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September 1965

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EVALUATIONS OF SOVIET SURFACE-TO-SURFACE MISSILE DEPLOYMENT

20TH REVISION

A Report of the Deployment Working Group

of the

Guided Missile and Astronautics Intelligence Committee

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The Guided Missile and Astronautics Intelligence Committee (GMAIC) wishes to express its appreciation to the National Photographic Interpretation Center for its assistance in the editing, illustration, and publication of this report.

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GUIDED MISSILE AND ASTRONAUTICS INTELLIGENCE COMMITTEE

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DEPLOYMENT WORKING GROUP

MEMBERSHIP

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Photographic Interpreter support is provided by the Photographic Analysis Group, NPIC.

NOTE: All correspondence relative to this report should be directed to the Chairman, Guided Missile and Astronautics Intelligence Committee (GMAIC).

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PREFACE

This report, published bimonthly by the GMAIC Deployment Working Group (DWG), provides a comprehensive, ready-reference listing of all ICBM, IRBM, and MRBM deployment locations, types of site configurations, photographic references, estimated construction and operational status, and other evaluations by the DWG. These data constitute the majority view of the DWG membership, and may not correspond precisely to individual assessments by each member. Additional data may be added to future revisions.

Dissemination of the report was previously limited to holders of the DWG report, Soviet Surface-to-Surface Missile Deployment. Because the information contained herein is both supplemental and self-sustaining, distribution will no longer be limited to holders of the above report.

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ILLUSTRATIONS

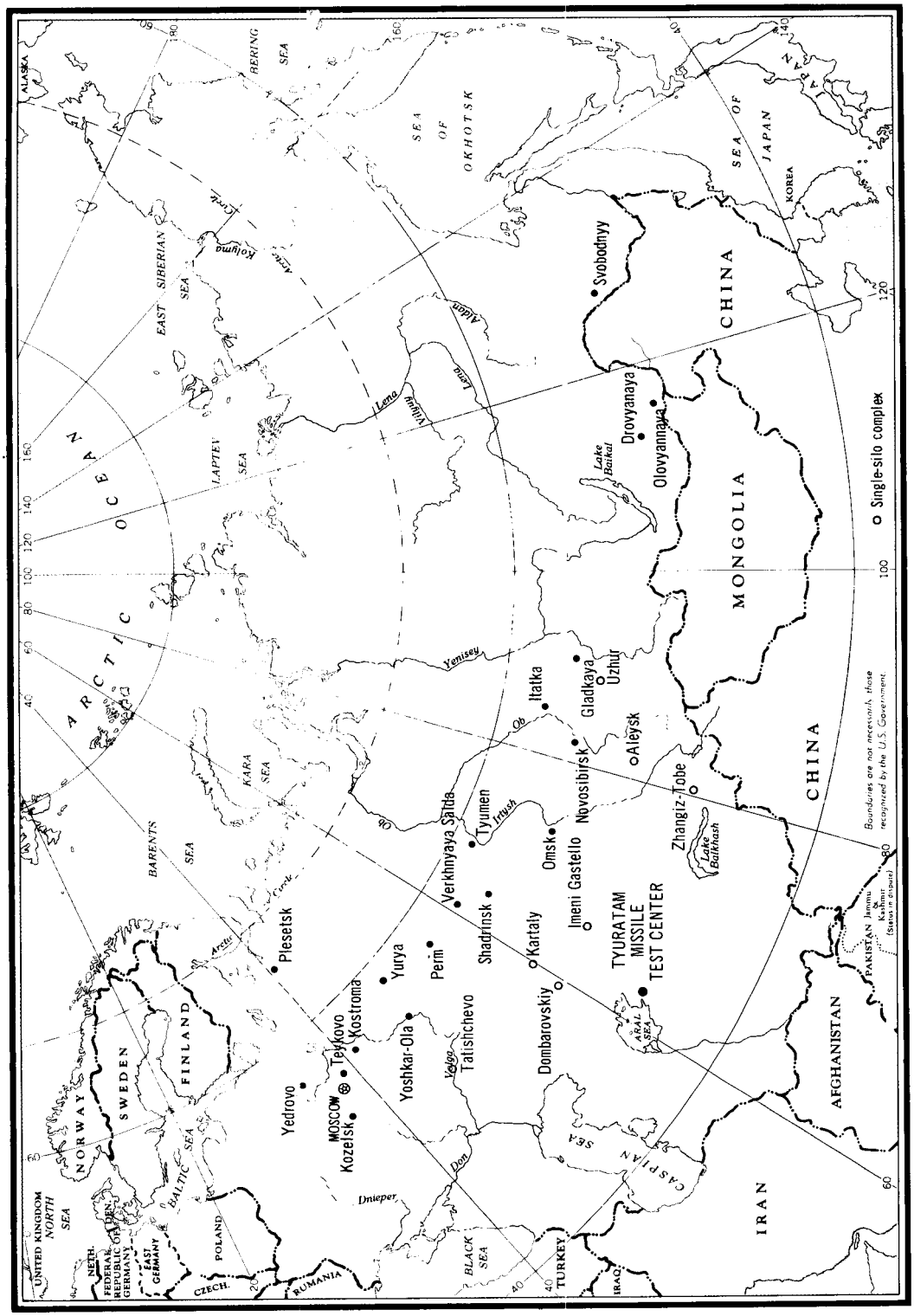


FIGURE 1. DEPLOYMENT OF SOVIET ICBM COMPLEXES.

INTRODUCTION

This report is the 20th Revision of Evaluations of Soviet Surface-to-Surface Missile Deployment prepared by the Deployment Working Group (DWG) of the Guided Missile and Astronautics Intelligence Committee (GMAIC). While information in this and previous revisions is self-sustaining, it serves to supplement the basic DWG report Soviet Surface-to-Surface Missile Deployment, which provides detailed information on individual launch facilities of the Soviet Strategic Rocket Forces. The basic report, dated 1 January 1962 [redacted] has been revised and updated on a periodic basis. Further updating is accomplished in reports prepared and published for GMAIC by the National Photographic Interpretation Center.

[redacted] and continuing analysis of previous missions and other sources have provided additional information on the Soviet strategic missile deployment program. The new data are reflected in Table 1* and in the estimated operational status shown in Tables 2 through 6. Technical characteristics of Soviet ICBM, IRBM, and MRBM systems currently operational or under development are given in Table 10. These characteristics have been reviewed and updated since publication of the 19th Revision. Cutoff date for information contained in this report is 20 August 1965.

We have completed out periodic in-depth review and analysis of the entire Soviet ICBM, IRBM, and MRBM deployment programs, including test range facilities and missile firing activity at Tyuratam and Kapustin Yar. We have also examined evidence relating to the status of currently operational strategic missile systems, the pace and extent of current deployment, and development of follow-on programs. The results of this review and analysis are included in this report.

*Table 1 has been updated to include single-silo ICBM sites detected on [redacted] The additional data are not reflected in the totals given in text, or in Table 2.

SOVIET ICBM DEPLOYMENT

GENERAL

Significant trends in the Soviet ICBM deployment program at this time include: (1) continued deployment during [redacted] of Type IIIC single silos at the 6 previously identified complexes, at about the same pace observed in [redacted] (2) continued deployment of Type IIID silos at complexes previously associated with these sites, but at what may be a reduced start rate (possibly temporary) over that observed in [redacted] and (3) a construction pace for both types of single silos somewhat slower than we had previously estimated.

Other significant developments in deployment-related activities of the Soviet Strategic Rocket Forces include continued flight testing of a probable new liquid-propellant ICBM; a flight test of the SS-9 missile, probably from a single silo at Tyuratam to the Pacific Impact Area; and the launch of a space vehicle from Launch Site G3/G4 at Tyuratam.

CURRENT DEPLOYMENT

The number of identified ICBM complexes remains at 25. See Figure 1 for location of deployed ICBM complexes. These complexes now contain a total of 378 confirmed and probable launchers in various stages of construction, an increase of 9 over the number reported in our 19th Revision. Of these 378 launchers, 150 are soft and 228 are hard. Included in the hard launchers are 150 single silos. In addition, we are carrying 15 single-silo sites in the possible category. An additional 49 launchers

at Tyuratam, including 28 silos, complete the total force identified to date.

Of the 378 confirmed and probable launchers in various stages of construction, 224 are estimated to be operational, including 78 in a hard configuration. In addition, we believe that 34 of the 49 launchers at Tyuratam are operational; although all are not normally maintained in an alert status, they could be used operationally. The ICBM sites have been designated by type, as shown and explained in Figure 2.

Evaluation of all evidence received since our last revision has resulted in the following additions at the complexes indicated:

DOMBAROVSKIY, Launch Site G (11), Probable Launch Sites H (10), I (8), and J (9), and Possible Launch Site K (12), Type IIIC, under construction

IMENI GASTELLO, Launch Site K (11), Type IIIC, under construction

KARTALY, Launch Site K(11) and Possible Launch Sites L and M, Type IIIC, under construction

UZHUR, Launch Sites O (15), P (16), and Q (17), Type IIIC, under construction.

STATUS OF 1ST AND 2ND GENERATION DEPLOYMENT

25X1 Continued [redacted] coverage of the 18 older ICBM complexes reveals no significant change in status at any of the deployed sites associated with the first- and second-generation missile systems. In view of the extensive photographic coverage of the 18 older complexes and Soviet rail system over an extended period of time, we are virtually certain that no additional complexes or launch sites for first- and second-generation systems remain undetected.

SS-6 Sites

Continuing photographic coverage of the 4 SS-6 launchers at Plesetsk indicates that this system is still operational. There is no evidence of construction activity or other indicators which we can relate to retrofit of the Plesetsk launchers for a folow-on system.

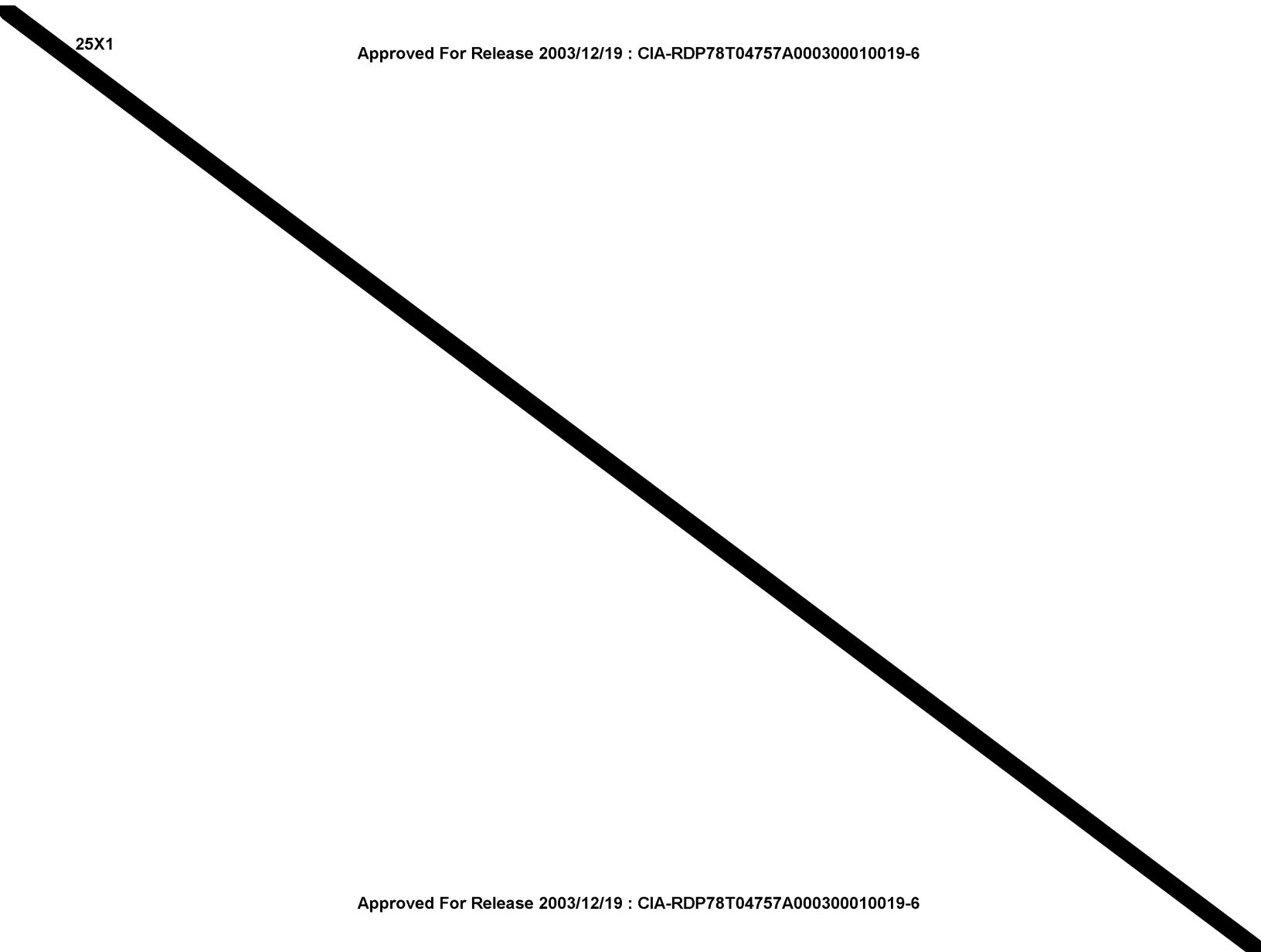
We cannot identify any ICBM system currently operational or under test which might be compatible with SS-6 launch facilities. If retrofit were intended for the launchers, we would expect to see such retrofit preceded by firing of the new system from SS-6 facilities at Tyuratam. No such firings have been detected. We expect, however, that the SS-6 ICBM system will be phased out of the inventory within the next few years.

SS-7 Sites

Total deployment of site configurations identified with the SS-7 missile system consists of 64 soft sites (128 launchers) and 23 hard sites (69 silos) distributed among 15 complexes. All are operational.

We are still unable to determine with a high degree of confidence whether the SS-7 or SS-9 missile system is deployed in the later group of 9 Type IIIA hard sites (see 17th Revision). We continue to believe that the SS-9 is the most likely possibility.

In our 17th Revision we discussed in detail the possibity that SS-7 sites could be retrofitted to accommodate the SS-9 ICBM. This analysis is still valid. We see no evidence that such a program is underway, nor do we expect to see it begun at an early date. We base this judgment on the continued utility of the SS-7 system against many US targets, the relatively large number of these missiles estimated to be in the inventory, and the appar-



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ent intent of the Soviets to accomplish a significant increase in the total number of operational launchers.

SS-8 Sites

The SS-8 missile system remains deployed in 7 soft (14 launchers) and 3 hard sites (9 silos) at 4 complexes in the USSR. These sites are all operational.

We can detect no activity at deployed SS-8 sites indicative of retrofit with a newer system. As is the case for the SS-6, we would expect retrofit of SS-8 test facilities and firings of the new system from prototype launchers at Tyuratam to precede changes at deployed sites. To date, no firings of missiles other than the SS-8 have been detected from Launch Sites E (6) and F (7) at the test center.

We continue to believe that SS-8 missiles at deployed sites may be phased out during the next several years, because maintenance of the few sites deployed will become less desirable as more advanced missile systems become operational.

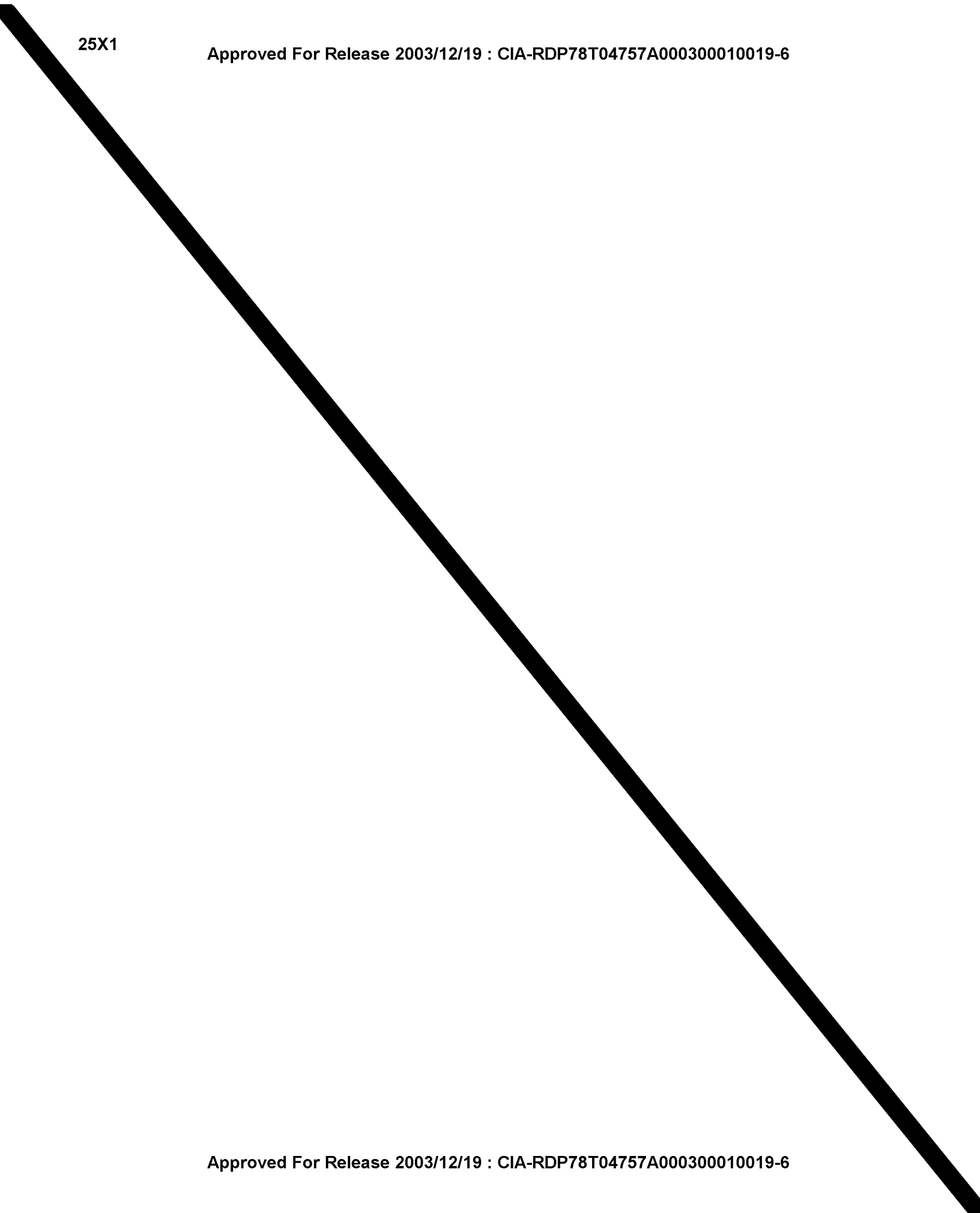
Refire Capability

There is good evidence that Soviet operational concepts for strategic missile forces include a refire capability from soft sites, including ICBM sites. There is no evidence of an intent or capability to refire from hard sites and we do not believe that such a capability exists. [redacted] evidence dating back to 1959 establish that refire from soft MRBM sites was both intended as an operational concept and practiced in exercises, although no evidence of live firings of refire missiles is available. There is little doubt that soft ICBM sites were designed to have a refire capability. The number and size of missile-ready buildings at deployed sites provide evidence of such an intent, probably adopted on the premise that site locations would remain hidden from observation. Recent evidence tends to substantiate that the refire concept is still valid. During [redacted] additional missile-ready buildings were added to 5 SS-7 soft sites that had been operational for periods ranging from a few months to 2 years. Additionally, recent [redacted] coverage of a missile exercise underway at the Itatka Complex (see 19th Revision) showed 3 possible missiles at 1 launch site.

We are unable, however, to determine the actual number of missiles available for refire from soft ICBM sites, since no direct evidence is available. Our analysis has also been tempered by the belief that current US first-strike and retaliatory capabilities would limit or preclude Soviet refire from a significant number of soft sites. We also believe that the refire capability is not uniform throughout the Soviet ICBM force. This judgment is based on the fact that the number, size, and configuration of missile-ready buildings at individual sites vary considerably. The number of ready buildings varies from 1 to 3 at SS-7 soft sites, and SS-8 soft sites each have 2 buildings. SS-7 sites have 3 different sizes of ready buildings, but the SS-8 sites have only 1 building (Figure 3).

A rough estimate of the maximum capability for refire can be obtained by an analysis of the capacity of the missile-ready buildings at each site, assuming reasonable space requirements for maintenance and checkout as well as storage of ready missiles. This analysis indicated that the number of ready missiles in these buildings could total as many as 400 ICBMs for the 146 soft launchers currently operational.

Some gross limitations as to the magnitude of the total number of missiles available can be deduced from evidence of missile production, although such evidence is inconclusive. This evidence, based on an analysis of floor space



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at known ICBM production plants and so-called "batch testing" at Tyuratam, indicates that about 2 missiles are available for each SS-6, SS-7, and SS-8 soft launcher. These figures are in addition to a single missile for each operational hard launcher.

These analyses indicate that the missiles available to the currently operational force of 224 launchers (including 78 silos) for initial salvo, refire, and maintenance spaces may range from a low of about 375 to a high of as many as 475. It is believed likely that some sites might have a multiple refire capability while others have none. In any event, there is little doubt that the Soviets have available to their currently operational ICBM force the number of missiles necessary to meet operational requirements.

TYPE IIIC SITES*

General

Confirmed Type IIIC single-silo site deployment continues to be limited to the complexes at Aleysk, Dombarovskiy, Imeni Gastello, Kartaly, Uzhur, and Zhangiz-Tobe. These complexes contain a total of 60 confirmed and probable sites, in construction stages ranging from early to mid. In addition, recently initiated construction at Kartaly suggests the start of another 3 sites and new activity at Dombarovskiy indicates another possible site under construction. The launch sites at each complex are separated by distances ranging from 3 to 6 miles.

Total sites at the 6 complexes range from a low of 6 at Aleysk and Zhangiz-Tobe to a high of 17 at Uzhur. Analysis of construction activity at each of the complexes indicates that planned deployment -- at least in terms of pace of site activation--is not the same for all 6 complexes. Except for Dombarovskiy, activation of new sites has been progressing at a fairly even pace at those complexes containing more than 6 sites. At Aleysk, however, no new site construction has been identified since [redacted] 25X1
[redacted] at Zhangiz-Tobe, no new start has 25X1
been observed since [redacted] The 25X1
sixth site at Dombarovskiy was not begun until [redacted] some 6 months after 25X1
iniation of construction activity at the fifth site.

The size of the complex support facility at Type IIIC complexes indicates that all will contain more than 6 sites. No reliable estimate can be made of the maximum number of sites to be deployed at any one, or all, of the complexes. It does appear, however, that all the complexes may not be programmed for the same number of sites.

Site Composition and Configuration

Type IIIC launch areas consist of a single silo and a relatively limited site support facility. In previous revisions we have pointed out the similarity of the Type IIIC silo to individual silos accommodating the SS-7 (and possibly the SS-9) at Type IIIA sites. Continuing analysis supports this belief. Mensurations of Type IIIC inner silo diameters now average about [redacted] the same as 25X1
for Type IIIA sites. Silo doors observed at Tyuratam Launch Sites A3 (15), B2 (16), and I (14), prototypes for Type IIIC field deployment, appear identical to those at Launch Complex D and deployed second-generation counterparts.

The most advanced Type IIIC sites in the field are still in a midstage after 17 to 18 months of construction. At most sites, ramps lead onto the silo structure (Figure 4). How-

*See Table 1. Detection of 4 additional Type IIIC sites at the Zhangiz-Tobe Complex on [redacted] is not reflected in text, or in Table 2.

