bear whatever elements of indirect evidence and US experience they and their advisors thought relevant to quantity production and deployment of missiles. The rate of test-firings was a factor in the estimate because it was thought to indicate the pace of the overall program. So were such things as US training schedules and the estimated production capacities of various airframe and automotive plants in the USSR. In general, this type of evidence was used mainly to attempt to get a "feel" for what would be a reasonable size and reasonable schedule for the Soviet deployment program, rather than to put any firm constraints on it. Adjustments in the numerical estimates prior to 1961 were therefore based on general estimative judgment, even though sometimes they were assumed to be based on hard facts.

One result of the need to seek out indirect evidence of this type was gradually to give CIA production and deployment specialists a better

understanding of what was involved in a big missile program. Probably the most significant aspect of the improved understanding was the realization, in late 1959 and early 1960, that the meaningful measure of an ICBM program was the number of operational launchers rather than operational missiles. There were two main reasons for this: one was that the threat to the US was best measured by salvo capability and not total missile inventory; the other was that the pacing elements in building a missile force were the building of launchers and ground support equipment and the training of launch crews rather than the manufacture of missiles themselves. This caused the change in the unit of measure used in the estimates in early 1960, but more important it focussed the analysts more on launcher deployment and less on missile production.

Shortly thereafter, in March 1960, CIA set up a Guided Missile Task Force of both scientific and production specialists, to focus greater analytical effort on the pace and magnitude of Soviet missile production and deployment. This group was set up by Robert Amory, Jr., then Deputy Director for Intelligence, and was charged by him to "track the fox to its lair." This was one of several such special groups in the community--others were set up for essentially the same purpose in USAF intelligence headquarters and in the intelligence section of the Strategic Air Command. The conviction in each agency was that there must be some evidence of deployment, especially since the estimated

IOC date had passed and a buildup of launching sites had presumably been under way for some time without detection. In SAC's case there was the further conviction that suspected deployment sites must be identified as candidates for targeting.

Lists of suspect locations were drawn up by these groups, collection guides were issued, and bits and pieces of evidence were weighed and argued before the GMAIC committee of USIB. More than 100 locations in the USSR had been considered as candidates for ballistic missile deployment by September 1960. Of the 94 which were written up in some detail by GMAIC at that time, only four were evaluated as "possible" ICBM deployment locations on the basis of the very fragmentary data then available. All the others were considered doubtful, negative, or undetermined. None were evaluated as probable or confirmed deployment sites. As it turned out, the September 1960 list actually included the only two ICBM deployment complexes the USSR had at that time--Plesetsk, a first-generation complex, and Verkhnaya Salda, second-generation complex under construction. (The list also included Polyarnyy Ural, where it was later determined that the USSR probably started a first-generation complex and then cancelled it some time after 1957.) But there was no way of sorting these out for sure from the other names on the list, which turned out to be a potpourri of MRBM and IRBM sites, other missile-related facilities, and many non-missile facilities. In any case, such lists had little bearing on the numerical estimates made because the

estimators did not believe they could rely on the ability of Intelligence to acquire the necessary information.

Another contributor to the effort to accumulate evidence on deployment was the U-2 overflight program. Twenty-eight missions were accomplished over various parts of the USSR and East Europe between mid-1956 and 1 May 1960. Many important installations including the missile rangeheads at Kapustin Yar and Tyuratam were covered during the four-year life of this program. In the entire program, however, no photography was acquired of any ballistic missile deployment complex which was sufficiently far enough along in construction to be recognizable. (Later it turned out that the U-2 had photographed the Verkhnaya Salda complex, but so early that only a single rail spur was visible.) Again, these negative results were not regarded as a basis for altering the estimates. Partly this was because the area coverage of the U-2 was quite limited. Moreover, until the first ICBM complex was seen and recognized, there was the nagging concern that deployment activity might not be distinguishable from other construction. Worse yet it might be invisible because it was concealed or mobile.

The first photographic reconnaissance satellite mission was conducted in August 1960, a few months after the last U-2 flight. Nothing was learned about missile deployment from it. The second successful satellite mission, in December 1960, photographed the ICBM complex at Plesetsk, but low sun angle, small scale, and snow cover prevented its identification at that time. It was not until the next two satellite

missions, in the middle of 1961, that the photographic coverage revealed for the first time the extent of Soviet deployment of ICBMs and other ballistic missile systems.

Influence of Soviet Statements

From the political and psychological point of view the ICBM was a Soviet weapon from the very first test-firing in 1957, and so were the Sputniks and Luniks. The Soviet leaders had long felt a sense of strategic inferiority to the US, and they were clearly determined to take the political high ground with this new weapon and to use it to advantage in international affairs. They had done so with medium range missile capabilities when they rattled their rockets at the time of Suez and Hungary. With the ICBM and space launching programs they began a steady barrage of statements, boasts, and "disclosures" designed to convey the impression that irresistable new capabilities were now in the Soviet arsenal and further, that the "correlation of forces" between East and West was irrevocably altered.