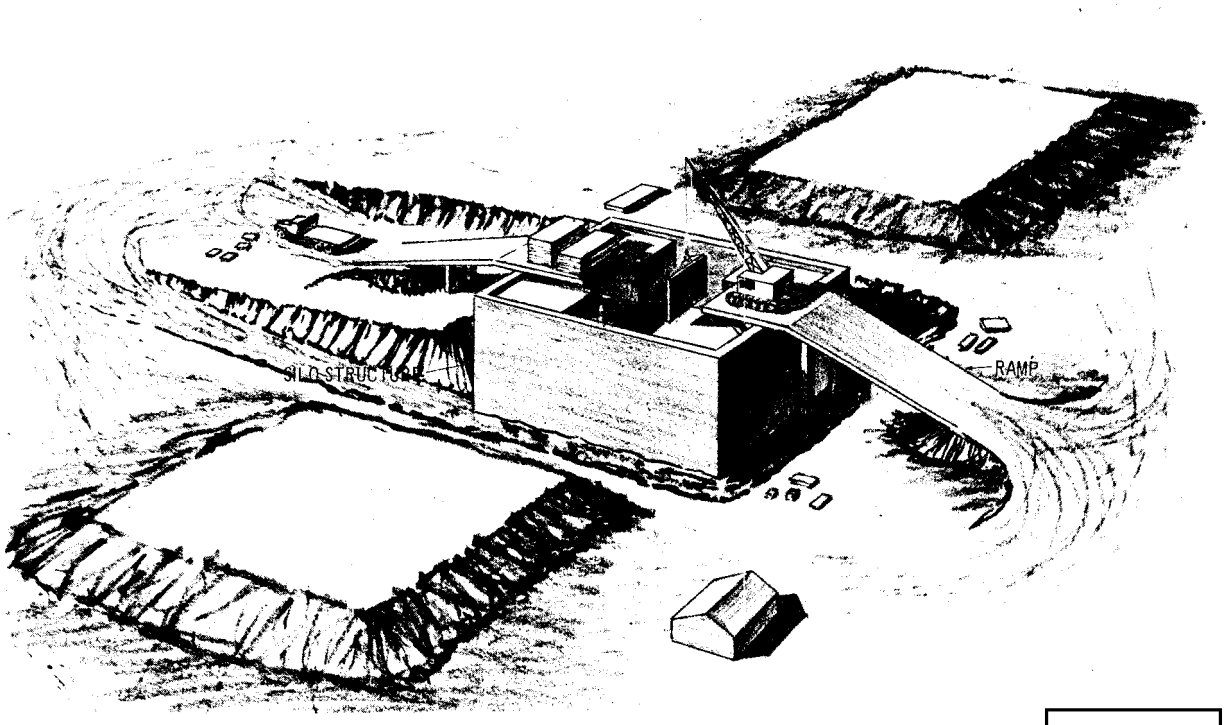

FIGURE 4. ARTIST'S CONCEPT OF TYPE IIIC LAUNCH SILO UNDER CONSTRUCTION.

ever, the most recent coverage of Uzhur indicates that backfilling may have begun at some of the sites at this complex.

In our 17th Revision, we provided a detailed description of construction procedures at Type IIIC sites. Subsequent coverage provides further details. Construction procedures vary slightly at each site, probably due to geological or environmental conditions, but generally folow a basic pattern. Usually a security fence is erected around the proposed site, site support buildings are erected, and earth moving equipment begins surface grading. Next an excavation 20 to 30 feet deep is apparent, with 1 or 2 earthen ramps providing access into the excavation. At this time the spoil from the excavation is usually mounded in a large rectangular pattern on one side of the excavation; additional spoil is piled in a square mound, aligned with the silo excavation and the rectangle, but on the opposite side of the excavation. This rectangle and square do not appear at all Type IIIC sites in the field or at Tyuratam. They probably are constructed (or in some instances cut) to provide level access to the silo.

The silo excavation is usually dug with sheer walls, although at least 2 of the sites have terraced sides, probably due to soil considerations. Once the desired depth is reached, the silo coring begins. The time required to excavate and core at individual sites appears to vary widely. At Imeni Gastello Launch Site H (9), it took about 3 months; at Zhangiz-Tobe Launch Site F (6), 6 months were required. Concrete is poured into the silo coring, forming a cylindrical silo with an inside diameter of approximately feet and an outside diameter of about This cylindrical silo is built up to the bottom of the excavation, and a beveled ring with an interior diameter

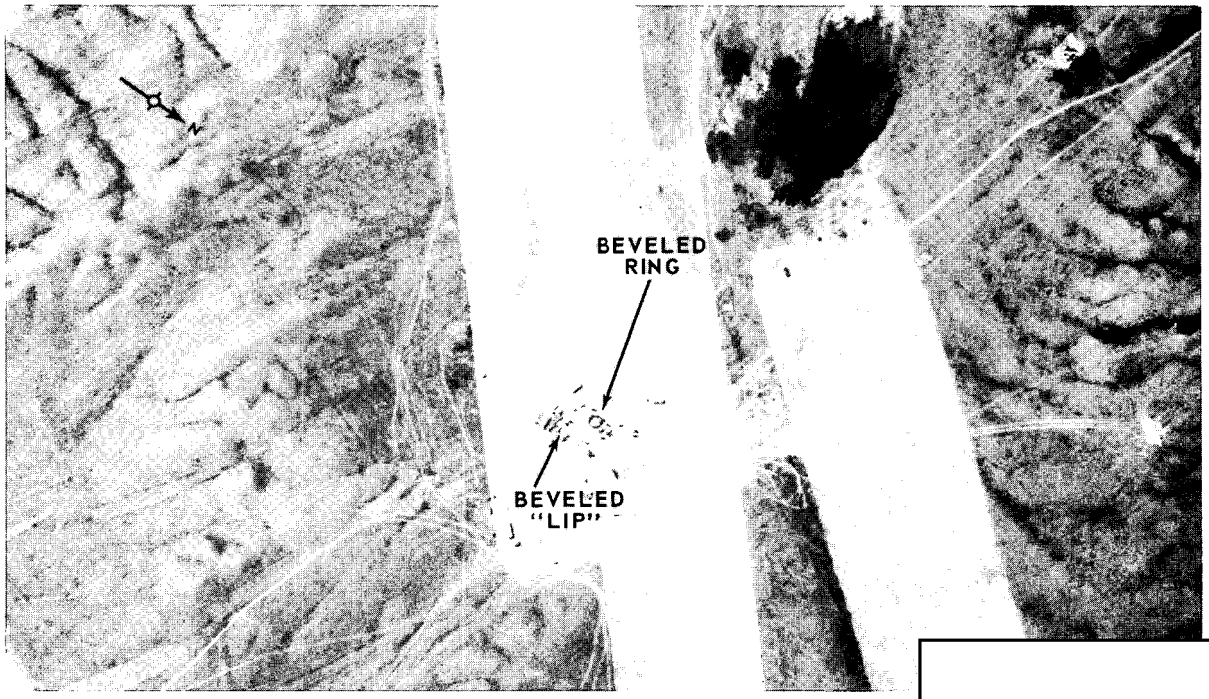

FIGURE 5. LAUNCH SITE F(6), ZHANGIZ-TOBE ICBM COMPLEX.

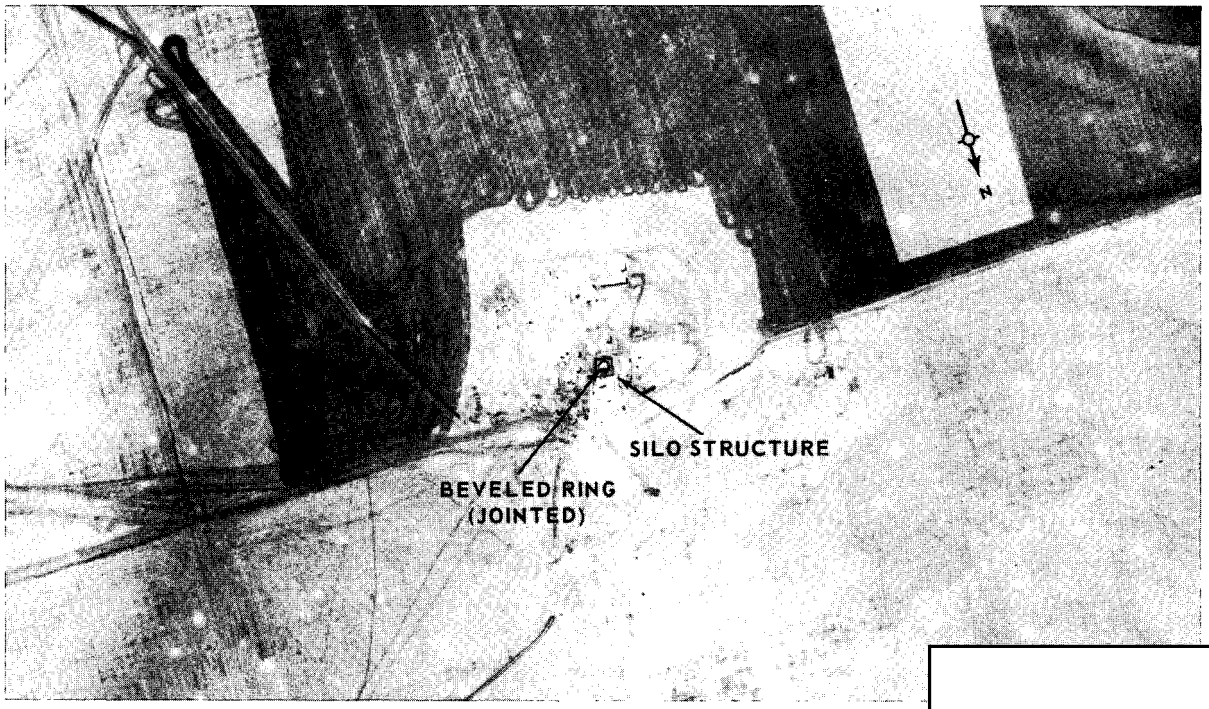

FIGURE 6. LAUNCH SITE F(6), IMENI GASTELLO ICBM COMPLEX.

of approximately [redacted] and an overall diameter of about 50 feet is fitted onto the top of the silo core. At Zhangiz-Tobe Launch Site F (6), on [redacted] this beveled ring can be seen being fabricated in 3 segments just outside the excavation (Figure 5); a beveled "lip" in the center of the base of the square silo excavation can be seen. At Imeni Gastello Launch Site F (6), on the same mission, a similar beveled ring is in place and 2 of the 3 joints can be defined (Figure 6); at this same site the walls of the square silo structure, which measures about 65 feet on a side, are slightly above the base of the excavation.

In the next visible step, a concrete slab for the base of the silo structure is poured in the squared-off bottom of the excavation, and the vertical walls of the silo structure are begun. A loop road is usually apparent at this stage, which averages 9 to 11 months after initiation of construction. The square form of the silo structure then takes shape and compartmentalization within the structure is evident. At this point -- some 12 to 14 months from start -- 1 or 2 construction ramps are in place from ground level to the top of the silo structure. The walls of the silo structure are then brought to their predetermined height, and the silo structure "capped". At this point, about 17 to 18 months have elapsed from start. Also apparent at this time, when exposed to isodensity techniques, are openings on opposite sides of the silo, probably for venting exhaust during launch from within the silo. At 4 of the complexes, Imeni Gastello, Kartaly, Uzhur, and Zhangiz-Tobe, cylindrical or convex linear objects, appear on the rectangular mounds adjacent to the silos. The exact nature of these objects -- which are similar, if not identical, to those observed at Type IIIA sites -- cannot be determined precisely, but they are probably silo liners fabricated on site. Their appearance at these sites varies time-wise throughout the mid-construction stage.

A hardened control facility and an L-shaped electronic facility are under construction at only 1 launch site, as indicated, in each of the following complexes: Aleysk Launch Site C (3), Dombarovskiy Launch Site B(3), Imeni Gastello Launch Site D(4), Kartaly Launch Site A (1), Uzhur Launch Site B(2), and Zhangiz-Tobe Launch Site A (1). The control facility is located at the apex of the "L", and consists of a large compartmented building (probably the primary control building) and a smaller building (probably for equipment). Both buildings are in an excavation and will almost certainly be earth mounded when completed. The segments of the "L" are approximately 1,300 to 1,350 feet long. There is good evidence that each facility will contain several antenna silos, since these are visible at similar facilities associated with the prototype sites at Tyuratam. A typical control/electronic facility is shown in Figure 7.

Tyuratam Prototypes

We believe that the launch group formed by Launch Sites A3 (15), B2 (16), and I (14) at Tyuratam is almost certainly the prototype for deployed Type IIIC sites. It is also possible that the launch group formed by Launch Sites G7 (18) and K/K2 (13) is for the same missile system, although the signature of this group differs somewhat from the other group, and from deployed sites.

Launch Sites A3 (15), B2 (16), and I (14) appeared complete when last observed on [redacted] photography, although equipment installation and checkout apparently was still underway and the associated control building at Launch Site I (14) had not yet been earth mounded. We believe that these sites are now operational

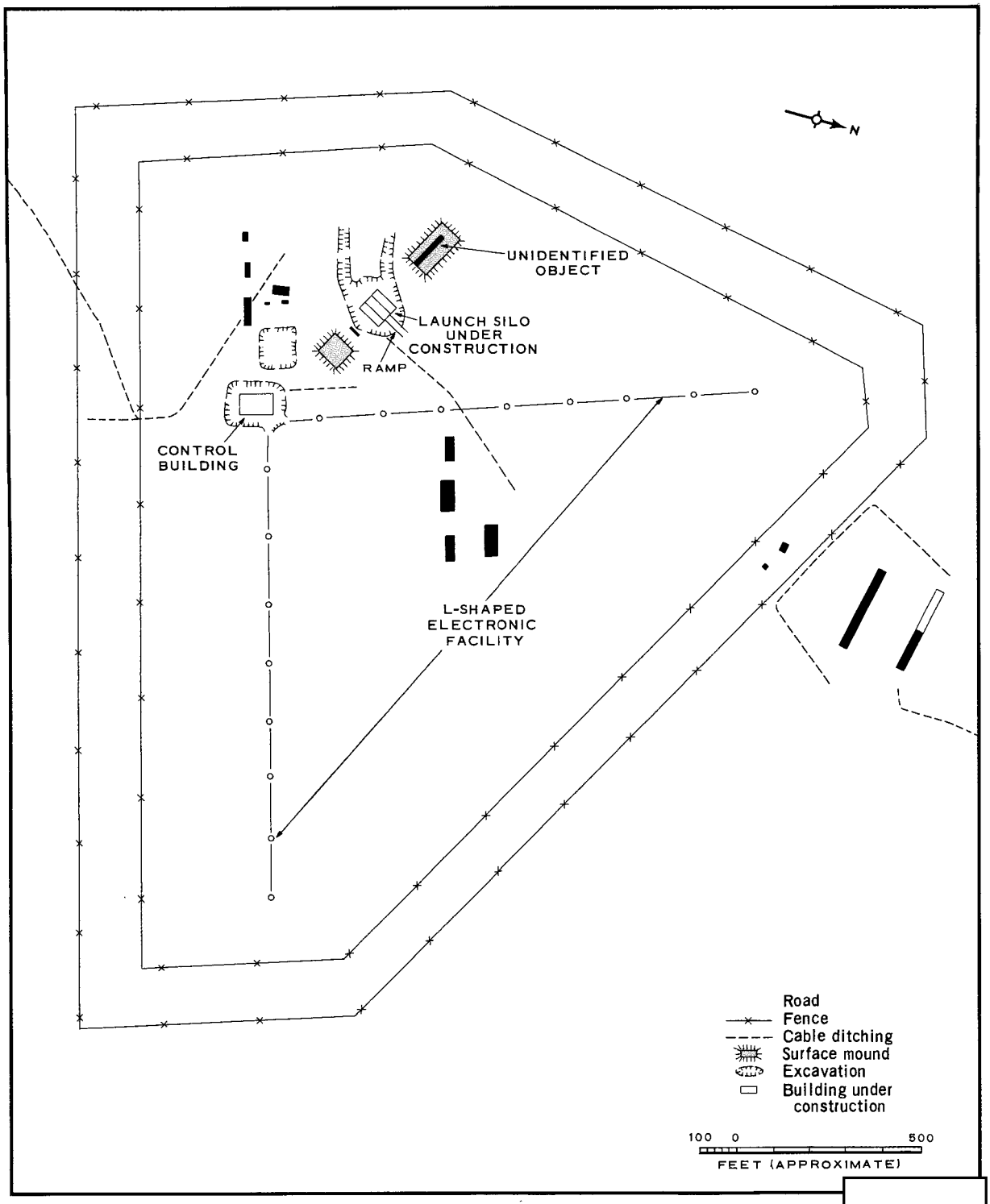

FIGURE 7. TYPE IIIC LAUNCH SITE WITH CONTROL/ELECTRONIC FACILITY.

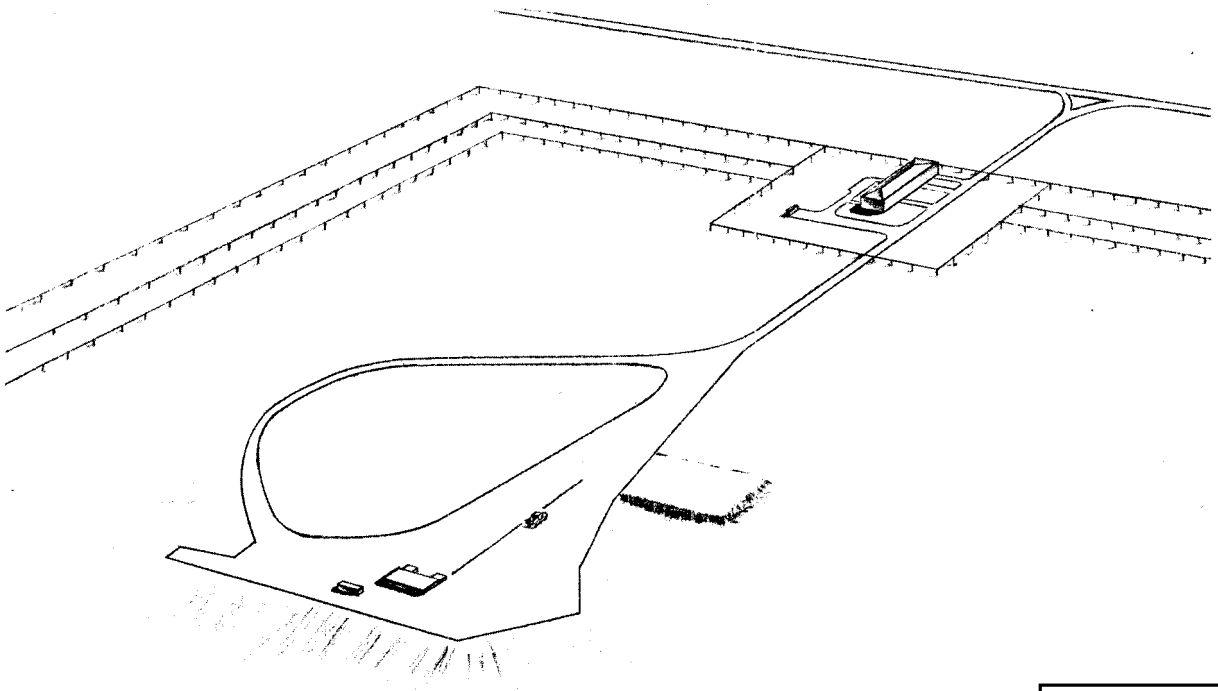

FIGURE 8. ARTIST'S CONCEPT OF LAUNCH SITE A3(15), TYURATAM.

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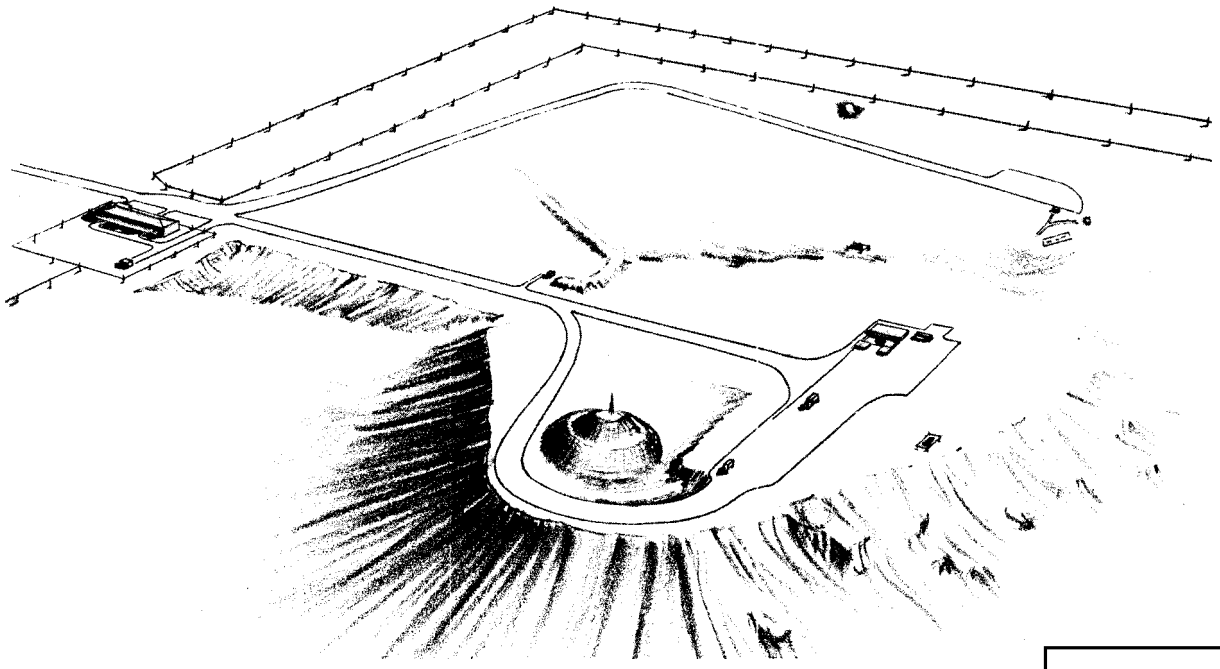

FIGURE 9. ARTIST'S CONCEPT OF LAUNCH SITE B2(16), TYURATAM.

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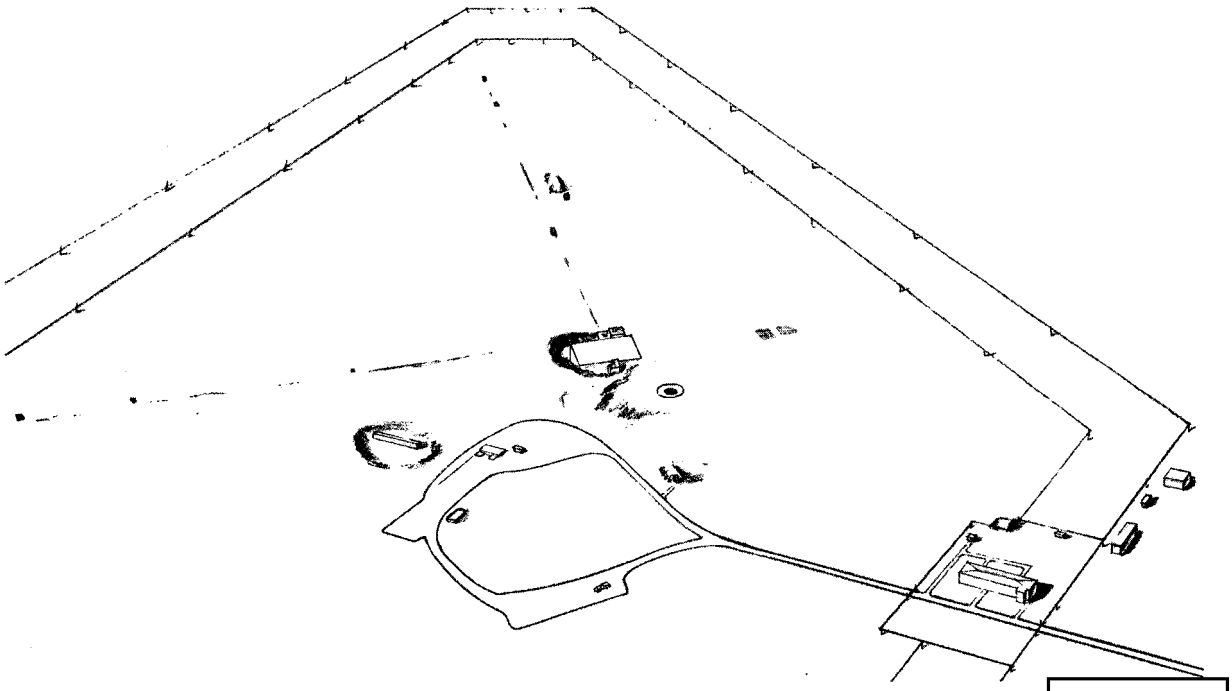

FIGURE 10. ARTIST'S CONCEPT OF LAUNCH COMPLEX I(14), TYURATAM.

(Figures 8, 9, and 10). Each site contains what appears to be an exact replica of an individual Type IIIA silo. Only Launch Site I (14) has a control and electronic facility, and cabling is visible from it to the other 2 sites, indicating that control of all 3 sites will be exercised from a common source.

The silos at Launch Sites G7 (18) and K1/K2 (13) appear identical to those at Launch Sites A3 (15), B2 (16), and I (14), although they have not yet progressed beyond a midstage of construction (Figures 11 and 12). Both sites are connected by cabling, but only Launch Site G7 (18) has a control and electronic facility under construction. The major difference between the 2 groups is that one consists of 3 separate sites whereas the other contains only 2 sites; Launch Site K/K2 (13) is, in reality, a single site composed of 2 launch silos approximately 1,100 feet apart and contained within the same security fencing.

Deployment Pattern and Operational Control

Early assessment of Type IIIC site deployment indicated a pattern of site layout in groups of 3, (i.e., 1 launch control center for 3 sites). This judgment was based primarily on the prototype grouping at Tyuratam and the fact that we have been unable to identify individual control facilities at each site. To date, this assessment has not been borne out. We have identified a control facility, at 1 of the first 6 sites at each complex, but have not yet observed any firm evidence of a second. There is good evidence that the sites within a complex will be connected by an extensive cable network, and we continue to believe that a redundant control scheme will be utilized. Further coverage will be required before we can define it more accurately.

To date, only one L-shaped electronic facility has been identified at each complex. This fact raises some doubt as to the purpose

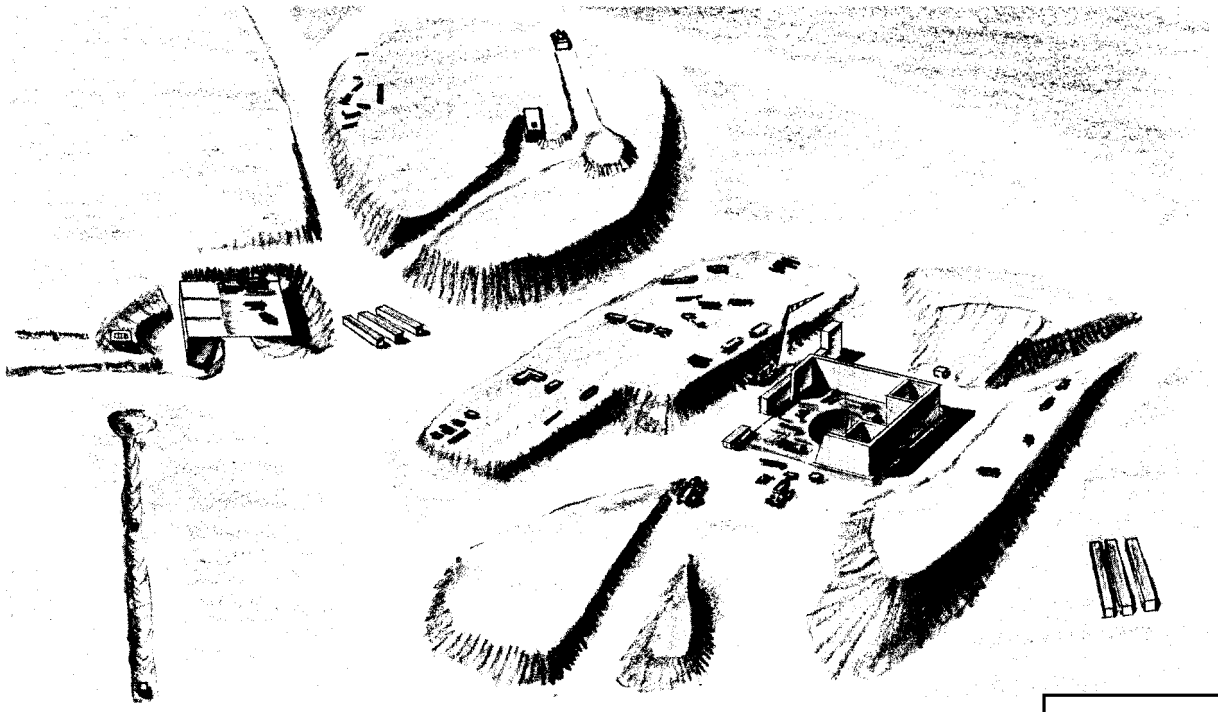

FIGURE 11. ARTIST'S CONCEPT OF LAUNCH SITE G7(18), TYURATAM.

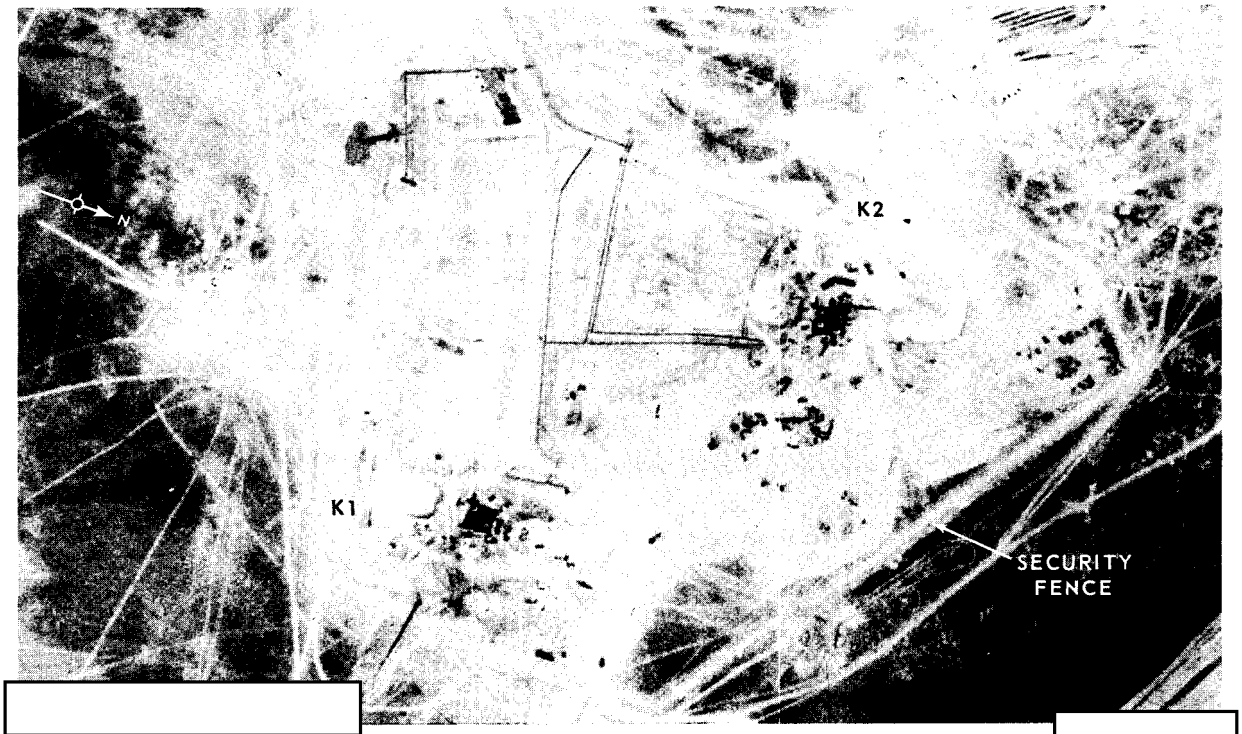

FIGURE 12. ARTIST'S CONCEPT OF LAUNCH SITE K1/K2(13), TYURATAM.

of this facility. If it is to serve both a launch control and guidance function, we would expect additional "Ls" to appear at each complex. This redundancy probably would be required since the electronic portion appears to be softer than the launch silos and control bunker. Another purpose of the L-shaped electronic facility may be to determine, in a combat situation, the success of missiles in attaining the desired target trajectories. Such a system would permit the Soviets to re-target or follow up with alternate or backup missiles based on the assessment of the probable CEPs achieved. The system would not only assess the probably destruction of primary objectives, but would enhance maximum effective utilization of the total force by preventing wasteful overkill. This is an important consideration for the Soviets because of the apparent missile gap between US and Soviet forces.

Construction Timing

Construction of Type IIIC sites at deployed complexes continues to progress more slowly than would be expected in view of the probable availability of SS-9 missiles, and the similarity between this type of single silo and one type of silo at the earlier SS-7 hard sites. The last group of Type IIIA sites was constructed in 17 to 20 months. The average construction time for all Type IIIA sites was 22 to 24 months. Additionally, the "brick and mortar" phase of construction at Launch Sites A3 (15), B2 (16), and I (14), at Tyuratam was completed in about 16 to 18 months.

[redacted] coverage since our last revision indicates that the "brick and mortar" phase of construction at some deployed sites may take somewhat longer than the 18 to 21 months we previously estimated; others may fall within this time frame. We currently believe that the "brick and mortar" phase of construction at those sites now under construction in the field will require some 18 to 24 months to complete. With additional time allowed for installation and checkout of equipment, we believe that individual sites will require 21 to 27 months to reach operational status. The estimated operational dates for these sites, contained in Table 2, have been modified to assess each site individually (rather than in groups of 3) on the basis of an average 24-month construction period.

Logistic Support

Logistic support facilities at the 6 complexes associated with Type IIIC site deployment consist of a complex support facility, a rail-to-road transfer point, and relatively limited individual site support facilities. The following information updates and supplements the more detailed description of these facilities contained in our 17th Revision.

The complex support facilities at all 6 complexes continue to grow in size. They apparently are functionally similar to the facilities at the 18 older ICBM complexes, but appear to be somewhat smaller.

Imeni Gastello, Uzhur, and Zhangiz-Tobe, have similar complex support facilities. Each facility is located on the edge of town and is served by a direct rail spur; this spur divides into 3 branches as it enters the facility. Buildings at the 3 installations now number 19, 24, and 30, respectively. Approximately 60 per cent of these structures appear to be for storage, and the remainder includes shops, sheds, and barracks. Each installation has a probable transshipment shed located along 1 of the rail spurs. The roofs of these sheds are arched and appear to be supported by columns. Each of the complex support facilities has a motor pool and a large area for open storage.

The complex support facilities at Aleysk, Dombarovskiy and Kartaly are similar to those at the other 3 complexes, but are divided into 3 separately fenced areas, each served by rail

spurs. Aleysk has the largest number of buildings, 51, followed by Kartaly with 49, and Dombarovskiy with 34. As at the other 3 complexes, about 60 percent of the structures appear to be for storage, and the remainder for shops, sheds, and housing. The central area in each of these 3 facilities consists of about 12 shop and storage buildings, a motor pool, an open storage area, a probable transshipment shed and a large U-shaped building. The rail spur serving this portion of the facility divides into 3 or 4 deadend spurs. The second fenced area, a military or construction camp, is rail served and consists of 14 barracks-type buildings, a messhall , 6 storage buildings, 2 or 3 shop buildings, and an additional 6 buildings under construction. The third area is rail served and appears to be a permanent barracks and housing camp. It consists of 3 or 4 multistory barracks (with 2 or 3 more under construction), 8 or 9 storage buildings, 2 or 3 shop-type buildings, and a large motor pool.

Site support facilities associated with the individual launch areas at all 6 complexes are relatively small. They are always located outside the launch site security fence at distances of up to 1 mile. The individual site support facilities at 5 of these complexes contain 2 to 4 large rectangular buildings of equal size, and normally parallel to each other. These appear to be barracks-type buildings. Several smaller structures are located within the facility. At Imeni Gastello, there are 6 to 8 smaller buildings instead of the larger rectangular type.

In summary, an analysis of the complex and site support facilities at the Type IIIC complexes indicates that the nature and scope of those facilities cannot be used to determine either the missile system to be employed or the number of launch sites to be supported.

Associated Missile Systems

We are virtually certain that some, if not all, of the Type IIIC silos under construction at deployed complexes are for the SS-9 missile system. This judgment is based on an analysis of silo size and configuration, and concurrency of flight test programs with site construction. In

[redacted] 25X

It is also possible that the SS-10 missile system is compatible with the Type IIIC silo. However, this system has not been fired since [redacted] and we suspect that the program may have been canceled. If firings of the SS-10 missile are resumed, it is possible that this system also will be deployed in Type IIIC sites. 25X

Development at Deployed Type IIIC Complexes

ALEYSK COMPLEX

Aleysk has not been covered by [redacted] 25X photography since our last revision.

DOMBAROVSKIY COMPLEX

[redacted] revealed 1 confirmed, 3 probable, and 1 possible new Type IIIC sites in an early stage of construction at the Dombarovskiy Complex. These launch sites have been designated G (11), H (10), I (8), J (9), and K (12). 25X

Launch Site G (11), located approximately 12 nm north of the complex support facility, can be negated on [redacted] 25X It consists of a shallow square excavation 25X and several small buildings. Probable Launch Sites H (10) and I (8), located 11 nm northwest and 3 nm east of the complex support facility, respectively, can be negated, respectively, on [redacted] and Possible Launch 25X

Site K (12) on

No significant changes are visible at the complex support facility and Launch Site E (17). A linear object is apparent on the rectangular mounds at Launch Sites A (4), B (3), and C (2). These sites remain in a midstage of construction. Launch Site F (7) can be identified only, and Launch Site D (1) is cloud covered. Improved roads are under construction throughout the complex. A schematic layout of the Dombarovskiy Complex is shown in Figure 13.

IMENI GASTELLO COMPLEX

Highlight of partial coverage of the Imeni Gastello Complex on was the identification of a new Type IIIC launch site, designated Launch Site K (11), in an early stage of construction. This site is located approximately 20 nm southwest of the complex support facility. It is first visible on this mission and can be negated on

No significant changes were observed at Launch Sites A (1), B (2), C (3), and G (7). The complex support facility and Launch Sites D (4), E (5), F (6), H (8), I (9), and J (10) were cloud covered. A schematic layout of this complex is shown in Figure 14.

KARTALY COMPLEX

The Kartaly Complex was partially covered by The earlier mission revealed 3 newly identified areas of activity. One, a confirmed Type IIIC launch site in an early construction stage, is designated Launch Site K (11). It can be negated and is first visible on The other 2 sites, designated Possible Launch Sites L and M, are negated on and first seen on

Probable fabrication of silo liners is apparent at Launch Sites A (1) and D (4), where linear objects are visible on the rectangles adjacent to the silos. No significant activity can be identified at the remaining sites. A schematic layout of the complex is shown in Figure 15.

UZHUR COMPLEX

The Uzhur Complex was covered by both missions and this coverage was highlighted by the discovery of 3 new Type IIIC sites, all in an early stage of construction. Launch Sites O (15) and P (16) are first visible on and both are negated on Launch Site Q (17) is negated on

Launch Sites A through F (1-6), H (8), and K (11) are in a midstage of construction; backfilling may have begun at some of these sites. Launch Sites G (7), I (9), J (10), and L through N (12-14) are in an early stage. Construction continues at the L-shaped electronic facility at Launch Site B (2). Cable trenches lead from the vicinity of this site to Launch Sites A (1), C (3), D (4), and E (5); cable scars are also visible between Launch Sites A (1) and F (6), D (4) and C (3), D (4) and E (5), and from C (3) toward G (7) and D (4) toward I (9).

A road now leads from the rail-to-road transfer point northward to an improved road running east and west through the complex. Improved roads lead from this main road to Launch Sites A (1), B (2), C (3), D (4), F (6), and H (8). An improved road also leads from Launch Site E (5) toward the rail-to-road transfer point. Construction continues at the transfer point and the complex support facility. A schematic layout of the Uzhur Complex is shown in Figure 16.

ZHANGIZ-TOBE COMPLEX

The Zhangiz-Tobe Complex has not been covered by photography since our last revision.

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TYPE IIID SITES*

General

We have identified a total of about 100 confirmed, probable and possible Type IIID single-silo launch sites, located at the Tatishchevo Complex and 4 of the older ICBM complexes (Drovyanaya, Gladkaya, Olovyannaya and Perm). The latter 4 complexes previously were associated only with the SS-7 missile system.

Earliest construction of the Type IIID site configuration began at the Tatishchevo Complex about [redacted] Additional deployment was initiated at Perm in [redacted] Olovyannaya and Gladkaya [redacted] and at Drovyanaya about [redacted]

*See Table 1. Detection of 11 additional Type IIID sites at the Olovyannaya Complex and 3 additional sites at the Tatishchevo Complex on [redacted] is not reflected in text, or in Table 2.

Deployment Pattern and Operational Control

We continue to believe that Type IIID single silos will be deployed in operational groups of 10, based on [redacted] coverage of Launch Groups D (4-13) and E (14-23) at Olovyannaya, A (1-11) at Tatishchevo, G (7-18) at Drovyanaya, and Launch Group L (21-30) at Tyuratam. At each of these launch groups, the support/control facility and 1 launch silo are in the center of a generally circular configuration, with the remaining launch sites at distances ranging from 2.5 to 4 nautical miles. At 4 of the 5 groups the sites are interconnected by an extensive network of cabling. No site support facility can be identified at any of the 9 outlying launch sites.

The center sites contain an L-shaped electronic facility similar, but not identical, to those at Type IIIC launch complexes (Figure 17). The length of 1 segment of these electronic facilities averages about 1,325 feet. It appears

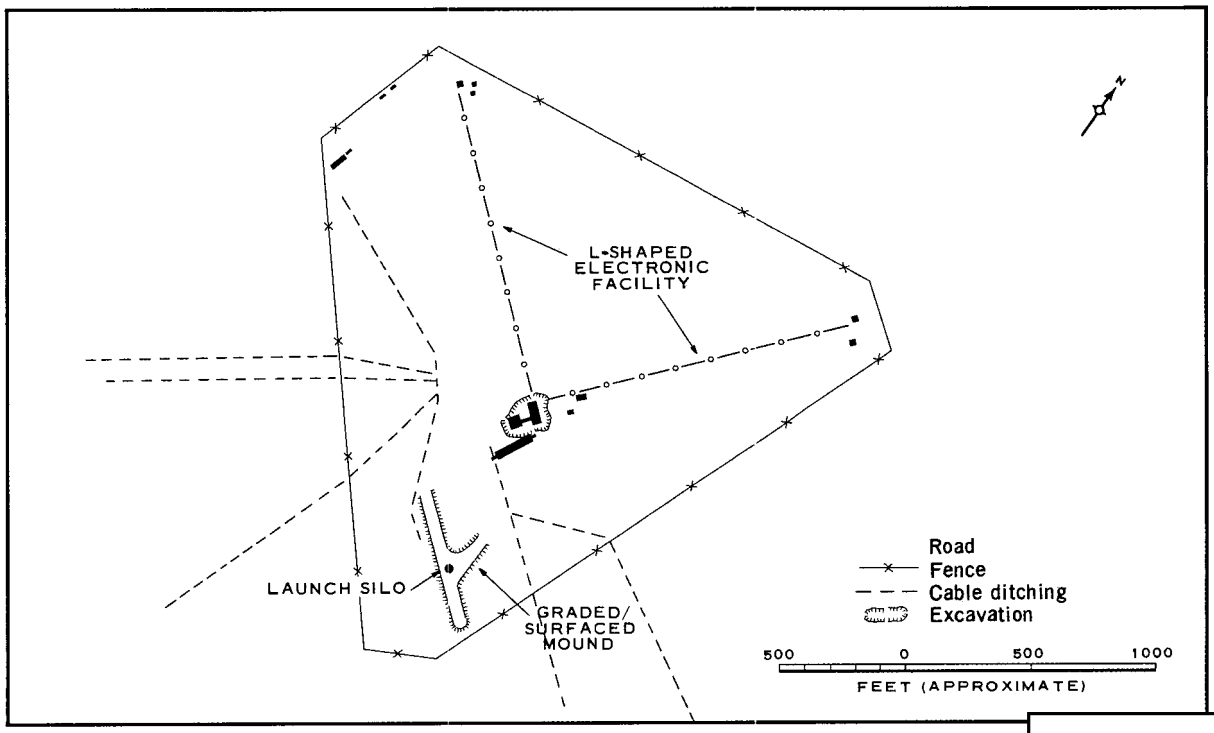


FIGURE 17. TYPE IIID LAUNCH SITE WITH SUPPORT/CONTROL FACILITY. [redacted]

that there will be hardened antenna positions at the extremities of the segments of the L and at the vertex. The control facility, located in an excavation at the vertex of the L, consists of 2 control/equipment buildings roughly equal in size. They appear to be connected by an underground passageway. The control facility, when completed, will almost certainly be earth mounded.

We are currently carrying some 14 launch groups at the 5 complexes associated with Type IIID site deployment. In many cases, however, groupings of sites are close together and we are unable to identify the specific sites associated with each group. We probably will be able to identify these groups only after inter-site cabling is evident. Determination of the number of launch groups in these instances is based on identification of central control/support facilities, total numbers of sites identified, and their geographic layout. Of the 14 launch groups, there are 4 each at the Olovyannaya and Tatishchevo Complexes, and 3 complexes each have 2 groups.

There is no evidence, as yet, that launch groups within a complex will be inter-connected, but we believe that this will be accomplished to provide maximum flexibility in the event that 1 control center is rendered inoperative.

Site Composition and Configuration

Individual launch sites, other than the 1 containing the support/control facility, are simple and austere. Each site contains a doughnut-shaped silo structure approximately [redacted] in diameter (Figure 18); the inner diameter of the silo is about 15 feet. A small building is located near the silo. At some sites a small structure has also been observed near the appendage on the side of the silo. This structure, which may contain equipment, apparently is covered by backfilling.

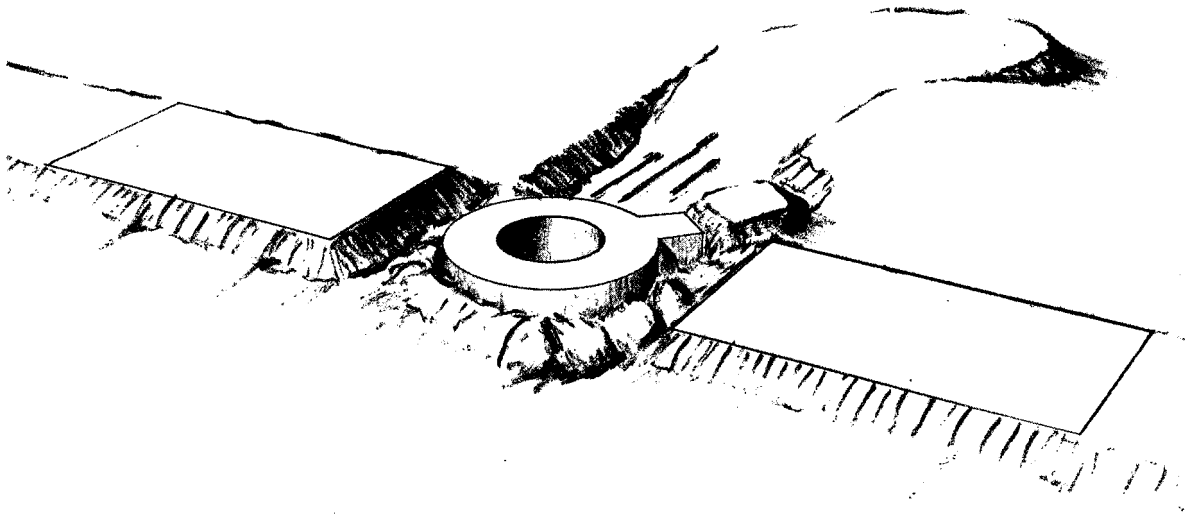


FIGURE 18. ARTIST'S CONCEPT OF TYPE IIID LAUNCH SILO UNDER CONSTRUCTION. [redacted]

Coring for the silo is accomplished after the digging of a small irregular excavation. The silo is then constructed in the coring. During this time, the small building is constructed near the silo and grading for the level access is accomplished. The network of cables between sites is also begun during this period. By the time the silo reaches ground level, the silo access has been completed except for the immediate area around the silo. This area remains open for a period of 2 to 6 months. Sometime during backfill, an environmental cover approximately [redacted] is placed over the silo opening. The most advanced silos at deployed launch groups have reached a point where backfill is complete and the sites have a clean appearance. Silo doors have not yet been identified, however.