In general, there were three types of Soviet statements about missiles which the intelligence analysts had to evaluate: boasts about milestones, hints about plans, and statements about policy. Khrushchev was a principle source of all three types, but other Soviet officials also made such statements in the relatively free exchange of visits and correspondence which existed at the time.

As to the boasts of milestones, Khrushchev, Defense Minister Malinovsky, and others supplied a steady flow of commentary in 1958-1960, designed to show rapid progress toward operational ICBM capabilities. Khrushchev claimed publicly in November 1958 that series production of ICBMs had begun. In December of that year, another Soviet official told Dr. George Kistiakowsky of Harvard (soon to become Science Advisor to the President) that numbers of operational ICBM bases already existed. In July 1959, Khrushchev told Vice President Nixon that Soviet launching facilities were cheap because they were mobile. In November of that year, he claimed one plant was producing 250 rockets per year, and in January 1960 he said dispersed and camouflaged launching bases existed. Each such statement was analyzed in detail and became a part of the estimators' stock of information. Such statements obviously did not prevent the estimators from gradually moving away from their very alarmist initial post-Sputnik estimates, though the late 1958 boasts did cause USIB to introduce a slight "hedge" into one estimate, to the effect that "a considerable operational ICBM capability ... cannot be ruled out as impossible" under a very high risk program.* In general, however, Intelligence evaluated these early Soviet claims as exaggeration from an emerging capability to an existing capability--that is, dealing in futures.

* See NIE 11-4-58, paragraph 125 and footnote, [redacted].

On the other hand, it seemed reasonable that some such statements were valid hints of real Soviet plans. Khrushchev's 250-missile-a-year plant remark was not considered grounds for raising a somewhat lower figure which Intelligence had arrived at as a reasonable number to support a launcher deployment program. But some other statements he made privately, for example a remark to Ambassador Harriman about the Soviet budget for missiles over the coming several years, were taken into account in estimating that Soviet force goals would probably call for several hundred operational launchers.

Finally, policy statements the Soviet leaders made to the Supreme Soviet were usually taken quite seriously. By far the most significant of these were the announcements by Khrushchev and Malinovsky in January 1960, which stated that rocket forces had become the most important branch of the Soviet armed forces and initiated a one-third reduction in military manpower, to be accomplished in the next 18 months or two years. In May, a separate arm of service called Strategic Rocket Forces was established. US analysts interpreted these measures as signs of Soviet confidence that attainments in nuclear and missile weapons would permit them to meet their military requirements with fewer men. Policy statements of this sort also seemed clearly to reflect a Soviet conviction that the ICBM would have a revolutionary effect on the USSR's strategic situation. The US intelligence estimators shared this conviction. It

influenced their sense of the likely tempo of the Soviet program and affected their evaluation of the sparse evidence of other types they had to work with.

PUBLIC REFLECTIONS OF ESTIMATES

The public repurcussions came principally in the form of statements and counterstatements by defenders and critics of the Administration's defense programs. Many such statements were charges that the post-Sputnik levels of American defense effort were inadequate. Many included recommendations for increasing the tempo of US strategic missile programs or for taking actions to reduce the vulnerability of US strategic air power to surprise attack.

The degree to which the statements were based specifically on intelligence estimates varied considerably and often could not be determined. Some were very generalized judgments like that of a Rockefeller Panel report in January 1958, which said "it appears that the United States is rapidly losing its lead over the USSR in the military race." Others were straight leaks of classified information, like a Hanson Baldwin column of March 1959 which correctly quoted the number of Soviet ICBM shots to that date, as well as the then-current intelligence estimate on the times by which the USSR could have operational capabilities with various numbers of ICBMs. Suffice it to say that despite the highly-

classified nature of the estimates and of the briefings given by Intelligence, a fairly accurate picture of the findings on this subject was revealed to the public by the various spokesmen of the Administration, its critics in the Congress, and the columnists.

The expressions "missile gap" or "missile lag" were of course not used by intelligence officers, who made no such comparisons. The first public use of the expression was probably by Joseph Alsop, in a column which appeared in February 1958. The expression "missile gap" quickly came to have wide public currency and to obscure the comparisons of overall US and Soviet military strengths with which Administration spokesmen sought to counter their critics. In early 1959, Defense Secretary McElroy was drawn into admitting publicly that in the early 1960's the USSR could have three times as many ICBMs as the US planned to have. In early 1960 his successor, Secretary Gates, who had just received a new estimate of probable numbers of Soviet operational launchers, sought to show publicly that the new estimate narrowed the differences. He immediately became embroiled in controversy over whether the comparison was valid and whether Intelligence was justified in changing from a "capability" estimate to a "probability" estimate. In late January, Mr. Dulles attempted to set the record straight by giving a speech which described the methodology at some length and stressed that incorporating "the elements of programming and future

intentions" into estimates was a normal intelligence procedure. But the next day Senator Symington charged that "the intelligence books have been juggled so the budget books may be balanced."