Tyuratam Prototypes

We believe that the prototype for deployed Type IIID sites is Launch Group L (21-30) at Tyuratam, a 10-site configuration. In addition, Launch Sites K3 (20) and G8/G9 (19) appear to have similar silos. However, significant differences in overall site configuration at G8/G9 suggest that 2 different missile systems may be planned.

Launch Group L (21-30) was begun in [redacted] and is progressing toward completion at a rapid rate. It is currently in a late construction stage and, if work progresses at the pace observed to date, the group should be operational by late summer or early fall [redacted] The center site, Launch Site L1 (21), is similar, if not identical, to Launch Site K3 (20), except that the electronic facility at L1 is oriented north toward the US, while that at K3 is oriented downrange toward Kamchatka (Figures 19 and 20).

Launch Site K3 (20), containing 1 launch silo and a control and electronic facility, was constructed in about 6 months during the spring and summer [redacted] In the fall, however, the apex of the L was reexcavated and 2 buildings added. Additional excavating was also visible at this time in the vicinity of the silo, although the nature of this activity has never been established. Both of these areas have again been backfilled (Figure 21). Although we can neither confirm nor deny the presence of a silo door on existing photography, the remainder of the site appears complete and we estimate that it is operational.

It is also possible that Launch Site G8/G9 (19) at Tyuratam may employ the same missile system. This 2-silo site, begun early in [redacted] is currently operational (Figure 22). The silos, some 385 feet apart, appear to be similar to other Type IIID silos at the center and at deployed sites. The site configuration differs from the others, however, and there is no L-shaped electronic facility which can be specifically associated with these silos. This site can be associated closely with Launch Site G5/G6 (12) at Tyuratam, a soft site also lacking an L-shaped electronic facility.

Construction Timing

It appears that Type IIID sites will be deployed in groups of 10, and we estimate that they will become operational in groups, although it is possible that fewer than 10 silos could have a somewhat earlier operational capability.

It is apparent from continued [redacted] coverage of Type IIID launch groups at deployed complexes that the pace of construction is deliberate and unhurried. While at Tyuratam it appears that Launch Group L (21-30) will be completed in a year or less, some 4 launch groups in the field have been underway about 14 to 16 months, and only 2 of these are currently in a late stage. Our previous estimate that approximately 1 year is required for the "brick

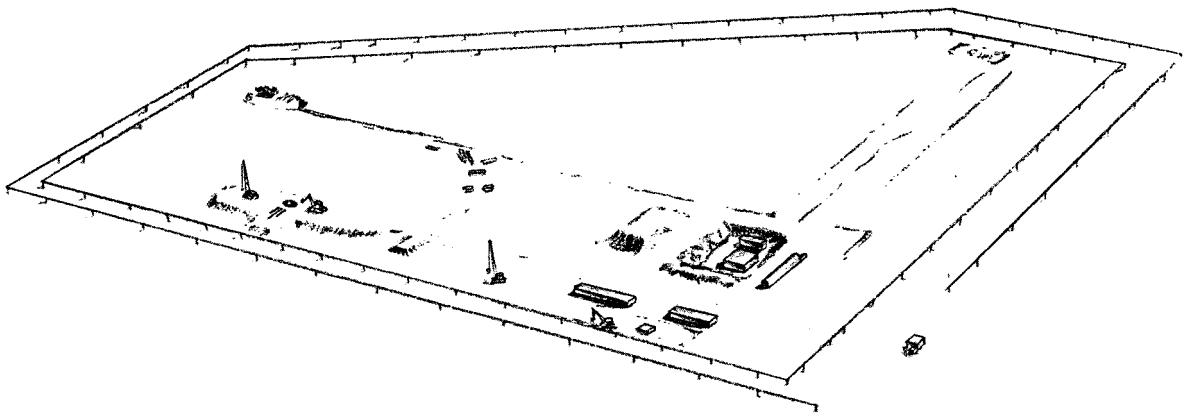


FIGURE 19. ARTIST'S CONCEPT OF LAUNCH SITE L1(21), TYURATAM.

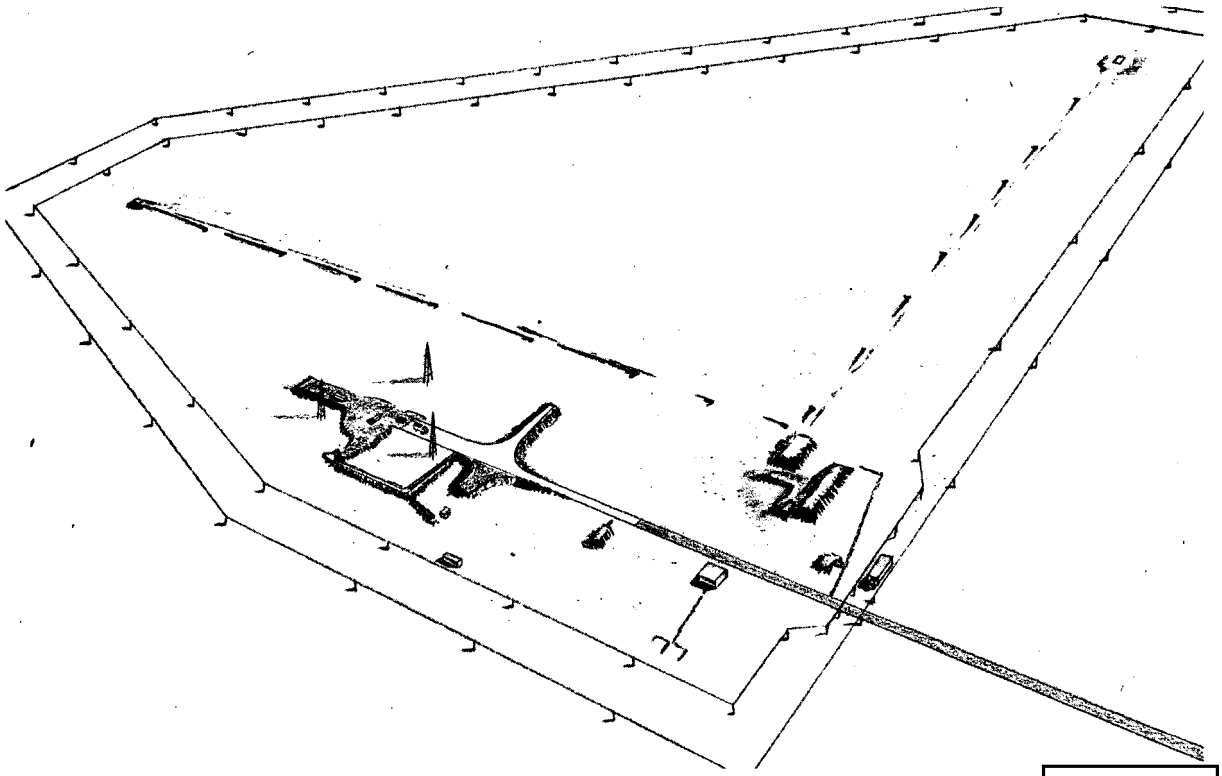


FIGURE 20. ARTIST'S CONCEPT OF LAUNCH SITE K3(20), TYURATAM.

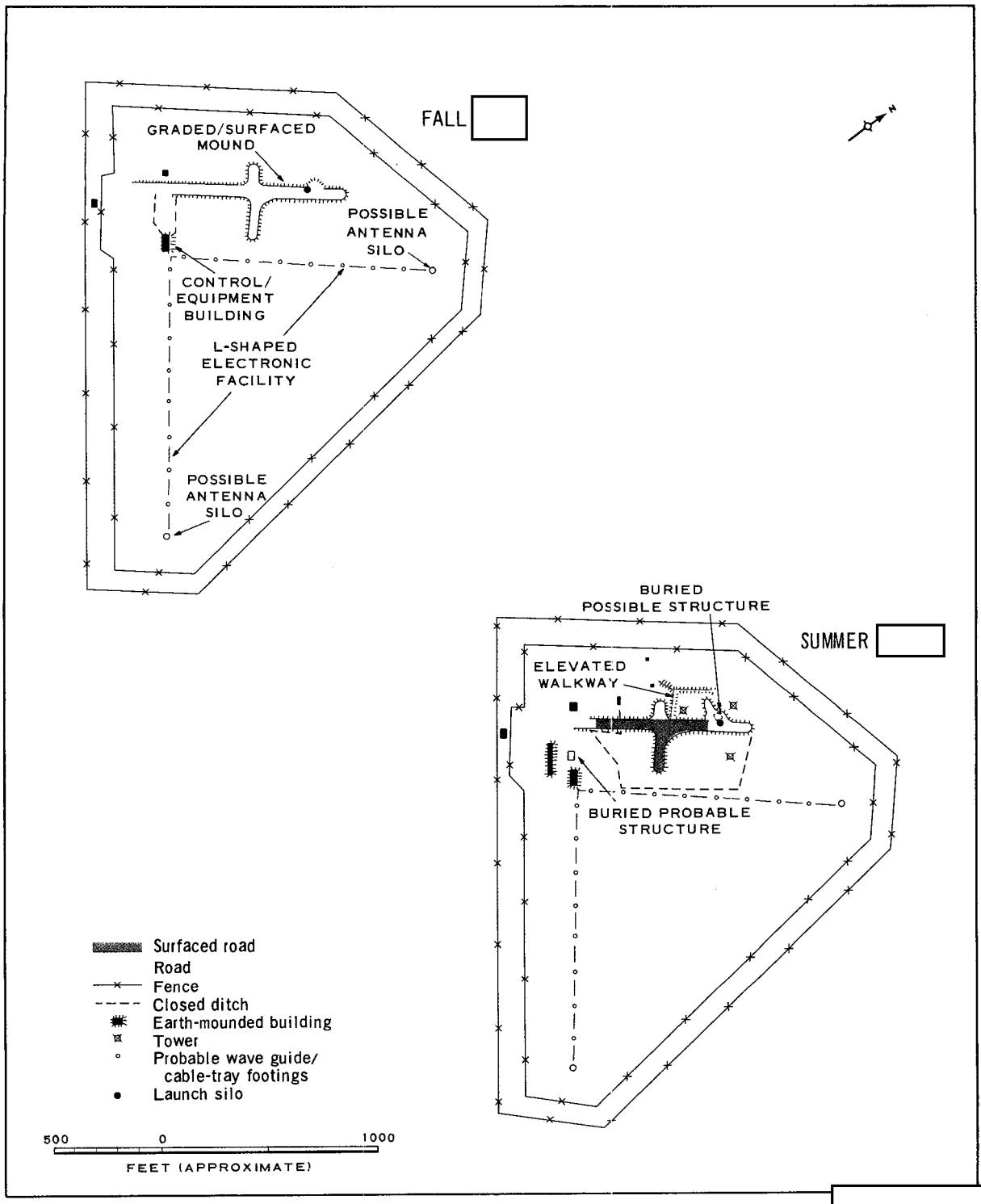


FIGURE 21. LAUNCH SITE K3(20), TYURATAM.

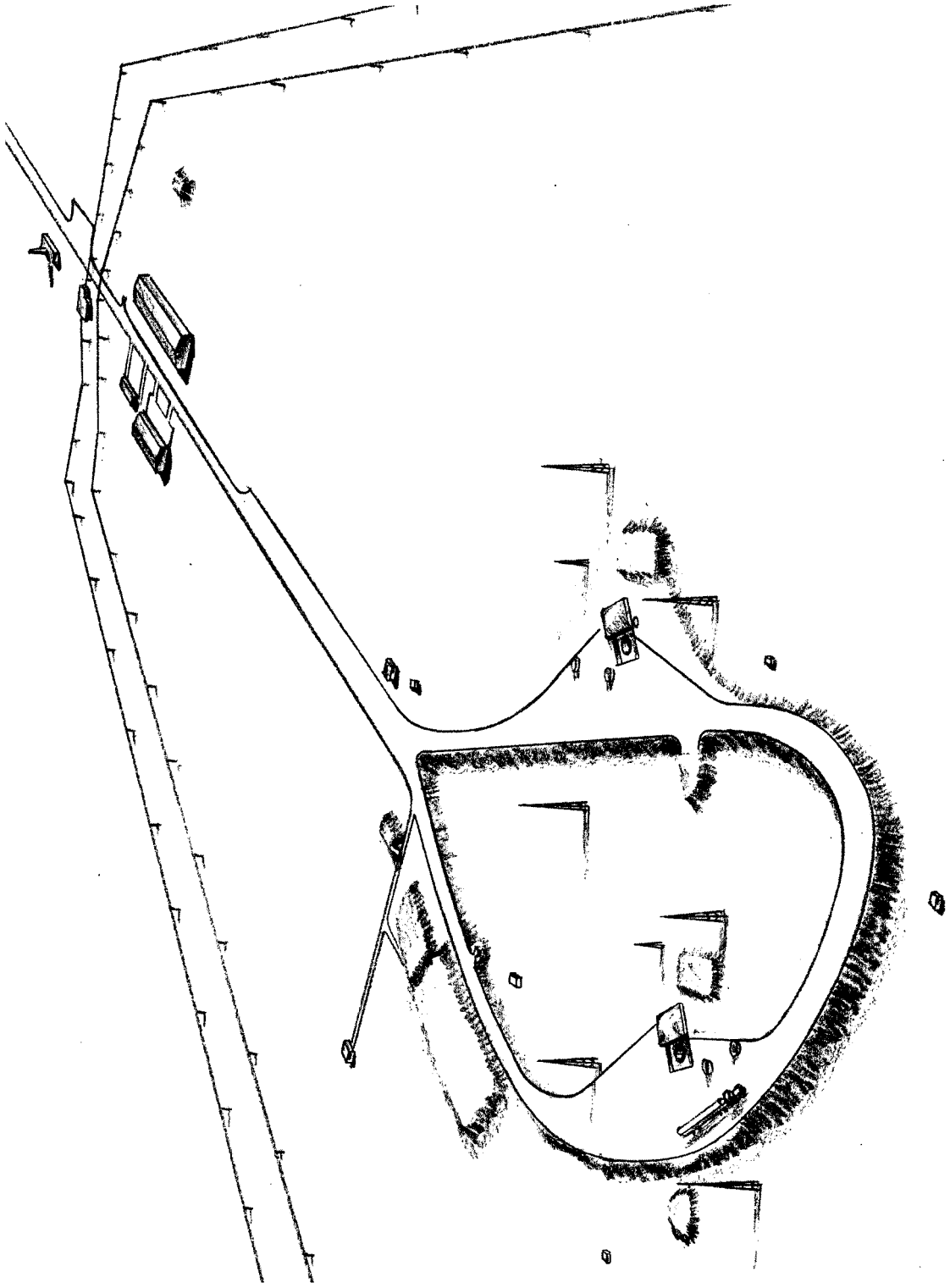


FIGURE 22. ARTIST'S CONCEPT OF LAUNCH SITE G8/G9(19), TYURATAM.

and mortar" phase of silo construction is still a median figure, with a range of 10 to 15 months observed at individual sites. No silo doors have been identified as yet, however, and several silos have remained unchanged externally since early [redacted] It appears, therefore, that installation and checkout of equipment at these sites has been delayed or is taking longer than the 6 months we previously estimated. It now appears that it will take from 21 to 24 months for each launch group to reach an operational status. Estimated operational dates for the 14 launch groups identified to date are contained in Table 2, and are based on a total construction time of 21 months for each group, the earliest we believe that they will be operational.

Logistic Support

In our 17th Revision we provided a detailed description of logistic facilities supporting Type IIID site deployment. The following information updates and supplements this information.

The complex support facility at Tatishchevo is still under construction at the terminus of the rail spur. It appears to be somewhat smaller than similar facilities at Type IIIC complexes, but contains the same functional components. Tatishchevo is the only complex where the road network serving the Type IIID launch sites has been improved to any degree. The improved road which runs through Launch Group A (1-11) is reminiscent of the complex main road at the older ICBM complexes; the site access roads branch off this road.

Deployment of Type IIID launch groups at the 4 older complexes has resulted in a significant buildup in support facilities since [redacted] The bulk of the new construction is barracks-type buildings. At Drovyanaya, a total of about 125 buildings has now been added to the complex support facility, and the housing area to the north. About 40 buildings support Type IIID deployment at Perm, and 30 to 35 buildings have been added to existing facilities at Olovyannaya and Gladkaya.

As previously reported, only 1 support facility has been identified at each launch group. It is colocated with the launch site containing the control/support facility. There is no evidence of on-site support facilities at the other launch sites in each group.

A significant buildup of facilities has been observed at rail-to-road transfer points supporting Type IIID site deployment. These facilities include very large rectangular buildings, large semiburied tanks, arch-roofed building(s), a large clerestory building, large rail-through building(s), and additional rail spurs. All of the transfer points are similar except that at Perm. The buildup there is not yet as extensive as at the other complexes.

Associated Missile Systems

Two missiles are candidates for deployment in Type IIID silos. The first is a probable new 2-stage liquid-propellant missile, designated TT-2, which has been flight tested from Tyuratam to Kamchatka on at least 5 occasions since [redacted] Flim Flam backtracks indicate that the missile is being fired from Launch Complex G -- possibly from Launch Site G5/G6 (12), although Launch Site G1/G2 (7) cannot be eliminated. The present firing rate of more than 1 per month can be compared to the early test phase of the SS-7 program. In that program the rate increased significantly after the first 10 firings. Should a comparable increase occur in TT-2 testing, and if the program is successful, initial operational capability could be reached as early as [redacted] when the first Type IIID silos also could be completed.

The second candidate, the 3-stage solid-propellant missile (SAVAGE) displayed in the 9 May 1965 Moscow parade, has not been flight

tested, at least in its full configuration. Initial operational capability for this missile system could be reached in late 1966 or early 1967, if intensive 3-stage testing commences in the immediate future.

Development at Deployed Type IIID Complexes

DROVYANAYA COMPLEX

Launch Groups G (7-18) and H (16-26) were both covered by [redacted] Construction continues at Launch Group G (7-18), where all of the sites except Launch Sites G4 (10), G7 (13), and G9 (16) are in a late stage of construction. Launch Group H (16-26) remains in a midstage of construction and now contains 10 sites, following the identifidation of Launch Site H10 (26) on [redacted] This site is negated on [redacted] and is first visible on Mission [redacted]

GLADKAYA COMPLEX

Launch Group F (7-15) and Probable Launch Group G (16-21) have not been covered by [redacted] photography since our last revision.

OLOVYANNAYA COMPLEX

Olovyannaya Launch Groups D (4-13), E (14-23), and Probable Launch Groups F (24) and G (25-27) have not been covered by [redacted] photography since our last revision.

PERM COMPLEX

Launch Groups G (7-16) and H (17) have not been covered by [redacted] photography since our last revision.

TATISHCHEVO COMPLEX

Launch Groups A (1-11), B (12-21), C (23-27), and D (28-29) have not been covered by [redacted] photography since our last revision.

PACE AND EXTENT OF SINGLE-SILO DEPLOYMENT

General

It is apparent that the Soviets have designed their single-silo deployment program to significantly increase the total number of operational ICBM launchers and reduce site vulnerability through dispersion and hardening. It is significant to note that whereas the number of operational hard launchers at deployed complexes will probably increase from the current figure of 78 to over 250 by mid-1967, the number of aiming points will be increased from 26 to over 200 in the same period.

It is not yet clear to what extent current deployment programs will continue, or whether they will be succeeded by follow-on programs. We still are unable to determine whether the Soviets intend to increase the credibility of their deterrent force by the addition of a significant, but relatively limited, number of launchers in a comparatively short period of time; whether the rate and pace of construction observed thus far will continue for several years; or whether the single-silo deployment program is designed to eventually match the US program in numbers. Succeeding paragraphs present our analysis of existing evidence relating to the pace and extent of the single-silo deployment program.

Type IIIC Site Deployment

Of the 64 confirmed, probable and possible Type IIIC sites identified to date, about 38 were begun in [redacted] and the remaining 26 in [redacted] From this, it appears that deployment of this configuration is continuing at about the same rate as in [redacted] The Soviets are experienced in building this launch site configuration and do not appear to be having difficulties with development and production of the associated SS-9 missile system. Construction of these sites, however, was apparently scheduled at a slow and deliberate pace. This site configuration and the missile system it probably will employ are not compatible with large-scale economical deployment, as the Type IIID site and its associated system appear to be. We think, therefore, that the Type IIIC deployment

program will continue at about the pace observed to date and, when complete, will number some 100 to 200 silos.

Type IIID Site Deployment

Of the 100 confirmed, probable, and possible Type IIID launch sites identified to date, about 85 were begun in [redacted] and the remaining 15 [redacted] In terms of identified launch groups, 11 were begun in [redacted] and only 3 thus far in [redacted] While the evidence is not yet conclusive, this may indicate a temporary slowdown in Type IIID site deployment, possibly related to missile system difficulties. As with Type IIIC sites, the pace of construction activity is slow and deliberate. We have not yet identified the missile system or systems to be deployed in these silos, but it is apparent that it will be a small missile, roughly comparable to the US Minuteman in size, and designed for a deployment program of several hundred launchers. We believe that, barring technical difficulties with development of the missile system, Type IIID site deployment will continue for the next several years.

Comparison With Previous Programs

It now appears that some 120 identified single silos were begun during [redacted] about 30 more launchers than the previous high achieved in [redacted] In terms of sustained construction activity, the previous high total of about 140 launchers concurrently under construction in [redacted] has now been exceeded. A total of more than 150 confirmed and probable launchers (including 4 soft sites at Plesetsk) are currently under construction, and there are almost certainly several tens more that are either undetected or will start before the first single-silo site in the field is operational.

Conclusions

In summary, while the current Soviet single-silo deployment program represents the greatest effort the Soviets have yet exerted in terms of ICBM site activations and sustained construction activity, it does not appear to be a "crash" program. Construction progress at individual launch sites has been relatively slow and deliberate, for undetermined reasons. We expect that construction of new sites at identified complexes will continue, and that additional complexes may be constructed to accommodate deployment of third- and fourth-generation missile systems. In this respect, however, it should be pointed out that most of the 25 identified complexes provide room for expansion and could support a total of several hundred more launchers if the Soviets decide to limit their current deployment program to these installations.

SOFT SITE DEPLOYMENT AT PLESETSK

Probable Launch Sites G (9) and H (10) at Plesetsk were covered by [redacted] Both remain in a midstage of construction. Backfilling of ditches at both launch sites is nearly finished. The pad areas at both sites are not clearly defined, but we believe that each will ultimately have 2 rail-served launch pads. We cannot equate these probable launch sites to any prototype at Tyuratam, nor is there any indication that similar sites are under construction at other identified complexes. We also are unable to associate any weapons system with thse sites.

MODE OF OPERATION OF HARD ICBM SITES

There is good evidence that Type IIIA (SS-7) and Type IIIC hard ICBM sites are configured to allow the missile to fly out of the silo. These silos are similar, if not identical, in size, configuration, and method of construction. Both are covered by a [redacted] silo door, indicating a requirement to protect something more than the approximate [redacted] diameter silo aperture. Several [redacted] photographs of both types of sites

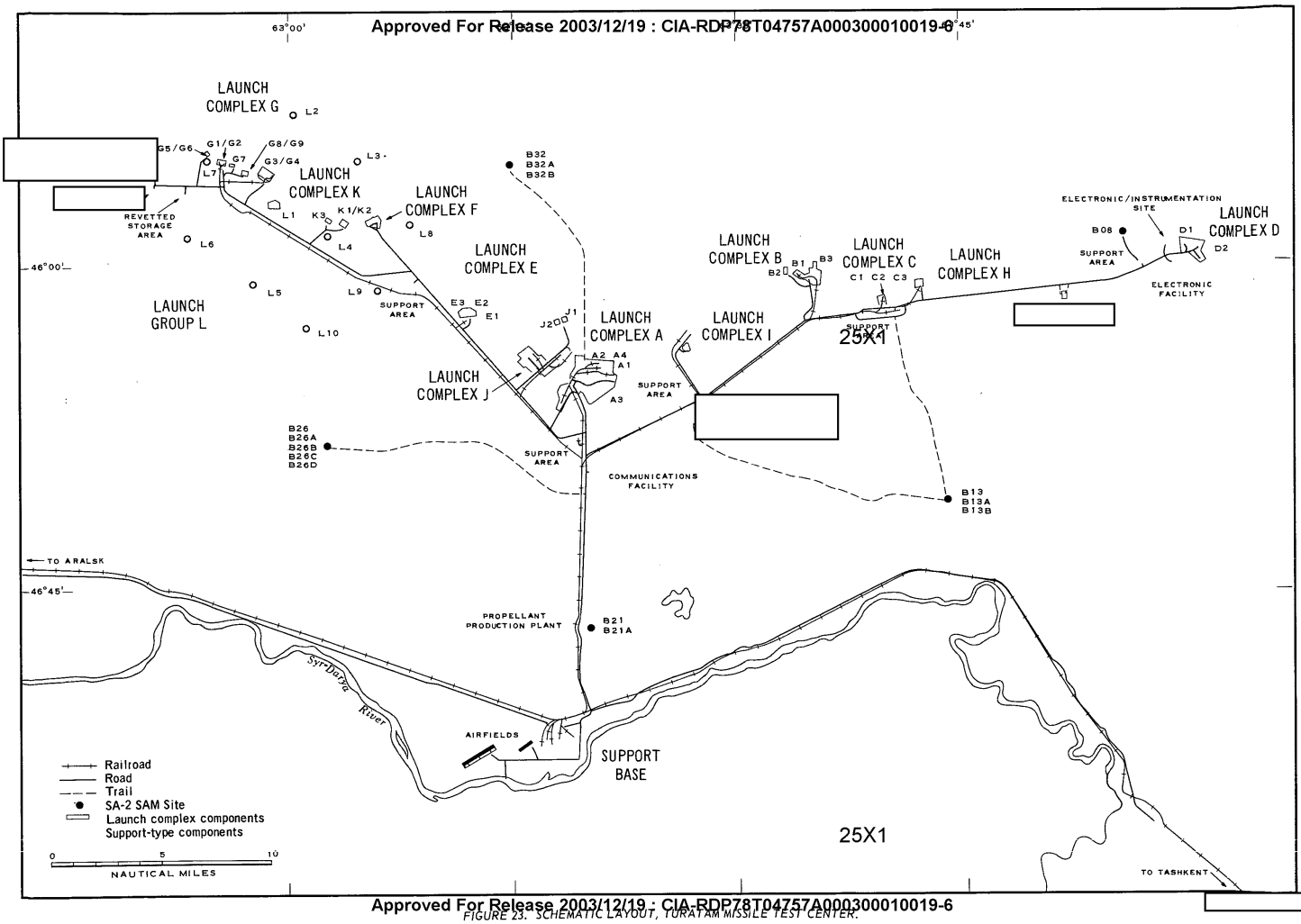


FIGURE 23. SCHEMATIC LAYOUT, TURATAM MISSILE TEST CENTER.

appear to show apertures on either side of the silos. Recent isodensimetric studies of Type IIIC launch sites in a midstage of construction confirm the presence of these apertures, and we are convinced that they are exhaust vents.

There is no comparable evidence concerning the design of Type IIIB (SS-8) hard sites. However, analysis of recently released Soviet films indicates that the SS-8 is, in fact, launched from the silo.

We see no evidence of a venting system at Type IIID sites, but believe that the missile will have a fly-out capability, possibly venting itself in the hole in the same manner as the US Minuteman. We cannot exclude an elevate-to-launch technique, but do believe that such a system would be a backward step inconsistent with demonstrated Soviet capabilities.

TYURATAM MISSILE TEST CENTER

Test Range Facilities

The Tyuratam Missile Test Center (Figure 23) was partially covered by poor-to-fair quality photography on both [redacted] No significant activity could be discerned on either mission, and the quality of the photography precluded detailed interpretation of the few sites that were covered.

Test Range Facilities

Firing activity on the Tyuratam test range during the period [redacted] was highlighted by continued R&D testing of the liquid-fueled TT-2 missile, by the first probable launch of the SS-9 missile from a single-silo launch site at Tyuratam, and by the launch of the Proton I space vehicle from Launch Site G3/G4.

[redacted] firing of an SS-9 ICBM to Kamchatka probably represented troop training, since telemetry was reduced and there was no Flim Flam tracking. On [redacted] a probable SS-9 launch resulted in an early inflight failure. [redacted] a probable SS-9 operation to the 4,500-nm Pacific Impact Area was accomplished. Flim Flam evidence indicated Launch Complex B as the most likely launch point. Launch Site B2 (16), a Type IIIC prototype, has recently been completed. This was the 25th identified launch of the SS-9 ICBM, 18 of which have been successful.

Launches of the TT-2 missile occurred on [redacted] The first resulted in an early inflight failure. The second, launched from Complex G, successfully reached the Kamchatka Impact Area.

Proton I, described as a scientific space station by the Soviets, was launched on [redacted] probably from Launch Site G3/G4 at Tyuratam. Analysis to date indicates that a new booster was used in the launching and orbiting of a payload weighing in excess of 2 tons.

Other ICBM firing activity at the range was limited to the SS-7 missile system. Probable troop training firings to Kamchatka took place on [redacted] operation intended for the Klyuchi Impact Area resulted in an early inflight failure.

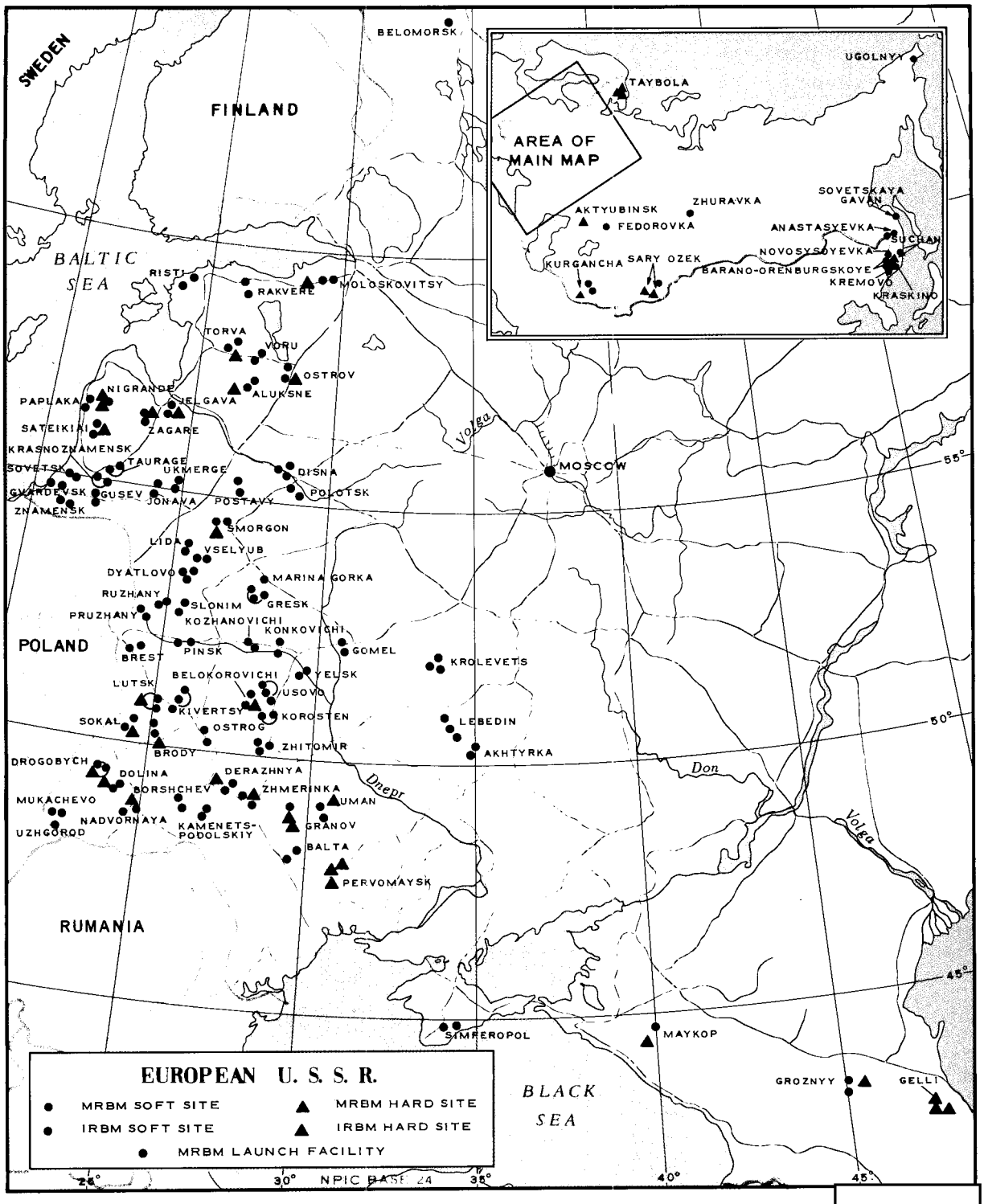


FIGURE 24. DEPLOYMENT OF SOVIET IRBM/MRBM COMPLEXES.

SOVIET IRBM/MRBM DEPLOYMENT

GENERAL

Our recently completed review and analysis of the Soviet IRBM/MRBM deployment program shows that significant developments during the past year include (a) confirmation that deployment of the SS-5 IRBM system and the SS-4 MRBM system in primary sites has ended; (b) a current IRBM/MRBM force level somewhat lower than that previously estimated; (c) a significant increase in the number of fixed field sites associated with deployed MRBM complexes; and (d) firm evidence that SS-4s and SS-5s at deployed hard sites have a fly-out capability.

Based on the quality and frequency of [redacted] coverage, and considering the fact that new site construction ceased in early [redacted] for the SS-4 and early [redacted] for the SS-5, we believe that few, if any, IRBM/MRBM primary sites of known configuration remain undetected.

CURRENT FORCE LEVELS

General

The IRBM component of the Strategic Rocket Forces (Table 4) currently consists of 14 complexes containing 109 launchers at 15 soft and 17 hard sites. All are estimated to be operational. Figure 24 shows the location of deployed IRBM/MRBM complexes. Typical configurations of IRBM/MRBM launch sites, with associated missile systems are depicted in Figure 25. The Soviet MRBM force (Table 5) currently consists of 624 identified launchers at 67 complexes containing 156 individual launch sites. Of these 624 launchers, all of which are operational, 540 are soft and 84 are in a hard configuration.

The total identified IRBM/MRBM force consists of 733 operational launchers deployed at 188 primary launch sites in 81 complexes. Of the total of 733 launchers, 135 are in a hard configuration. These figures reflect a reduction of some 26 launchers (18 IRBM, 8 MRBM) over the totals we were carrying a year ago. This reduction, and probable further reductions in the number of operational launchers during the next few months are explained in succeeding paragraphs.

Inactive or Abandoned Hard Sites

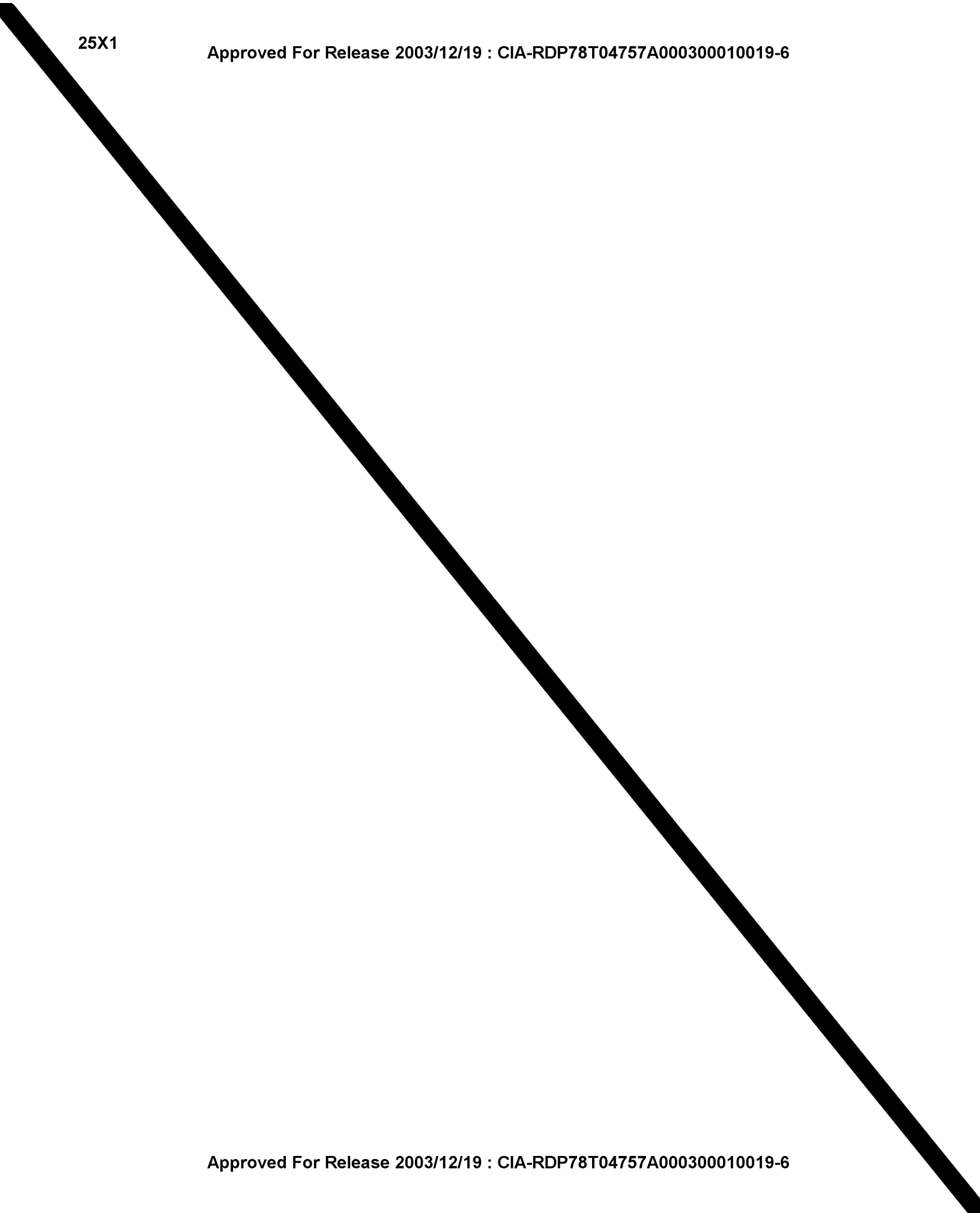
The tables in our 14th Revision reflected the fact that about 26 IRBM/MRBM launch silos were still under construction in the summer of [redacted] Some of these, including all the MRBM sites, have since been completed. Four IRBM sites, however, were not completed. One site at Bolshaya Kamenka has definitely been abandoned. Construction activity at 3 others, Karakhobda, Novosysoyevka 3 and Taybola 3 has been lacking for a considerable period of time and we believe that they are inactive, if not abandoned. We have dropped all 4 of these sites from our inventory.

Half Sites

Recent coverage of the Bereza IRBM sites at the Krolevets Complex (See 17th Revision) revealed that this launch facility has only 2 launch pads rather than the 4 normally associated with IRBM/MRBM soft sites. A review of all other IRBM/MRBM soft sites shows no evidence that other "half sites" exist.

Singly Deployed Sites

Three singly deployed soft sites (1 IRBM, 2 MRBM) have been abandoned during the past year and there is good evidence that at least 4 of the remaining 6 will also be deactivated in the near future. These 9 soft sites--5 MRBM (Kraskino, Marina Gorka, Rozhdestvenka, Sledyuki, and Uzhgorod) and 4 IRBM (Bayram-Ali, Ramoye, Traktovyy, and Zhuravka)--are unique not only for their single deployment, but also for the lack of usual administration and housing facilities (Figure 26). We have never been able to determine the role of these sites in the



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Strategic Rocket Forces. The time frame of their construction (1962-early 1963) suggests a relationship with the Cuban missile crisis, but this can neither be confirmed nor denied. Numerous personnel and vehicular revetments have been observed in and around the Bayram-Ali and Rozhdestvenka launch sites on [redacted] photography. Their presence, and the fact that military installations are located in the vicinity of both sites, suggests a training function. However, a missile exercise has never been observed at any of the 9 sites. In fact, activity and/or equipment has been visible on only 2 occasions: possible erectors and prime movers at Bayram-Ali in [redacted] and vehicles on the access road to the Rozhdestvenka site in [redacted]

It appears that whatever the role played by these sites, they are being phased out. The sites at Bayram-Ali, Rozhdestvenka, and Sledyuki have been dismantled and we have dropped them from the operational inventory (Table 8). We are currently carrying the remaining 6 sites in an operational status, although there are indications that dismantling may be beginning at 4 of the sites. We estimate that all of these sites will be deactivated by [redacted]

Projected Force Levels

We believe that planned deployment of the SS-4 MRBM and SS-5 IRBM in primary sites was completed by mid-1965 and that, except for a slight reduction in operational launchers as the singly deployed sites are inactivated, this force level will remain relatively constant through mid-1967. The fact that no new MRBM or IRBM site starts have been observed since early [redacted] respectively, is a strong indication that construction of primary sites for the SS-4 and SS-5 has ended. On the other hand, there is good evidence that all existing primary IRBM/MRBM sites, other than the singly deployed facilities, are manned and operational. Construction activity at site support facilities indicates that continued occupancy is intended. This construction activity includes the erection of multistoried barracks, garages, and, at MRBM soft sites, the addition of storage tanks. Construction [redacted] is also continuing, and we expect that in time each will have its own. There is no activity at any deployed IRBM/MRBM site indicative that a retrofit program is underway.

Current Deployment Pattern

Deployment of the IRBM/MRBM components of the Strategic Rocket Forces has remained in the previously established pattern, covering targets in Europe, North Africa, portions of the Far and Middle East, and limited areas in Alaska and Greenland. Composition of the complexes is given in Table 9.

With 1 possible exception, there is no evidence of any mixing of IRBM/MRBM systems within a complex. The systems may be mixed at the Ugolnyy site, located near Anadyr in the Soviet Far East and targeted against Alaska (Figure 27). Recent coverage of this launch facility--carried as an MRBM site--shows that launchers of 2 different dimensions may be on each pair of pads. Further analysis of on-site equipment and vehicles will be required before deployment of both the SS-4 and SS-5 at this site can be confirmed.

Refire Capability

We continue to believe that IRBM/MRBM soft sites were designed to permit the launching of refire missiles and that these sites carry a refire missile for each launcher.

MODE OF OPERATION FROM HARD SITES

We are virtually certain that both the SS-4 and SS-5 have a fly-out capability from deployed hard sites (See 19th Revision). Our original

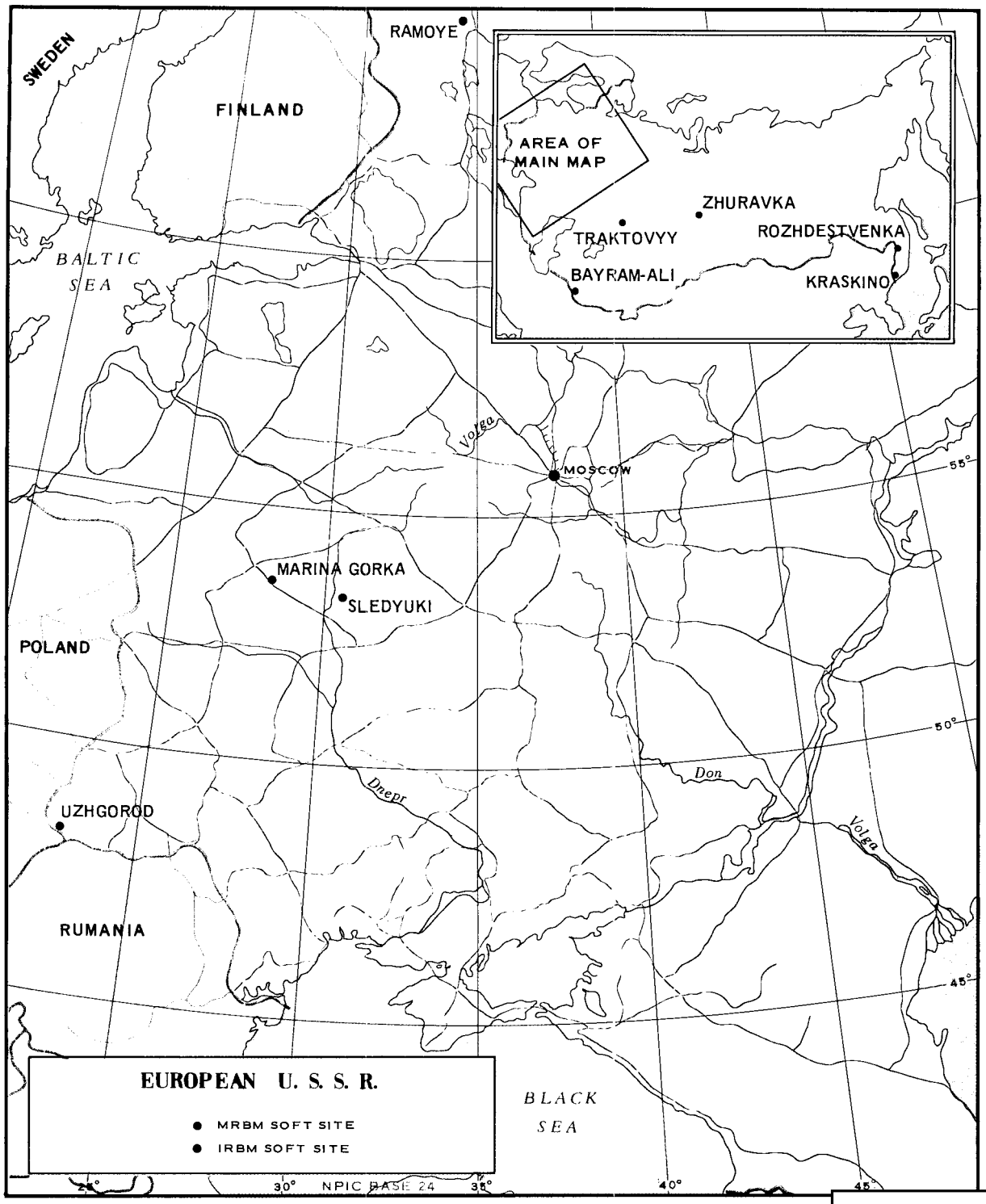

FIGURE 26. LOCATIONS OF SINGLY DEPLOYED SOVIET IRBM/MRBM LAUNCH SITES.