Also in January 1960, calculations of the vulnerability of US retaliatory forces to missile attack were made public by Gen. Power of the Strategic Air Command. The general announced in a speech that with 150 ICBMs and an equal number of shorter range missiles, the Soviets under conditions of no warning "could virtually wipe out our entire nuclear strike capability." On 5 February, Joseph Alsop published a column entitled "The Dulles Testimony," which quoted the DCI as having told the Senate Space Committee that the Soviets would have 140 to 200 ICBMs operational by mid-1961. To be sure, Alsop said, by that time SAC would have more weapons to be hit and thus the Soviet requirement would have climbed, but who was to say that Mr. Dulles' estimates were not too low?

Thus in the spring of 1960 the public press carried numerical information from credible sources which support both the simple and sophisticated versions of the "missile gap" idea. Even the downing of the U-2 on May Day was considered to have a bearing on the question because its overflight activities were said to show that the intelligence estimates had been based on solid evidence. The figures and sources

quoted above are only examples of a great quantity of public utterance on the subject. Citing these and other respected authorities on defense matters, the Democrats were able to sustain the issue in the Presidential campaign.

CLARIFICATION AND CORRECTION OF ESTIMATES, 1961

In the spring and summer of 1961, three elements of evidence finally brought a major clarification of the status of the Soviet ICBM program. From these elements the estimators acquired a basis for sharply reducing their previous estimates of the ICBM threat and for making estimates on this critical subject much more confidently than had been possible before. This did not quite happen all at once, but almost so. It began to be reflected in an NIE in June 1961 and was the main feature of a supplementary follow-up NIE in September.

Cross-confirming Evidence

The first new element of evidence was the initiation of Soviet testing of second-generation ICBMs. The first successful Soviet shots occurred in April 1961. [ ] two different follow-on vehicles were being tested. It was not immediately recognized that these were new types of ICBMs; this was considered a possibility in an NIE completed in June 1961, and was reported as a certainty in the NIE of September 1961. Considering R&D lead-time, this

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made it clear that the Soviets had decided on a second-generation program at least as early as 1958. It tended to confirm that the simplified launch facilities built at Tyuratam since 1959 represented a new system rather than a solution to the logistical and operational problems of the old one. This in turn strongly suggested that deployment of the first-generation system would be quite limited.

Second, two very successful satellite reconnaissance missions, in June and July 1961, brought the first positive identifications of ICBM deployment in the field. The first-generation complex at Plesetsk was photographed and several second-generation complexes were found under construction. More important from the estimative point of view, these installations were found to be large, readily-recognizable on the basis of test-range signatures, and dependent for their logistic support on the Soviet rail network. A basis was thus established for searching for complexes by regular satellite photography, for identifying, pinpointing and timing the launch facilities as they were constructed, and for ruling out the existence of such facilities at locations where good-quality coverage produced negative results. In terms of geographic coverage, these initial satellite operations provided information on about half the total railroad route mileage in the USSR. Coverage which was believed to be good enough to tell whether an ICBM complex existed or not was achieved over about half of the portion of the USSR within

which deployment was most likely. Only five confirmed or possible ICBM complexes were found in all of this photography; one was the first-generation complex at Plesetsk and the other four were second-generation complexes under construction.

In a memorandum to the DCI after the June photography had been scanned, the BNE assessed it as "the most important breakthrough into the Soviet long range ballistic missile program since the acquisition of radar coverage of test firings and TALENT (i.e., U-2) coverage of test range installations some years ago." The memo went on to say that the results gave promise "that frequent coverage by this means can reduce the problem of current and near future Soviet strength in long range ballistic missiles to one of order-of-battle rather than, as heretofore, one of estimating on the basis of inference from indirect evidence."

The third element of clarification was the acquisition from Col. Penkovskiy in May 1961 of vital inside information on the status of the Soviet ICBM program. While Penkovskiy had begun providing information in mid-1960, this was his first contribution on this particular subject. From senior Soviet officers connected with the missile program, Penkovskiy had learned that Khrushchev was deliberately magnifying his missile successes to impress the West and that the USSR then had at most a very limited capability to strike at the US with missiles. Millions of rubles

[redacted]

were being spent on the missile program, however, and new types of missiles and fuels were being worked on. While the Soviets did not have the hundreds of ICBMs they pretended to have, they would have them some day.