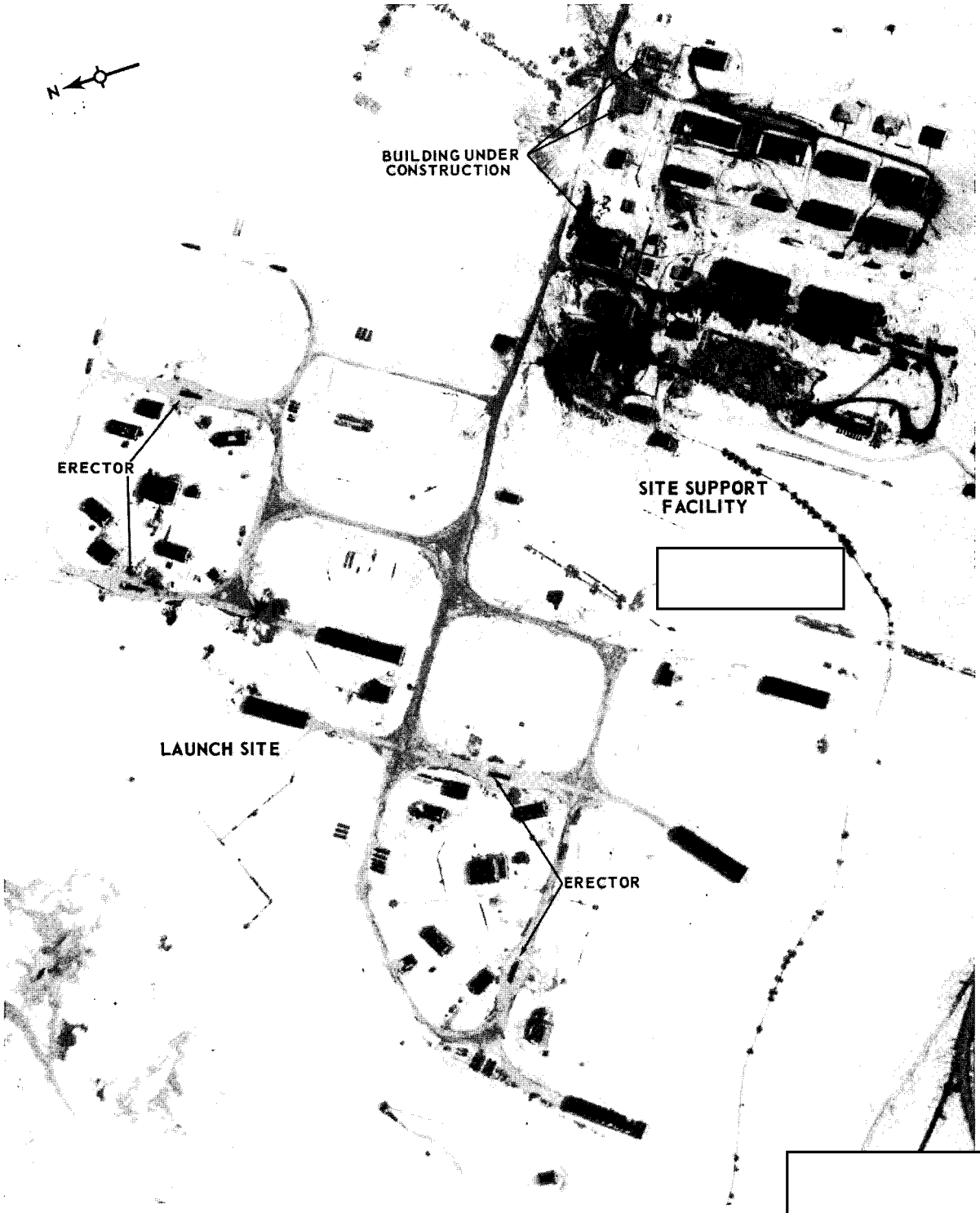

FIGURE 27. UGOLNYY LAUNCH SITE, UGOLNYY MRBM COMPLEX.

judgment in this respect, contained in our 16th Revision, was based on analysis of excellent photography of several IRBM hard sites in various stages of construction. It was confirmed in the launch sequences in the Soviet Film "Rockets Guard the Peace" televised throughout Europe in May 1965.

FIXED FIELD SITES

We are still unable to assign a common function to the 85 fixed field sites identified to date on photography (Table 7). We firmly believe, however, that the SS-4 MRBM is the only currently operational strategic missile system capable of using such field launch facilities. Continuing analysis of these sites indicates that they do not all serve the same purpose. Indeed, some may be associated with military units other than those belonging to the Strategic Rocket Forces. Although some fixed field positions may actually represent the alternate/reserve positions referred to in documents, many, because of their proximity to parent primary MRBM sites, would make poor alternate positions. Additionally, winter photography of some 45 of these sites reveals no evidence of snow removal, indicating that their role, if operational, is on a seasonal basis. Field training for operational crews appears to be a logical function of some of the pads; training exercises have been identified at 5 sites, utilizing equipment removed from a nearby permanent facility. Some of the older sites probably represent early deployment of the now obsolete SS-3 MRBM system.

It is interesting to note that of the 85 identified fixed field sites, the majority were constructed Only a few sites constructed have been identified to date. About 50 of the 67 MRBM complexes have 1 or more fixed field sites associated with them. The greatest number associated with a single complex are the 4 at Korosten, which contains only 2 primary sites.

FUTURE DEVELOPMENTS

Evidence of follow-on systems is somewhat ambiguous. The Soviets have paraded what appears to be a solid-fueled mobile rocket, designated the SCAMP by the western intelligence community. Marshal Krylov, Commander-in-Chief, Soviet Strategic Rocket Forces, claims that it is capable of intermediate ranges. No flight test program for such a vehicle to strategic ranges (over 600 nm) has been identified. However, at Kapustin Yar, flight testing of an apparent new system (s) to tactical ranges has been underway since This program could involve component testing for a follow-on IRBM/MRBM system. In addition, at Kapustin Yar Launch Site 4C1 (prototype for MRBM hard sites) 2 silos have been undergoing modification for over a year; 1 silo apparently will be rail served.

Unless there is a drastic change in targeting requirements, we see no reason for the Soviets to expand their total IRBM/MRBM force beyond its present level, in terms of operational launchers. If a follow-on system is deployed within the near term, we believe that it will be road mobile and that a number of soft launchers will be phased out, with possible retrofit of existing hard launch sites to accommodate the new system.

It is estimated that the long-term Soviet trend in IRBM/MRBM systems will be toward solid-propellant missiles and increased mobility. By 1970 current systems probably will have been supplemented by solid-propellant missiles deployed on mobile launchers and in hardened silos which may be modifications of existing sites. The force will be characterized by improved flexibility, reliability and reaction time, and decreased vulnerability.

The total strength of the force may rise as new systems are introduced, but will not be increased significantly beyond current levels unless additional target requirements occur (e.g. hardened

The implications of mobile IRBM/MRBM missile systems, if successfully developed and deployed, are significant. They would permit the Soviets to enjoy the benefits of publicizing the existence of such a capability without compromising the number of operational launchers available or the location of launch points. Such systems would probably be capable of undetected movement and concealment both within and outside the borders of the USSR.

DEVELOPMENTS AT DEPLOYED COMPLEXES

General

covered 7 of the 14 IRBM and 40 of the 67 MRBM complexes. Significant observations are summarized in succeeding paragraphs.

Taybola IRBM Complex

revealed that site construction has failed to progress at Taybola Launch Site 3 and we are dropping it from our tables as inactive.

Sites Without Support Facilities

covered 2 of the 6 remaining singly deployed sites. At Traktovyy, there was no apparent change in facilities or any further evidence of dismantling. At Zhuravka, however, a building has been removed from the Pending further coverage, we are continuing to carry this site in the operational inventory.

Sary Ozek IRBM Complex

showed that tank-like objects have been removed from the silo covers at the Kara Babau 2 Launch Site since (Figure 28). This launch site

Fixed Field Sites

Five additional fixed field sites, each with 4 firing positions, have been identified since our last revision, bringing the total sites to 85 and total launchers to 312 (Table 7). New sites include a fourth fixed field facility at the Dyatlovo MRBM Complex, a second at the Gomel, Moloskovitsy and Torva MRBM Complexes; and the first at the Kozhanovichi MRBM Complex.

KAPUSTIN YAR MISSILE TEST CENTER

Test Range Facilities

The Kapustin Yar Missile Test Center (Figure 30) has not been covered since our last revision. A summary evaluation of selected launch facilities is given in Table 6.

Test Range Activity

During the period a total of 5 SS-4s and 2 SS-5s was launched from the rangehead. In addition, there were 4 SS-4 firings from Makat to the 1,050-nm impact area and a firing of an SS-5 to Kamchatka from an operational site in the Soviet Far East.

The SS-4 firings from Kapustin Yar were associated with troop training. The purpose of

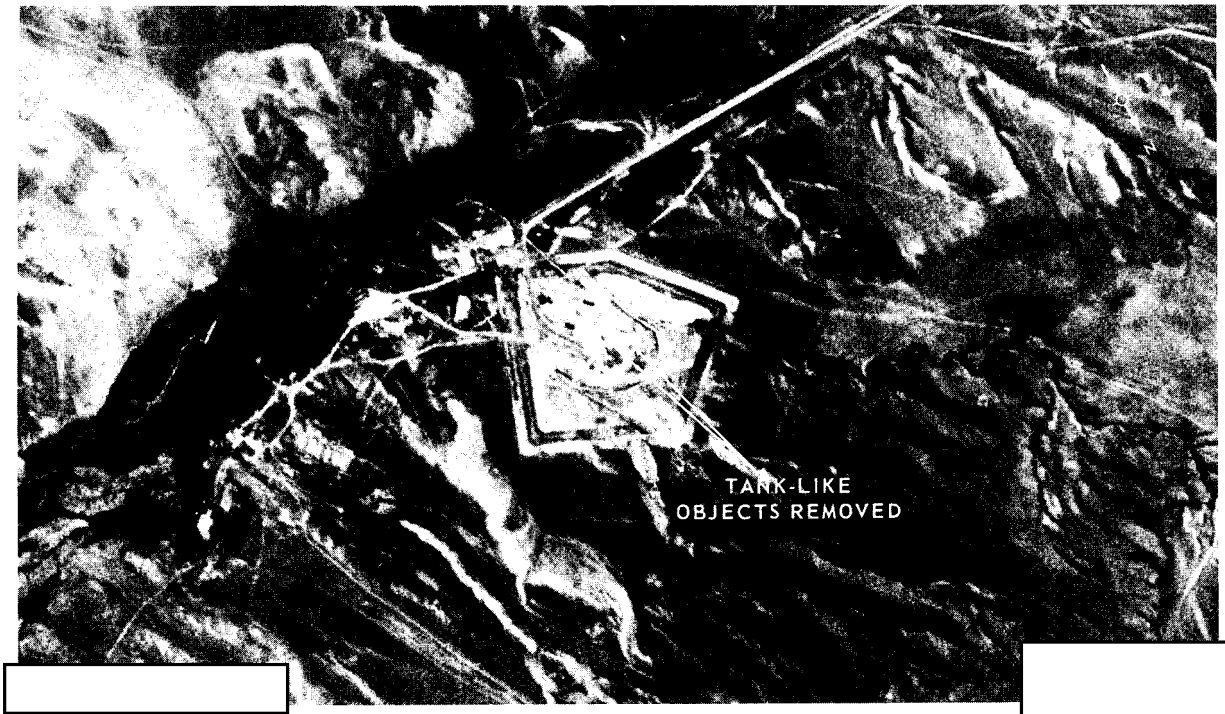

FIGURE 28. KARA BABAU 2 LAUNCH SITE, SARY OZEK IRBM COMPLEX.

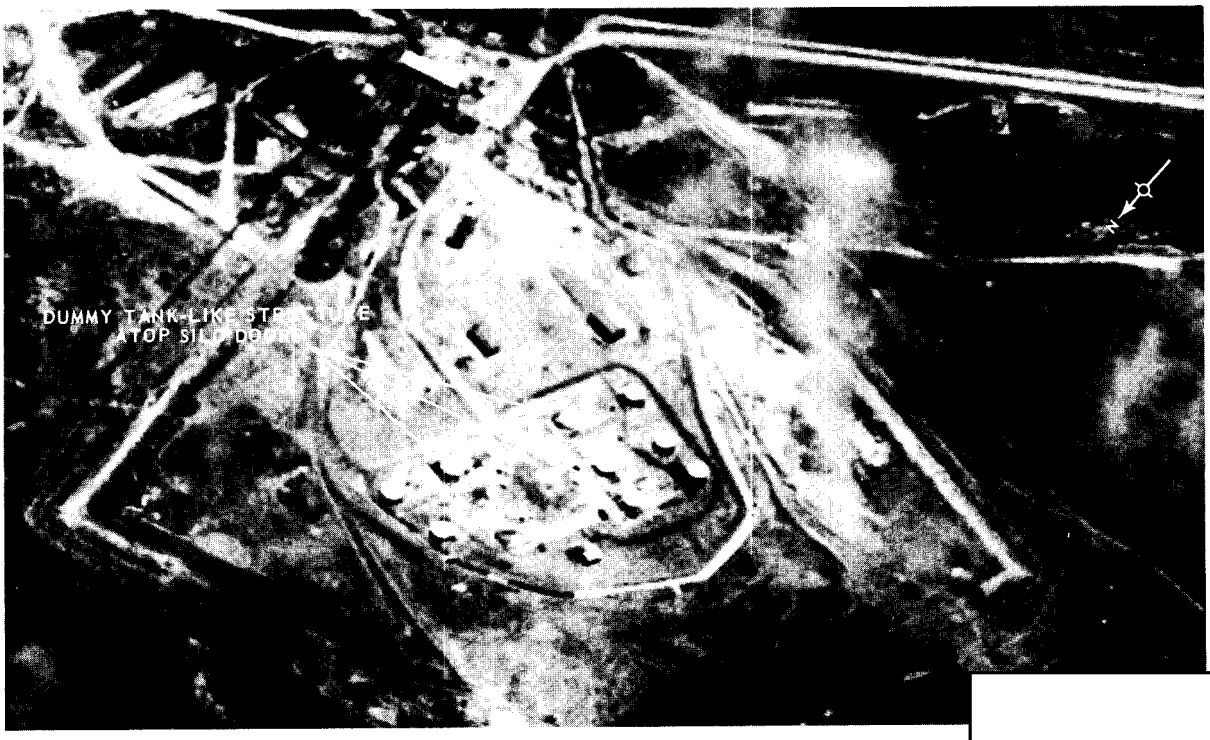

FIGURE 29. KARA BABAU 2 LAUNCH SITE, SARY OZEK IRBM COMPLEX.

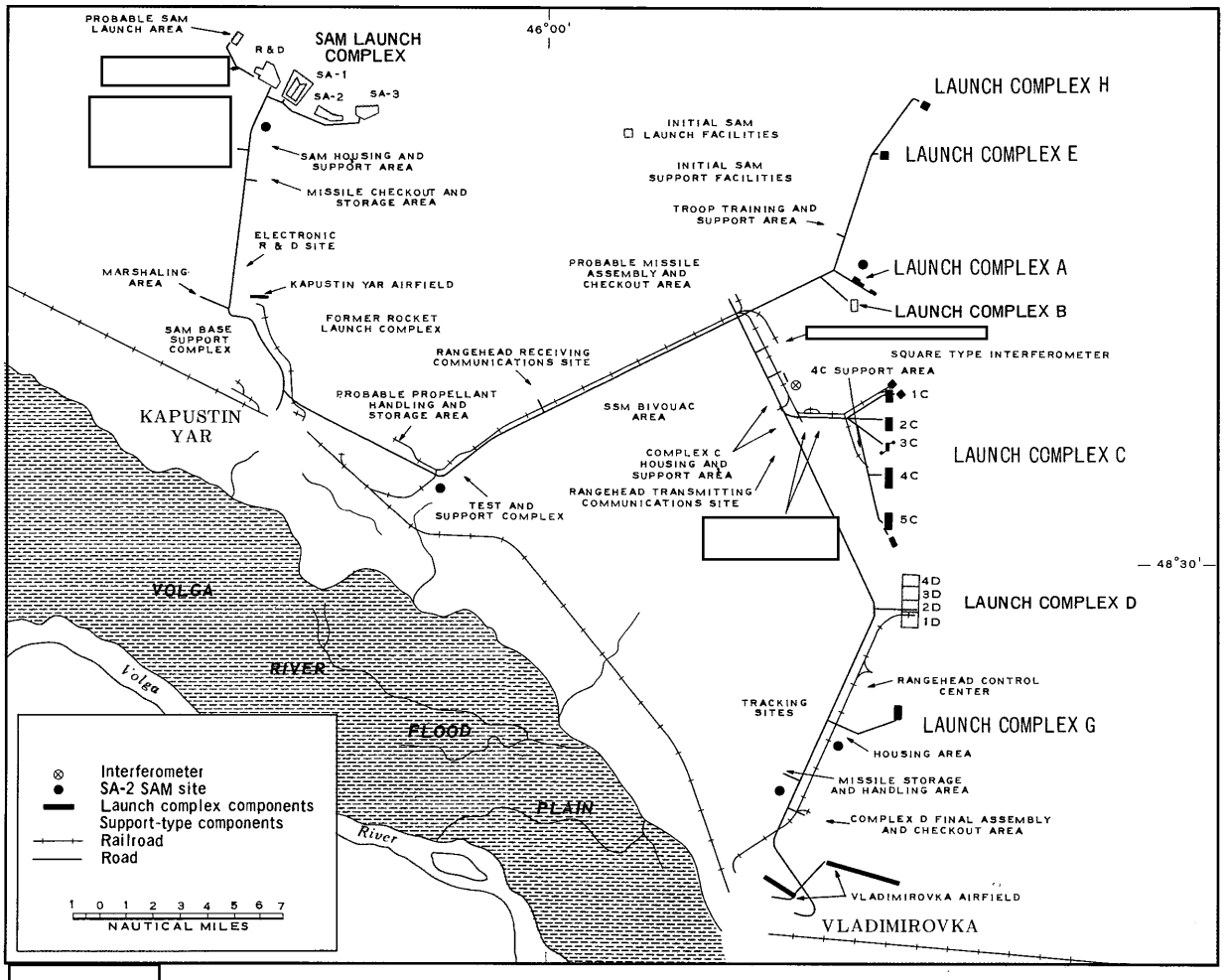

FIGURE 30. SCHEMATIC LAYOUT, KAPUSTIN YAR MISSILE TEST CENTER.

the Makat firings to Sary Shagan cannot be determined. The SS-5 firings from Kapustin Yar were also probably associated with troop training. One, on [redacted] was fired to a range of 2,417 nm -- possibly a fuel depletion test.

The launch of an SS-5 from an operational IRBM complex (probably Novosysoyevka) on [redacted] was the second identified launch of a missile from a deployed site; the first occurred in [redacted] from the Gelli IRBM Complex.

TABLE 1. SUMMARY OF ESTIMATED STATUS OF IDENTIFIED ICBM, IRBM, AND MRBM LAUNCHERS AT DEPLOYED COMPLEXES, [redacted]

Type	Sites	Launchers	Operational	U/C
		ICBM		
IA	3	4	4	0
IB	2	4	0	4
IIA	5	10	10	0
IIB	29	58	58	0
IIC	7	14	14	0
IID	30	60	60	0
IIIA	23	69	69	0
IIIB	3	9	9	0
IIIC**	65	65	0	65
IIID***	104	104	0	104
TOTALS	271	397	224	173

Type	Sites	Launchers	Operational	U/C
		IRBM		
III	15	58	58	0
IV	17	51	51	0
TOTALS	32	109	109	0
		MRBM		
I	84	336	336	0
II	51	204	204	0
IV	21	84	84	0
TOTALS	156	624	624	0
GRAND TOTALS	188	733	733	0

*See Tables 2, 4, and 5 for details. Figures include 3 launch silos at Type IIIA and IIIB ICBM and Type IV IRBM sites, and 4 launch silos at Type IV MRBM sites. Type IIIC and IIID ICBM sites contain single silos. ICBM figures include 4 Type IIIC sites at the Zhangiz-Tobe Complex, 11 Type IIID sites at the Olovyannaya Complex, and 3 Type IIID sites at the Tatishchevo Complex detected on [redacted] The additional data are not reflected in text, or in Table 2.

**Figures do not include 3 sites carried in the possible category.

***Figures do not include 13 sites carried in the possible category.

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TABLE 2. SUMMARY EVALUATION OF SOVIET ICBM DEPLOYMENT

Location*	BE Number	Coordinates	Type of Site	Number of Launchers		Site Negated		First Coverage		Latest Coverage		Stage of Const on Last Usable Coverage			Estimated Quarter Site Operational				Estimated Status
				Soft	Hard	Date	Msn	Date	Msn	Date	Msn	Date	Msn	Const**	1st	2nd	3rd	4th	
ALEYSK																			
Site A(1)		52-27N 82-35E	IIIC		1									Mid				65	U/C
Site B(2)		52-29N 82-40E	IIIC		1									Mid		66			U/C
Site C(3)		52-33N 82-42E	IIIC		1									Mid		66			U/C
Site D(4)		52-32N 82-34E	IIIC		1									Mid			66		U/C
Site E(5)		52-33N 82-30E	IIIC		1									Mid		66			U/C
Site F(6)		52-36N 82-36E	IIIC		1									Mid			66		U/C
DOMBAROVSKIY																			
Site A(4)		51-11N 59-37E	IIIC		1									Mid	66				U/C
Site B(3)		51-06N 59-38E	IIIC		1									Mid		66			U/C
Site C(2)		51-01N 59-41E	IIIC		1									Mid		66			U/C
Site D(1)		50-58N 59-32E	IIIC		1									Mid		66			U/C
Site E(6)		51-04N 59-28E	IIIC		1									Mid			66		U/C
Site F(7)		51-09N 59-31E	IIIC		1									Early	67				U/C
Site G(11)		51-12N 59-51E	IIIC		1									Early		67			U/C
Site H(10) Probable		51-09N 59-44E	IIIC		1									Early		67			U/C
Site I(8) Probable		51-02N 59-57E	IIIC		1									Early		67			U/C
Site J(9) Probable		51-06N 59-50E	IIIC		1									Early		67			U/C
Site K(12) Possible		51-10N 59-58E	IIIC		1									Early		67			U/C
DROVYANAYA																			
Site A(1)		51-25N 113-00E	IIB	2										Complete	63				Operational
Site B(2)		51-25N 113-04E	IIIA		3									Complete	64				Operational
Site C(4)		51-28N 113-04E	IID	2										Complete				63	Operational
Site D(3)		51-20N 113-01E	IID	2										Complete	64				Operational
Site E(5)		51-23N 112-50E	IIIA		3									Complete				64	Operational
Site F(6)		51-20N 112-55E	IIIA		3									Complete				64	Operational
Group G (7-18)		51-31N 113-04E	IIID		10									Mid	66				U/C
Group H(16-26)		51-23N 112-57E	IIID		10									Mid	66				U/C
GLADKAYA																			
Site A(3)		56-20N 92-18E	IID	2										Complete				63	Operational
Site B(2)		56-25N 92-27E	IID	2										Complete	64				Operational
Site D(5)		56-20N 92-13E	IIIA		3									Complete				64	Operational
Group F (7-15)		56-13N 92-13E	IIID		7									Early	66				U/C
Group G(16-21) Probable		56-15N 91-45E	IIID		1									Early			66		U/C
IMENI GASTELLO																			
Site A(1)		51-03N 66-06E	IIIC		1									Mid		66			U/C
Site B(2)		51-06N 66-02E	IIIC		1									Mid		66			U/C
Site C(3)		51-10N 66-06E	IIIC		1									Mid		66			U/C
Site D(4)		51-07N 66-13E	IIIC		1									Mid		66			U/C
Site E(5)		51-13N 66-13E	IIIC		1									Mid	66				U/C
Site F(6)		51-13N 66-05E	IIIC		1									Mid			66		U/C
Site G(7)		50-57N 66-09E	IIIC		1									Early	67				U/C
Site H(8)		50-58N 66-00E	IIIC		1									Early		67			U/C
Site I(9)		50-58N 66-17E	IIIC		1									Early		67			U/C
Site J(10)		50-52N 66-19E	IIIC		1									Early		67			U/C
Site K(11)		50-52N 65-59E	IIIC		1									Early		67			U/C
ITATKA																			
Site A(1)		56-59N 85-32E	IIB	2										Complete			62		Operational
Site B(2)		57-01N 85-39E	IIB	2										Complete	63				Operational
Site C(3)		56-54N 85-39E	IID	2										Complete				63	Operational
KARTALY																			
Site A(1)		53-01N 60-26E	IIIC		1									Mid					U/C
Site B(2)		52-56N 60-31E	IIIC		1									Mid		66			U/C
Site C(3)		52-55N 60-24E	IIIC		1									Mid		66			U/C
Site D(4)		52-51N 60-27E	IIIC		1									Mid		66			U/C
Site E(5)		53-00N 60-16E	IIIC		1									Mid		66			U/C
Site F(6)		53-04N 60-18E	IIIC		1									Mid			66		U/C
Site G(7)		53-09N 60-42E	IIIC		1									Early		66			U/C
Site H(8)		53-08N 60-34E	IIIC		1									Mid	67				U/C
Site I(10) Probable		53-09N 60-25E	IIIC		1									Early	67				U/C
Site J		53-12N 60-39E	IIIC											Early		67			U/C
Site K(11)		53-12N 60-32E	IIIC		1									Early			67		U/C
Site L Possible		53-12N 60-11E	IIIC											Early					U/C
Site M Possible		53-05N 60-07E	IIIC											Early					U/C

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TABLE 2. (Continued)

Location*	BE Number	Coordinates	Type of Site	Number of Launchers		Site Negated		First Coverage		Latest Coverage		Stage of Const on Last Usable Coverage			Estimated Quarter Site Operational				Estimated Status
				Soft	Hard	Date	Msn	Date	Msn	Date	Msn	Date	Msn	Const**	1st	2nd	3rd	4th	
KOSTROMA																			
Site A(1)		58-02N 41-22E	IIB	2										Complete		62			Operational
Site B(2)		58-02N 41-07E	IIB	2										Complete		62			Operational
Site C(3)		57-59N 41-09E	IIB	2										Complete			62		Operational
Site D(4)		58-05N 41-40E	IIB	2										Complete	63				Operational
Site E(5)		57-58N 41-14E	IIIA		3									Complete				63	Operational
Site F(6)		57-55N 41-10E	IID	2										Complete			63		Operational
Site G(7)		58-06N 41-32E	IID	2										Complete	64				Operational
KOZELSK																			
Site A(3)		53-54N 35-45E	IIC	2										Complete			63		Operational
Site B(2)		53-48N 35-47E	IIC	2										Complete				63	Operational
Site D(4)		53-54N 35-51E	IIC	2										Complete				63	Operational
Site E(5)		53-51N 35-41E	IIIB		3									Complete		64			Operational
Site F(6)		53-41N 35-39E	IIIB		3									Complete				64	Operational
NOVOSIBIRSK																			
Site A(2)		55-19N 83-10E	IIB	2										Complete	63				Operational
Site B(1)		55-19N 83-02E	IIIA		3									Complete		63			Operational
Site C(3)		55-23N 82-54E	IIIA		3									Complete					Operational
Site D(4)		55-22N 83-14E	IID	2										Complete			63		Operational
Site E(5)		55-20N 82-56E	IID	2										Complete	64				Operational
OLOVYANNAYA																			
Site A(1)		50-54N 115-48E	IIIA		3									Complete	64				Operational
Site B(2)		50-55N 115-45E	IIIA		3									Complete				64	Operational
Site C(3)		51-01N 115-58E	IIIA		3									Complete				64	Operational
Group D (4-13)		51-04N 116-06E	IIID		10									Late	66				U/C
Group E (14-23)		50-56N 115-58E	IIID		10									Mid			66		U/C
Group F(24) Probabl		50-51N 115-51E	IIID		1									Early	67				U/C
Group G(25-27) Probable		50-46N 115-42E	IIID		3									Early	67				U/C
OMSK																			
Site A(1)		55-09N 73-38E	IIIB		3									Complete	64				Operational
PERM																			
Site A(1)		57-41N 56-11E	IIB	2										Complete		62			Operational
Site B(2)		57-44N 55-55E	IIB	2										Complete			62		Operational
Site C(3)		57-38N 56-07E	IIB	2										Complete			63		Operational
Site D(6)		57-42N 55-47E	IID	2										Complete				63	Operational
Site E(5)		57-45N 56-00E	IID	2										Complete	64				Operational
Site F(4)		57-41N 56-04E	IIIA		3									Complete				64	Operational
Group G(7-16)		57-43N 56-07E	IIID		10									Mid	66				U/C
Group H (17) 1/		57-46N 55-49E	IIID		1									Early				66	U/C
PLESETSK																			
Site 1(1)		62-56N 40-27E	IA	2										Complete	60				Operational
Site 2(2)		62-56N 40-32E	IA	1										Complete	60				Operational
Site 3(3)		62-58N 40-41E	IA	1										Complete		60			Operational
Site A(4)		62-59N 40-47E	IIA	2										Complete			61		Operational
Site B(5)		63-03N 40-57E	IIB	2										Complete		62			Operational
Site C(6)		63-01N 40-53E	IIIA		3									Complete	63				Operational
Site D(8)		62-54N 40-47E	IIC	2										Complete			63		Operational
Site E(7)		62-51N 40-35E	IIC	2										Complete			63		Operational
Site F 2/		62-52N 40-44E																	
Site G(9) Probable		62-53N 40-51E	IB	2										Mid				65	U/C
Site H(10) Probable		62-53N 40-52E	IB	2										Mid				65	U/C
SHADRINSK																			
Site A(1)		56-09N 63-51E	IIIA		3									Complete			63		Operational
Site B(2)		56-10N 64-02E	IIIA		3									Complete	64				Operational
Site C(3)		56-07N 63-57E	IIIA		3									Complete				64	Operational

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TABLE 2. (Continued)

Location*	BE Number	Coordinates	Type of Site	Number of Launchers		Site Negated		First Coverage		Latest Coverage		Stage of Const on Last Usable Coverage			Estimated Quarter Site Operational				Estimated Status
				Soft	Hard	Date	Msn	Date	Msn	Date	Msn	Date	Msn	Const**	1st	2nd	3rd	4th	
SVOBODNYY																			
Site A(3)		51-55N 128-10E	IIB	2										Complete					Operational
Site B(1)		51-49N 128-19E	IIB	2										Complete			62		Operational
Site C(2)		51-53N 128-23E	IIB	2										Complete			62		Operational
Site D(4)		51-58N 128-07E	IID	2										Complete	64				Operational
Site E(6)		51-43N 128-00E	IID	2										Complete			63		Operational
Site F(5)		51-52N 128-13E	IID	2										Complete			63		Operational
Site G(7)		51-38N 127-58E	IIIA		3									Complete			64		Operational
Site H(8)		52-03N 128-06E	IID	2										Complete	64				Operational
TATISHCHEVO																			
Group A(1-11)		51-48N 45-39E	IIID		10									Late			65		U/C
Group B(12-21)		51-33N 45-29E	IIID		10									Mid		66			U/C
Group C(22-27)		51-30N 45-15E	IIID		5									Early		66			U/C
Group D(28-29) 3/		51-29N 45-34E	IIID		3									Early		66			U/C
TEYKOVO																			
Site A(1)		56-55N 40-27E	IIB	2										Complete		62			Operational
Site B(2)		56-56N 40-33E	IIB	2										Complete		62			Operational
Site C(3)		56-55N 40-17E	IIB	2										Complete	63				Operational
Site D(4)		56-59N 40-40E	IID	2										Complete			63		Operational
Site E(5)		56-49N 40-10E	IID	2										Complete			63		Operational
Site F(6)		56-55N 40-22E	IID	2										Complete		64			Operational
TYUMEN																			
Site A(3)		56-52N 65-34E	IIC	2										Complete			63		Operational
Site C(2)		56-51N 65-27E	IIC	2										Complete			63		Operational
UZHUR																			
Site A(1)		55-20N 88-43E	IIIC		1									Mid	66				U/C
Site B(2)		55-18N 89-38E	IIIC		1									Mid	66				U/C
Site C(3)		55-20N 89-33E	IIIC		1									Mid	66				U/C
Site D(4)		55-17N 89-26E	IIIC		1									Mid	66				U/C
Site E(5)		55-13N 89-33E	IIIC		1									Mid	66				U/C
Site F(6)		55-25N 89-39E	IIIC		1									Mid	66				U/C
Site G(7)		55-22N 89-27E	IIIC		1									Early		66			U/C
Site H(8)		55-19N 89-20E	IIIC		1									Mid		66			U/C
Site I (9)		55-13N 89-21E	IIIC		1									Mid		66			U/C
Site J(10)		55-12N 89-09E	IIIC		1									Early	67				U/C
Site K(11)		55-16N 89-10E	IIIC		1									Mid	67				U/C
Site L(12)		55-08N 89-37E	IIIC		1									Early		67			U/C
Site M(13)		55-13N 89-42E	IIIC		1									Early		67			U/C
Site N(14)		55-25N 89-15E	IIIC		1									Early		67			U/C
Site O(15)		55-05N 89-48E	IIIC		1									Early		67			U/C
Site P(16)		55-01N 89-33E	IIIC		1									Early		67			U/C
Site Q(17)		55-02N 89-43E	IIIC		1									Early		67			U/C
VERKHNYAYA SALDA																			
Site A(2)		58-09N 60-16E	IIB	2										Complete	62				Operational
Site B(1)		58-06N 60-21E	IIA	2										Complete			61		Operational
Site C(3)		58-10N 60-28E	IIA	2										Complete			61		Operational
Site D(4)		58-12N 60-34E	IIB	2										Complete		62			Operational
Site E(5)		58-14N 60-55E	IIB	2										Complete			62		Operational
Site F(7)		58-14N 60-41E	IIIA		3									Complete		63			Operational
Site G(8)		58-13N 60-49E	IIIA		3									Complete			63		Operational
Site H(9)		58-05N 60-13E	IID	2										Complete			63		Operational
Site I(10)		58-09N 60-32E	IID	2										Complete			63		Operational
YEDROVO																			
Site A(2)		57-48N 33-36E	IIB	2										Complete		62			Operational
Site B(1)		57-48N 33-14E	IIB	2										Complete			62		Operational
Site C(5)		57-49N 33-08E	IID	2										Complete	64				Operational
Site D(4)		57-48N 33-28E	IID	2										Complete		63			Operational
Site E(8)		57-52N 33-18E	IIIA		3									Complete	63				Operational
Site F(6)		57-44N 33-06E	IID	2										Complete		63			Operational
Site G(7)		57-47N 33-02E	IID	2										Complete	64				Operational
Site I(3)		57-52N 33-27E	IIIA		3									Complete			63		Operational

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TABLE 2. (Continued)

Location*	BE Number	Coordinates	Type of Site	Number of Launchers		Site Negated		First Coverage		Latest Coverage		Stage of Const on Last Usable Coverage			Estimated Quarter Site Operational				Estimated status
				Soft	Hard	Date	Msn	Date	Msn	Date	Msn	Date	Msn	Const**	1st	2nd	3rd	4th	
YOSHKAR-OLA																			
Site A(1)		56-35N 48-09E	IIB	2										Complete					Operational
Site B(2)		56-35N 48-18E	IIB	2										Complete		62			Operational
Site C(3)		56-32N 48-27E	IIB	2										Complete	63				Operational
Site D(4)		56-31N 48-20E	IID	2										Complete			63		Operational
Site E(5)		56-34N 48-13E	IID	2										Complete	64				Operational
Site F(6)		56-36N 48-28E	IID	2															
YURYA																			
Site A(2)		59-10N 49-32E	IIA	2										Complete			61		Operational
Site B(1)		59-09N 49-40E	IIA	2										Complete			61		Operational
Site C(3)		59-13N 49-25E	IIB	2										Complete	62				Operational
Site D(4)		59-16N 49-22E	IIB	2										Complete		62			Operational
Site E(5)		59-23N 49-17E	IIIA		3									Complete			62		Operational
Site F(7)		59-21N 49-14E	IIB	2										Complete	63				Operational
Site G(6)		59-04N 49-51E	IIIA		3									Complete	64				Operational
Site H(8)		59-11N 49-47E	IID	2										Complete			63		Operational
Site I(11)		59-21N 49-25E	IID	2										Complete	64				Operational
Site J(9)		59-06N 49-45E	IID	2										Complete	64				Operational
Site K(10)		59-13N 49-18E	IIIA		3									Complete				64	Operational
ZHANGIZ-TOBE																			
Site A(1)		49-12N 81-00E	IIIC		1									Mid	66				U/C
Site B(2)		49-16N 80-59E	IIIC		1									Mid	66				U/C
Site C(3)		49-11N 80-54E	IIIC		1									Mid		66			U/C
Site D(4)		49-10N 81-04E	IIIC		1									Mid			66		U/C
Site E(5)		49-06N 81-03E	IIIC		1									Mid				66	U/C
Site F(6)		49-08N 80-58E	IIIC		1									Mid					U/C
				252	150	228													

*TDI site designators are indicated in parentheses.

**To clarify the terms used in referring to construction stages at single-silo sites, identifiable steps in the construction process have been categorized as follows: early stage, clearing and grading, open-cut silo excavation, silo coring; midstage, silo under construction, silo backfilling; late stage, final backfill and grading, silo door installed; complete final configuration apparent; operational, equipment installed and checked out (estimated).

1/ See 19th Revision, page 9.

2/ Not considered an operational ICBM site (see 16th Revision).

3/ See 19th Revision, page 9.

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TABLE 3. SUMMARY EVALUATION OF LAUNCH FACILITIES, TYURATAM MISSILE TEST CENTER

Location*	BE Number	Coordinates	Type of Site	Number of Launchers		Site Negated		First Coverage		Latest Coverage		Stage of Const on Last Usable Coverage			Estimated Status
				Soft	Hard	Date	Msn	Date	Msn	Date	Msn	Date	Msn	Const	
Complex A1(1)		45-55N 63-21E	I	1										Complete	Operational
A2		45-55N 63-21E	I	1										Complete	Operational
A3(15)		45-54N 63-20E	IIIC $_p$		1									Complete	Operational
A4			I	1										Complete	Operational
Complex B1(2)		46-00N 63-34E	IA $_p$	1										Complete	Operational
B2(16)		45-59N 63-33E	IIIC		1									Complete	Operational
B3(17)		46-00N 63-34E	II	1										Complete	Operational
Complex C1(3)		45-48N 63-39E	II $_p$	1										Complete	Operational
C2		45-48N 63-39E	II	1										Complete	Operational
C3		45-48N 63-39E	II	1										Complete	Operational
Complex D1(4)		45-59N 63-57E	IIIA $_p$		3									Complete	Operational
D2(9)		45-59N 63-57E	IIIA		3									Complete	Operational
Complex E1(6)		45-48N 63-12E	IIC $_p$	1										Complete	Operational
E2		45-48N 63-12E	IIC	1										Complete	Operational
E3		45-48N 63-12E	IIC	1										Complete	Operational
Complex F(5)		46-02N 63-06E	IIIB $_p$		3									Complete	Operational
Complex G1/G2(7)		46-03N 62-56E	I	2										Complete	Operational
G3/G4(11)		46-03N 62-56E	I	2										Complete	Operational
G5/G6(12)		46-05N 62-54E	II	2										Complete	Operational
G7(18)		46-04N 62-56E	IIIC $_p$		1									Mid	U/C
G8/G9(19)		46-04N 62-57E	III		2									Complete	Operational
Complex H(8)		45-59N 63-42E	I	2										Complete	Operational
Complex I(14)		45-56N 63-26E	IIIC $_p$		1									Complete	Operational
Complex J		45-54N 63-64E	I	2										Early	U/C
Complex K1/K2 (13)		46-02N 63-03E	IIIC $_p$		2									Mid	U/C
K3(20)		46-02N 63-02E	IIID $_p$		1									Late	Operational
Launch Group L (21-3		46-03N 62-59E	III		10									Late	U/C
Total				21	28										

*TDI site designators are indicated in parentheses.

$_p$ Prototype.

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TABLE 4. SUMMARY EVALUATION OF SOVIET IRBM DEPLOYMENT

LOCATION*	BE NUMBER	COORDINATES	TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	
AKTYUBINSK Launch Complex						
PETROVSKIY		50-00-30N 56-58-00E	IV	3		Complete
BELOMORSK Launch Complex						
RAMOYE		64-25-45N 34-18-15E	III	4		Complete
FEDOROVKA Launch Complex						
TRAKTOVYY		53-25-15N 62-23-00E	III	4		Complete
GELLI Launch Complex						
KAKASHURA		42-38-45N 47-27-00E	IV	3		Complete
GELLI		42-26-30N 47-28-30E	IV	3		Complete
PARAUL		42-47-30N 47-23-00E	IV	3		Complete
GRANOV Launch Complex						
GRANOV 1		48-56-15N 29-30-15E	III	4		Complete
GRANOV 2		48-50-00N 29-28-45E	IV	3		Complete
KALNIK		48-59-30N 29-21-45E	IV	3		Complete
KROLEVETS Launch Complex						
KROLEVETS 1		51-36-45N 33-29-30E	III	4		Complete
KROLEVETS 2		51-40-45N 33-31-15E	III	4		Complete
BEREZA		51-43-45N 33-43-45E	III	2		Complete
LEBEDIN Launch Complex						
LEBEDIN 1		50-33-00N 34-25-45E	III	4		Complete
LEBEDIN 2		50-35-45N 34-24-30E	III	4		Complete
LEBEDIN 3		50-38-00N 34-27-30E	III	4		Complete
NIGRANDE Launch Complex						
NIGRANDE		56-31-00N 22-02-15E	III	4		Complete
SKRUNDA		56-35-30N 21-49-15E	IV	3		Complete
VAINODE		56-28-30N 21-50-15E	IV	3		Complete
NOVOSYSOYEVKA Launch Complex						
NOVOSYSOYEVKA 1		44-11-45N 133-26-15E	III	4		Complete
NOVOSYSOYEVKA 2		44-07-15N 133-28-30E	IV	3		Complete
PERVOMAYSK Launch Complex						
KAMENNYY MOST		47-58-00N 30-53-15E	IV	3		Complete
SEMENOVKA 1		47-58-45N 30-59-00E	IV	3		Complete
SEMENOVKA 2		47-53-30N 30-58-45E	IV	3		Complete

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TABLE 4. (Continued)

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LOCATION*	BE NUMBER	COORDINATES		TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	
SARY OZEK Launch Complex							
KARA BABAU 1		44-32-00N	77-46-15E	III	4		Complete
KARA BABAU 2		44-31-00N	77-58-45E	IV	3		Complete
KARA BABAU 3		44-30-15N	77-41-15E	IV	3		Complete
SMORGON Launch Complex							
SMORGON 1		54-31-45N	26-17-30E	III	4		Complete
SMORGON 2		54-26-00N	26-18-30E	IV	3		Complete
SMORGON 3		54-36-15N	26-22-30E	III	4		Complete
TAYBOLA Launch Complex							
TAYBOLA 1		68-28-00N	33-15-30E	IV	3		Complete
TAYBOLA 2		68-30-30N	33-23-15E	IV	3		Complete
ZHURAVKA Launch Complex							
ZHURAVKA		54-36-30N	76-39-45E	III	4		Complete

*TDI site designators have been adopted for IRBM launch sites.

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TABLE 5. SUMMARY EVALUATION OF SOVIET MRBM DEPLOYMENT

LOCATION*	BF NUMBER	COORDINATES	TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	25X1
AKHTYRKA Launch Complex						
AKHTYRKA 1		50-16-00N 34-50-15E	II	4		Complete
AKHTYRKA 2		50-22-00N 34-57-00E	II	4		Complete
AI UKSNE Launch Complex						
LEJASCIEMS 1		57-21-00N 26-44-45E	II	4		Complete
RUSKI		57-25-15N 26-50-00E	II	4		Complete
LEJASCIEMS 2		57-13-00N 26-33-30E	IV	4		Complete
ANASTASYEVKA Launch Complex						
ANASTASYEVKA 1		48-34-15N 135-37-45E	II	4		Complete
ANASTASYEVKA 2		48-35-45N 135-41-00E	II	4		Complete
BALTA Launch Complex						
BALTA 1		48-01-45N 29-34-00E	II	4		Complete
BALTA 2		48-07-00N 29-34-30E	II	4		Complete
BARANO-ORENBURGSKOYE Launch Complex						
SOFIYE ALEKSEYEVSKOYE		44-16-15N 131-22-30E	I	4		Complete
BARANO-ORENBURGSKOYE		44-19-45N 131-30-45E	I	4		Complete
BELOKOROVICHI Launch Complex						
OLEVSK 1		51-08-45N 28-03-15E	I	4		Complete
OLEVSK 2		51-10-30N 27-59-30E	I	4		Complete
RUDNYA ZLOTINSKAYA		51-03-30N 28-07-30E	IV	4		Complete
BORSHCHEV Launch Complex						
SKALA PODOLSKAYA 1		48-51-00N 26-08-30E	I	4		Complete
SKALA PODOLSKAYA 2		48-52-45N 26-03-30E	I	4		Complete
BREST Launch Complex						
BREST 1		51-48-45N 24-00-45E	II	4		Complete
BREST 2		51-51-45N 24-01-45E	II	4		Complete
BRODY Launch Complex						
BRODY 1		50-06-00N 25-12-15E	IV	4		Complete
BRODY 2		50-12-46N 25-05-00E	I	4		Complete
BERESTECHKO		50-20-00N 25-05-30E	I	4		Complete
DERAZHNYA Launch Complex						
DERAZHNYA 1		49-21-00N 27-26-30E	II	4		Complete
DERAZHNYA 2		49-26-15N 27-29-00E	II	4		Complete
KHMELNITSKIY		49-24-45N 27-08-45E	IV	4		Complete

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TABLE 5. (Continued)

LOCATION*	BE NUMBER	COORDINATES	TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	
DISNA Launch Complex						
DISNA		55-35-15N 28-16-00E	I	4		Complete
ZELKI		55-35-45N 28-24-30E	I	4		Complete
BORKOVICHI		55-41-45N 28-27-00E	II	4		Complete
DOLINA Launch Complex						
DOLINA 1		49-03-30N 24-03-30E	I	4		Complete
DOLINA 2		49-06-15N 24-08-30E	I	4		Complete
BOLEKHOV		49-06-45N 23-51-15E	IV	4		Complete
DROGOBYCH Launch Complex						
MEDENITSA		49-22-15N 23-45-30E	I	4		Complete
DROGOBYCH		49-25-30N 23-34-45E	I	4		Complete
STRYY		49-16-45N 23-43-00E	IV	4		Complete
DYATLOVO Launch Complex						
DYATLOVO		53-32-45N 25-16-45E	I	4		Complete
BEREZOVKA		53-35-30N 25-17-30E	I	4		Complete
ZBLYANY		53-35-45N 25-27-30E	II	4		Complete
GOMEL Launch Complex						
BORKHOV 1		52-18-30N 30-42-45E	II	4		Complete
BORKHOV 2		52-24-45N 30-39-00E	II	4		Complete
GRESK Launch Complex						
GRESK 1		53-14-15N 27-42-30E	I	4		Complete
GRESK 2		53-17-00N 27-40-45E	I	4		Complete
URECHYE		53-11-00N 27-58-30E	II	4		Complete
GROZNYY Launch Complex						
SUNZHENSKOYE		43-08-15N 44-54-15E	I	4		Complete
NESTEROVSKAYA		43-11-30N 44-57-00E	I	4		Complete
ACHKHOY-MARTAN		43-10-30N 45-10-30E	IV	4		Complete
GUSEV Launch Complex						
GUSEV 1		54-41-30N 22-05-00E	I	4		Complete
GUSEV 2		54-44-00N 22-03-30E	I	4		Complete
GVARDEYSK Launch Complex						
GVARDEYSK 1		54-40-30N 21-07-30E	I	4		Complete
GVARDEYSK 2		54-45-15N 21-09-15E	I	4		Complete
JELGAVA Launch Complex						
IECAVA 1		56-35-30N 24-04-00E	II	4		Complete
IECAVA 2		56-39-45N 24-07-30E	II	4		Complete
IECAVA 3		56-33-00N 24-20-30E	IV	4		Complete

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TABLE 5. (Continued)

LOCATION*	BE NUMBER	COORDINATES	TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	
JONAVA Launch Complex						
KARMELAVA		54-57-15N 24-05-45E	II	4		Complete
JONAVA		55-01-00N 24-14-15E	II	4		Complete
KAMENETS-PODOLSKIY Launch Complex						
KAMENETS-PODOLSKIY		48-51-15N 26-42-30E	II	4		Complete
DUNAYEVTSY		48-55-15N 26-59-00E	II	4		Complete
KIVERTSY Launch Complex						
KIVERTSY 1		50-53-15N 25-31-00E	I	4		Complete
KIVERTSY 2		50-56-00N 25-36-15E	I	4		Complete
TROSTYANETS		50-58-30N 25-39-30E	II	4		Complete
KONKOVICHI Launch Complex						
PETRIKOV		52-10-30N 28-34-45E	I	4		Complete
KONKOVICHI		52-15-30N 28-37-45E	I	4		Complete
KOROSTEN Launch Complex						
KOROSTEN 1		50-51-45N 28-18-15E	II	4		Complete
KOROSTEN 2		50-52-15N 28-31-00E	II	4		Complete
KOZHANOVICHI Launch Complex						
KOZHANOVICHI 1		52-10-15N 27-51-30E	I	4		Complete
KOZHANOVICHI 2		52-11-30N 27-48-00E	I	4		Complete
KRASKINO Launch Complex						
KRASKINO		42-44-00N 130-40-15E	II	4		Complete
KRASNOZNAMENSK Launch Complex						
VIESVILLE		55-01-30N 22-23-00E	I	4		Complete
RAGNIT		55-01-15N 22-11-15E	I	4		Complete
KREMOVO Launch Complex						
KREMOVO		44-01-24N 132-20-39E	I	4		Complete
LYALICHI		44-02-30N 132-26-26E	I	4		Complete
KURGANCHA Launch Complex						
KURGANCHA 1		39-37-45N 65-57-30E	I	4		Complete
KURGANCHA 2		39-37-30N 65-57-00E	I	4		Complete
TYM		39-35-15N 65-42-45E	IV	4		Complete
LIDA Launch Complex						
LIDA 1		53-47-30N 25-20-30E	I	4		Complete
LIDA 2		53-57-15N 25-27-45E	I	4		Complete