These three types of evidence were mutually cross-confirming. They provided a sound basis for key new judgments about the Soviet program in the NIE of September 1961. The estimators concluded, first, that in about 1958 the Soviets had decided to deploy only a small force of first-generation ICBMs while pressing toward second-generation systems, and second, that the effect of this decision had been to produce a "low plateau" of deployed strength in ICBMs which would probably not increase markedly in the months immediately ahead.** The "low plateau" was estimated at 10-25 operational launchers as of 1 September 1961; the correct number later proved to be four.

From that time forward additional information, much of it from satellite photography, permitted further refinements and adjustments in the estimates. Since then, the current progress of Soviet ICBM deployment has been followed and recorded on an "order-of-battle" basis, and it has been possible to build an accurate and up-to-date picture of current and near-term strength in operational launchers. There were a number of loose ends, of course. The chief intelligence officer of the

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** See NIE 11-8/1-61, paragraphs 2 and 3, [ ]

USAF continued to estimate a larger Soviet capability than the DCI and the majority of USIB. For a considerable time SAC held to the old lists of suspect deployment locations and was unwilling to use the photography and the test-range signatures as a basis for negating the presence of launch facilities. But it was the September 1961 NIE which withdrew the intelligence basis for a "missile gap" and established for the first time an uninflated view of the Soviet ICBM threat.

Timing Considerations

From the foregoing review it is clear that there were a number of factors contributing to the gross overestimates of 1957-1960, and that these factors included very general influences on the estimators as well as specific elements of evidence. Certainly the limitations of the collection capabilities of US intelligence at the time hid certain developments which, if known and recognized earlier, could have brought about a clarification and correction of estimates sooner.

Until 1961 the discussion in the estimates of follow-on or second-generation ICBMs was very cursory. The estimators tended to speak of the ICBM. Their analyses of production and deployment considerations were based on a single, smooth, uninterrupted buildup with a single system. Partly this was because the testing record made the first-generation system look so good and because their information did not

show clearly that a follow-on system was imminent. Partly it was because the limited US missile experience provided the estimators with an inadequate background to appreciate the operational difficulties the Soviets might encounter with their first-generation system. Partly also it was because the historical context of the late 1950's had conditioned the estimators to expect an urgent Soviet ICBM buildup.

The facts as now available show that Intelligence might theoretically have known as early as 1958 that the Soviets were beginning to design second-generation ICBM systems. Given the Soviet security system, however, it is not realistic to expect Intelligence to penetrate into design bureaus at such early stages, or to penetrate the strategic and operational decision-making which authorizes the bureaus to proceed. By the spring of 1959 a photograph was taken of new test-range facilities under construction, and perhaps at that point a better understanding of the missile deployment problem would have told the analysts that the ground support equipment to be used at these facilities would be so different from that of the first-generation system that it must be for something new and different.

Even if Intelligence had appreciated in 1958-1959 that there would be discontinuity in the Soviet program, however, it seems unlikely in retrospect that this knowledge alone would drastically have altered the estimates. Follow-on weapon systems can be designed, tested, and

introduced in both the US and USSR without sharply breaking the flow of a buildup when the degree of urgency and commitment of resources is sufficient. In retrospect, therefore, it appears that the Soviets simply did not authorize an early ICBM buildup of the magnitude we had expected, but that instead they had decided that a more gradual buildup, together with their MRBM, IRBM, and other military programs as well as the impact of their space activities, would be consistent with their strategic, political, and economic objectives as they then saw them. Their difficulties with the first-generation program, and the cutback of it suggested by the possible cancellation of a complex after 1957, merely made the buildup even slower.

If it is accepted that Intelligence cannot expect to know about Soviet decision-making and design bureau activities in the preliminary stages, then virtually the only way of knowing about a weapons program is through monitoring the actual progress of the later testing and deployment phases as they occur. In the case of the Soviet ICBM program, the concurrency between testing and deployment activities, and the very large regions where deployment might occur, made satellite photography of likely deployment areas the real key to understanding the program. The studies of factors affecting production and deployment which were used to bolster the meager evidence in 1957-1960 made it possible to interpret the "hard" photographic evidence better when it was finally

acquired. But until such evidence became available, and in particular until it became available in sufficient quantity and quality to support negative conclusions, the estimators had no basis for correcting their inaccurate picture of the Soviet program. This was finally achieved by 1961 through the employment of satellite collection systems which had been under development in the 1950's and were first employed shortly before the Presidential elections.

Once the deciding elements of evidence were in hand, intelligence moved promptly. The satellite mission which BNE described as a "break through" was concluded on 19 June 1961, the BNE memorandum to the DCI was completed on 25 June, a new estimate was formally initiated at JCS request on 5 July, the USIB representatives began considering a BNE draft in August, and USIB approved the revised estimate on 21 September.

APPENDICES A, B & C

DENIED IN FULL