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TABLE 5. (Continued)

LOCATION*	BE NUMBER	COORDINATES		TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	25X1
LUTSK Launch Complex							
LUTSK 1		50-46-45N	25-03-00E	I	4		Complete
LUTSK 2		50-50-30N	25-04-15E	I	4		Complete
VLADIMIR-VOLYNSKIY		50-48-30N	24-42-30E	IV	4		Complete
MARINA GORKA Launch Complex							
MARINA GORKA		53-26-30N	27-45-30E	II	4		Complete
MAYKOP Launch Complex							
KURDZHIPSKAYA		44-31-45N	40-00-45E	II	4		Complete
SHIRVANSKAYA		44-25-30N	39-54-00E	IV	4		Complete
MOLOSKOVITSY Launch Complex							
MOLOSKOVITSY 1		59-28-45N	29-06-00E	II	4		Complete
MOLOSKOVITSY 2		59-29-30N	29-12-15E	II	4		Complete
GURLEVO		59-25-00N	28-53-15E	IV	4		Complete
MUKACHEVO Launch Complex							
MUKACHEVO 1		48-18-45N	22-30-45E	I	4		Complete
MUKACHEVO 2		48-19-30N	22-37-15E	I	4		Complete
NADVORNAYA Launch Complex							
PARYSHCHE		48-37-45N	24-42-00E	I	4		Complete
NOVA VES		48-39-30N	24-48-15E	I	4		Complete
OTYNYA		48-47-30N	24-50-30E	IV	4		Complete
OSTROG Launch Complex							
OSTROG 1		50-14-00N	26-43-15E	I	4		Complete
OSTROG 2		50-17-15N	26-41-00E	I	4		Complete
OSTROV Launch Complex							
ASANOVSHCHINA		57-31-45N	28-12-15E	I	4		Complete
SHEVELEVO		57-37-00N	28-12-15E	I	4		Complete
REDKINO		57-24-30N	28-26-00E	IV	4		Complete
PAPLAKA Launch Complex							
PAPLAKA 1		56-24-00N	21-17-30E	I	4		Complete
PAPLAKA 2		56-25-00N	21-16-45E	I	4		Complete
PINSK Launch Complex							
IVANOVO		52-10-45N	25-41-15E	I	4		Complete
MOTOL		52-12-30N	25-44-30E	I	4		Complete

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TABLE 5. (Continued)

LOCATION*	BE NUMBER	COORDINATES		TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	25X1
POLOTSK Launch Complex							
POLOTSK 1		55-22-30N	28-44-30E	II	4		Complete
POLOTSK 2		55-24-15N	28-33-45E	II	4		Complete
POSTAVY Launch Complex							
POSTAVY 1		55-09-45N	26-53-45E	II	4		Complete
KOZYANY		55-20-30N	26-51-30E	II	4		Complete
POSTAVY 2		55-06-15N	27-00-15E	IV	4		Complete
PRUZHANY Launch Complex							
PRUZHANY 1		52-30-30N	24-08-45E	II	4		Complete
PRUZHANY 2		52-33-30N	24-06-15E	II	4		Complete
RAKVERE Launch Complex							
SIMUNA		59-08-45N	26-26-45E	II	4		Complete
VAIKE MAARJA		59-11-15N	26-20-45E	II	4		Complete
RISTI Launch Complex							
RISTI 1		59-04-00N	24-04-30E	I	4		Complete
RISTI 2		59-07-45N	24-06-45E	I	4		Complete
RUZHANY Launch Complex							
KRUPA 1		52-47-45N	24-42-30E	II	4		Complete
KRUPA 2		52-49-15N	24-45-30E	II	4		Complete
SATEIKIAI Launch Complex							
SALANTAI 1		55-59-45N	21-38-15E	I	4		Complete
SALANTAI 2		56-02-15N	21-41-30E	I	4		Complete
ZEMAICIU KALVARIJA		56-01-45N	21-54-30E	IV	4		Complete
SIMFEROPOL Launch Complex							
MAZANKA		44-53-45N	34-20-00E	I	4		Complete
VALKI		44-57-00N	34-26-00E	I	4		Complete
SLONIM Launch Complex							
BYTEN 1		52-52-30N	25-21-30E	I	4		Complete
BYTEN 2		52-55-45N	25-22-15E	I	4		Complete
SOKAL Launch Complex							
SOKAL 1		50-22-45N	24-18-15E	I	4		Complete
SOKAL 2		50-27-15N	24-20-00E	I	4		Complete
SOKAL 3		50-20-15N	24-26-15E	IV	4		Complete

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TABLE 5. (Continued)

LOCATION*	BE NUMBER	COORDINATES	TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	
SOVETSK Launch Complex						
SLAVSK 1		54-59-15N 21-36-30E	I	4		Complete
SLAVSK 2		54-59-45N 21-28-30E	I	4		Complete
SUCHAN Launch Complex						
NOVITSKOYE		43-01-45N 133-17-00E	I	4		Complete
SEVERNYY SUCHAN		43-10-00N 133-20-05E	I	4		Complete
TAURAGE Launch Complex						
TAURAGE 1		55-10-15N 22-20-30E	I	4		Complete
TAURAGE 3		55-05-00N 22-20-00E	I	4		Complete
TORVA Launch Complex						
TORVA 1		57-56-00N 26-04-00E	I	4		Complete
TORVA 2		57-59-15N 26-05-00E	I	4		Complete
TSIRGULIINA		57-49-45N 26-12-30E	IV	4		Complete
UGOLNYY Launch Complex						
UGOLNYY		64-47-32N 177-56-15E	II	4		Complete
UKMERGE Launch Complex						
VEPRIAI		55-07-45N 24-38-30E	I	4		Complete
UKMERGE		55-11-00N 24-42-30E	I	4		Complete
UMAN Launch Complex						
MOLODETSKOYE		48-53-45N 30-27-45E	I	4		Complete
MANKOVKA		48-57-45N 30-23-45E	I	4		Complete
KISHENTSY		49-00-15N 30-13-45E	IV	4		Complete
USOVO Launch Complex						
OVRUCH 1		51-17-15N 28-16-15E	I	4		Complete
OVRUCH 2		51-18-30N 28-10-30E	I	4		Complete
LIPNIKI		51-12-15N 28-26-30E	II	4		Complete
UZHGOROD Launch Complex						
UZHGOROD		48-33-30N 22-13-15E	II	4		Complete
VORU Launch Complex						
VORU 1		57-46-00N 26-47-15E	II	4		Complete
VORU 2		57-49-00N 26-50-30E	II	4		Complete
VSELYUB Launch Complex						
VSELYUB 1		53-45-45N 25-43-00E	I	4		Complete
VSELYUB 2		53-48-00N 25-46-45E	I	4		Complete

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TABLE 5. (Continued)

LOCATION*	BE NUMBER	COORDINATES	TYPE	NO OF PADS/ LAUNCHERS	DATE OF LATEST PHOTOGRAPHY	25X1
YELSK Launch Complex						
YELSK 1		51-42-30N 29-12-30E	I	4		Complete
YELSK 2		51-47-15N 29-18-15E	I	4		Complete
ZAGARE Launch Complex						
ZAGARE 1		56-23-15N 23-19-15E	I	4		Complete
ZAGARE 2		56-29-00N 23-20-45E	I	4		Complete
LIELELEJA		56-24-30N 23-36-45E	IV	4		Complete
ZHITOMIR Launch Complex						
ZHITOMIR 1		50-04-45N 28-15-45E	II	4		Complete
ZHITOMIR 2		50-10-00N 28-16-15E	II	4		Complete
BERDICHEV		50-05-30N 28-22-00E	II	4		Complete
ZHMERINKA Launch Complex						
GNIVAN		49-09-00N 28-11-45E	II	4		Complete
ZHMERINKA		49-10-15N 28-05-00E	II	4		Complete
VINNITSA		49-17-30N 28-20-15E	IV	4		Complete
ZNAMENSK Launch Complex						
ZNAMENSK 1		54-32-45N 21-11-15E	I	4		Complete
ZNAMENSK 2		54-35-15N 21-07-30E	I	4		Complete

*TDI site designators have been adopted for MRBM launch sites.

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Table 6. Summary Evaluation of Selected Launch Facilities, Kapustin Yar Missile Test Center

Complex/Area/Site	BE Number	Coordinates	Type of Site	Number of Positions		Site Negated		First Coverage		Latest Coverage		Stage of Construction on Last Usable Coverage			Estimated Status
				Soft	Hard	Date	Msn	Date	Msn	Date	Msn	Date	Msn	Const	
Complex A															
Launch Site 1A1		48-42N 46-15E	R&D	1	--									Complete	Operational
Launch Site 1A2			R&D/Trng	1	--									Complete	Operational
Launch Site 2A1			R&D	--	1									Complete	Operational
Launch Site 2A2			R&D	--	1									Inactive	Inactive
Complex C															
Launch Site 1C1		48-36N 46-17E	Space R&D*	1	--									Complete	Operational
Launch Site 1C2			Probable Space	1	--									Complete	Operational
Launch Site 1C3			Probable Space	1	--									Complete	Operational
Launch Area 2C		48-35N 46-17E	R&D/Trng	2	--									Complete	Operational
Launch Area 3C		48-34N 46-17E	R&D/Trng	1	--									Complete	Operational
Launch Site 4C1		48-34N 46-17E	Type IV MRBM $_p$	--	4									Complete, being modified	Undetermined
Launch Site 4C2		48-33N 46-17E	Type IV IRBM $_p$	--	3									Complete	Operational
Launch Site 5C1		48-32N 46-17E	Undet	2	--									Complete	Operational
Launch Site 5C2		48-32N 46-17E	--	2	--									Never completed	Abandoned
Complex E		48-46N 46-18E	Undet	1	--									Complete	Operational
Complex G		48-24N 46-17E	Trng	2	--									Complete	Operational
Complex H		48-48N 46-20E	Undet	2	--									Mid	U/C

*R&D/Trng site on first coverage,

$_p$ Prototype.

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TABLE 7. SUMMARY EVALUATION OF SOVIET FIXED FIELD SITES (SSM FIXED FIELD POSITIONS)

LOCATION*	BE NUMBER	COORDINATES	NEGATION DATE	FIRST OBSERVED	NO OF LAUNCH POSITIONS
AKHTYRKA					
Akhtyrka		50-19-30N 34-51-30E			4
ALUKSNE					
Lejasciems		57-15-15N 26-41-15E			4
ANASTASYEVKA					
Anastasyevka		48-32-15N 135-31-45E			4
BARANO-ORENBURGSKOYE					
Sofiye Alekseyevskoye		44-12-00N 131-24-00E			3
BELOKOROVICHI					
Rudnya Zlotinskaya		51-08-30N 27-59-45E			4
BORSHCHEV					
Skala Podolskaya 1		48-53-30N 026-13-30E			4
Skala Podolskaya 2		48-52-30N 026-16-00E			4
BREST					
Pishcha		51-35-15N 23-46-45E			4
Zamshany		51-50-05N 24-02-05E			4
BRODY					
Yazlovchik		50-05-45N 25-02-00E			4
Stanislavchik		50-07-00N 24-56-30E			4
DERAZHNYA					
Khmelnitskiy		49-25-00N 27-06-30E			2
Letichev 1		49-22-45N 27-43-45E			4
Letichev 2		49-25-15N 27-45-00E			2
DISNA					
Dernovichi		55-47-45N 28-20-00E			4
Demidovo		56-01-15N 28-18-45E			4
DOLINA					
Berezhnitsa		49-12-45N 23-57-30E			4
Rakuv		48-58-21N 24-05-35E			4
DYATLOVO					
Ruda Yavorskaya 1		53-23-15N 25-10-30E			4
Ruda Yavorskaya 2		53-23-15N 25-12-45E			5
Ruda Yavorskaya 3		53-23-15N 25-13-30E			4
Berezovka		53-42-30N 25-30-30E			4
GOMEL					
Gomel 1		52-20-45N 30-51-30E			4
Gomel 2		52-24-30N 30-50-30E			4

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TABLE 7. (Continued)

LOCATION*	BE NUMBER	COORDINATES	NEGATION DATE	FIRST OBSERVED	NO OF LAUNCH POSITIONS
GUSEV					
Tolmingkemsk		54-22-15N 22-20-15E			4
GVARDEYSK					
Geroyskoye		54-45-45N 21-25-15E			2
Vysokoye		54-44-30N 21-33-45E			4
JELGAVA					
Jelgava 1		56-38-45N 23-52-45E			
Jelgava 2		56-44-15N 23-55-15E			4
JONAVA					
Kaisiadorys		54-59-30N 24-29-00E			4
KAMENETS-PODOLSKIY					
Yarmolintsy		49-12-00N 26-46-45E			4
Vinkovtsy		48-58-20N 27-12-05E			1
KIVERTSY					
Kivertsy		50-50-00N 25-25-00E			4
KONKOVICHI					
Novoselki 1		52-23-00N 28-42-45E			4
Novoselki 2		52-25-45N 28-41-00E			4
KOROSTEN					
Litki 1		51-01-30N 28-27-45E			4
Yemilchino 1		50-52-30N 27-53-00E			4
Yemilchino 2		50-52-00N 27-53-00E			4
Litki 2		51-01-15N 28-24-15E			2
KOZHANOVICHI					
Lyudenevichi		52-18-00N 27-42-30E			4
KRASNOZNAMENSK					
Krasnoznamensk		54-57-30N 22-35-00E			4
Sudargas		55-00-30N 22-35-00E			4
KREMOVO					
Manzovka		44-12-00N 132-34-00E			4
KURGANCHA					
Kurgancha		39-41-00N 65-59-00E			4
LIDA					
Vasilishki		53-44-00N 24-56-15E			4
LUTSK					
Gorokhov		50-35-45N 24-48-45E			4

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TABLE 7. (Continued)

LOCATION*	BE NUMBER	COORDINATES	NEGATION DATE	FIRST OBSERVED	NO OF LAUNCH POSITIONS
MARINA GORKA					
Shatsk		53-27-45N 27-48-00E			4
MAYKOP					
Tulskaya		49-31-15N 40-14-15E			4
Maykop		44-32-30N 39-57-45E			4
MOLOSKOVITSY					
Kotly 1		59-37-45N 28-41-30E			4
Kotly 2		59-39-15N 28-30-00E			4
NADVORNAYA					
Ivanovtsy		48-38-00N 24-54-15E			4
OSTROG					
Slavuta		50-16-45N 26-57-45E			2
Shepetovka		50-12-30N 26-59-00E			4
OSTROV					
Shabany		57-23-45N 28-13-15E			4
PINSK					
Lychkovtsy		52-15-00N 25-21-45E			4
POLOTSK					
Plissa 1		55-12-30N 28-01-45E			3
Plissa 2		55-11-30N 27-54-45E			4
POSTAVY					
Sivtsy		55-09-30N 26-53-45E			1
Bogatoye		54-57-15N 26-28-45E			4
Kobylnik		54-56-30N 26-37-15E			4
PRUZHANY					
Strigovo		53-23-15N 24-14-30E			4
Shcherby		52-23-00N 24-10-00E			4
RISTI					
Kloostri		59-13-00N 24-03-00E			4
RUZHANY					
Shchitno 1		52-43-15N 24-58-15E			4
Shchitno 2		52-41-00N 24-57-30E			4

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TABLE 7. (Continued)

LOCATION*	BE NUMBER	COORDINATES	NEGATION DATE	FIRST OBSERVED	NO OF LAUNCH POSITIONS
SATEIKIAI					
Telsiai		55-56-45N 22-07-00E			4
Alsedziai		56-00-15N 22-06-00E			4
SLONIM					
Byten		52-54-30N 25-22-00E			2
SMORGON					
Smorgon		54-34-45N 26-21-30E			2
TAURAGE					
Skaudvile		55-23-00N 22-31-00E			4
Taurage		55-10-00N 22-14-30E			2
TORVA					
Valga 1		57-50-15N 25-54-15E			4
Valga 2		57-55-15N 25-46-30E			4
UKMERGE					
Gelvonai		55-07-15N 24-43-45E			4
Balninkai		55-13-00N 25-02-00E			4
USOVO					
Luginy		51-08-00N 28-23-00E			4
YELSK					
Yelsk		51-50-45N 29-05-15E			4
ZAGARE					
Dobele 1		56-40-00N 23-11-45E			4
Dobele 2		56-40-45N 23-06-45E			4
ZHITOMIR					
Berdichev		49-51-30N 28-25-30E			2
ZHMERINKA					
Vinnitsa		49-13-15N 28-18-45E			4
Bar		49-05-30N 27-43-00E			4
ZNAMENSK					
Pravdinsk		54-23-00N 20-59-45E			3
Domnovo		54-25-30N 20-53-00E			4
				TOTAL	312

*TDI site designators have been adopted for the fixed field sites, which are listed under the nearest permanent IRBM/MRBM complex.

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Table 8. Summary Evaluation of Soviet IRBM/MRBM Sites Without Support Facilities

Complex/ Site	BE Number	Coordinates	Type	Site Negated Date	Site Negated Msn	First Seen/Const Status Date	First Seen/Const Status Msn	First Seen/Const Status Status	Last Msn Site Intact Date	Last Msn Site Intact Msn	Dismantling First Observed Date	Dismantling First Observed Msn	Remarks
Bayram-Ali Bayram-Ali	[redacted]	37-46-00N 62-12-00E	III IRBM	[redacted]									2 barracks-type bldgs, RIM bldg removed; ready bldg bulldozed [redacted] destruction confirmed on [redacted]
Belomorsk Ramoye		64-25-45N 34-18-15E	III IRBM										2 barracks-type bldgs & RIM bldg removed on [redacted] bunkers between never completed
Bykhov Sledyuki		53-41-30N 30-20-30E	II MRBM										Abandoned on [redacted] all structures removed; [redacted] present
Fedorovka Traktovyy		53-25-15N 62-23-00E	III IRBM										2 barracks-type bldgs removed on [redacted]
Kraskino Kraskino		42-44-00N 130-40-15E	II MRBM										2 barracks-type bldgs, 1 small bldg, & a RIM bldg removed on [redacted]
Marina Gorka Marina Gorka		53-26-30N 27-45-30E	II MRBM										[redacted]
Rozhdestvenka Rozhdestvenka		45-47-15N 133-43-30E	II MRBM										Abandoned on [redacted] entrances to some bldgs appear sealed; bldgs partially destroyed
Uzhgorod Uzhgorod		48-33-30N 22-13-15E	II MRBM										No barracks-type bldgs seen associated with launch area
Zhuravka Zhuravka		54-36-30N 76-39-45E	III IRBM										1 barracks-type bldg & RIM bldg removed on [redacted] 1 bldg at [redacted] facility removed since [redacted]

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TABLE 9. COMPOSITION OF IRBM/MRBM COMPLEXES

	No of Complexes	Containing Soft Sites Only				Containing Hard Sites Only			Containing Hard and Soft Sites		
		One Site, No Housing or Support Facility	One Site	Two Sites	Three Sites	One Site	Two Sites	Three Sites	Two Soft, One Hard Site	One Soft, One Hard Site	One Soft, Two Hard Sites
IRBM	3	3									
	2				2						
	5								1	1	3
	4					1	1	2			
MRBM	3	3									
	43		1	36	6						
	21								20	1	
TOTALS	81	6	1	36	8	1	1	2	21	2	3

Table 10. Soviet ICBM, IRBM, and MRBM Systems, Estimated Technical Characteristics and Performance

	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9 1/	SS-10 2/
Initial operational capability (IOC)							
Nominal maximum range 4/ (NRE, non-rotating earth)	1,020 nm	2,200 nm	6,000 nm	6,000 nm	6,000 nm	6,000 nm	6,000 nm
Guidance	Inertial	Inertial	Radio inertial	Inertial	Radio inertial	Radio inertial 5/	Radio inertial
Circular error probability (CEP)							
Initial	1.25 nm	1.0 nm	2.0 nm	1-2 nm	1.0 nm	0.5-1.0 nm	1.0 nm (approx)
Improved/year	--	--	--	1.0 nm/1966	0.8 nm/1967	0.5 nm/1968-1970	0.8 nm/1967
Re-entry vehicle weight (lbs)	3,200, ± 500	2,500-4,000	8,000, ± 1,000	3,000-4,000 6/	2,500-4,000	10,000, ± 1,000	4000-8000
Warhead weight (lbs)	2,000, ± 300	2,000-3,200	6,000, ± 1,000	2,400-3,200	2,000-3,200	8,000, ± 1,000	Undetermined
Gross lift-off weight (lbs)	88,000 (approx)	200,000 (approx)	500,000 (approx)	300,000 (approx)	165,000 (approx)	400,000 (approx)	275,000 (approx)
Configuration	Single-stage	Single-stage	Parallel	Tandem 2-stage	Tandem 2-stage	Tandem 2-stage	Tandem 2-stage
Propellant	Storable liquid	Storable liquid	Non-storable liquid	Storable liquid	Non-storable liquid	Storable liquid	Liquid 7/
Reliability rates: 8/							
Alert	80%	80%	80%	80%	80%	85%	85%
Launch	90%	85%	85%	85%	85%	80%	80%
Improved/year						85%/1967	85%/1968
Inflight	90%	90%	85%	90%	90%	85%	85%
Improved/year						90%/1967	90%/1968
Warhead	95%	95%	95%	95%	95%	95%	95%
Weapon System	75%	75%	75%	75%	75%	65%	65%
Improved/year						75%/1967	75%/1968
Force	60%	60%	55%	60%	60%	55%	55%
Improved/year						65%/1967	65%/1968

Table 10. (Continued)

	SS-4		SS-5		SS-6	SS-7		SS-8		SS-9 1/	SS-10 2/
Reaction time from ready condition: 9/	Soft	Hard	Soft	Hard		Soft	Hard	Soft	Hard		
Condition 3	1-3 hrs	--	1-3 hrs	--	12 hrs (minimum)	1-3 hrs	--	1-3 hrs	--	--	--
Condition 2	15-30 min	5-15 min	15-30 min	5-15 min	1-2 hrs	15-30 min	--	30-45 min	30-45 min	5-15 min	5-15 min
Condition 1	5-15 min	3-5 min	5-15 min	3-5 min	1 hr (approx)	3-5 min	3-5 min	5-10 min	5-10 min	3-5 min	3-5 min
Hold time in ready condition 1 10/	hrs-days	days	hrs-days	days	1 hr	hrs	days	1 hr (approx)	1 hr (approx)	days	days
Refire time 11/	2-4 hrs	--	2-4 hrs	--	12 hrs (minimum)	2-4 hrs	--	2-4 hrs	--	--	--

1/ The SS-9 is believed to be intended for deployment primarily in hard sites.

2/ Tentative estimates based on limited data.

3/ If intense flight testing is renewed in the immediate future. The long stand-down in the SS-10 program (last fired [redacted]) makes its role in the ICBM force uncertain.

4/ Operational range is dependent on weight class of payload used.

5/ It is believed that the SS-9 has an additional all-inertial guidance capability with a CEP of 1-1.5 nm.

6/ More than one re-entry vehicle exists within these limits. Another, weighing as much as approx. 5,000 lbs (warhead 4,000 lbs) has been tested to a reduced range (4,700 nm).

7/ Probably a storable propellant if used as an ICBM; probably cryogenic if related to a space program.

8/ These reliability rates may be too high since they may not sufficiently take into account the effect of Soviet operational methods and troop training, which are at least as important as technical characteristics in determining system reliability. We have little basis for estimating these effects.

9/ Readiness Condition 3 is believed to be the normal readiness condition for missiles deployed at soft sites, and Condition 2 for hard sites.

10/ An unfavorable environment could seriously degrade these hold times. Because of the protection afforded a missile in a hardened site, it is given a longer hold time than its soft counterpart. We believe the cryogenic properties of non-storable propellants probably limit these missiles to a hold time of about 1 hour.

11/ Refire capabilities are applicable to soft sites only. Estimated refire times are based on the assumption that the launch sites were designed specifically for an efficient refire capability and that no major refurbishment of ground support equipment or launch stand is necessary.