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CIA/RR MP 221 - Section I

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FACTORS AFFECTING SOVIET OPERATIONAL CAPABILITIES
WITH AIR-TO-AIR MISSILES
(Section I of ORR Contribution to GMIC for NIE 11-5-58)

The principal economic problems facing the USSR in acquiring operational capabilities with air to air missiles relate not to production of the missile, but to the aircraft and associated early warning and ground control intercept systems. Missile production represents but a small portion of the total industrial effort needed to create an air-to-air missile defense system.

We have no direct evidence that the USSR is now series producing air-to-air missiles as basic armament for interceptor aircraft. However, a substantial number of Soviet fighter aircraft equipped with suitable airborne intercept radar is now available, and the USSR is pursuing an active program of improving and extending its early warning and ground control intercept systems. The additional training required by air and ground personnel could be carried out in parallel with a missile production program and should not retard development of an operational capability

We believe that if it chose, the USSR could rapidly implement a program for quantity production of each of the estimated air-to-air missiles, following their successful development. Having already made a considerable investment in the aircraft and associated systems, which represent the heaviest economic drain, the USSR could acquire a substantial

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air-to-air missile defense capability relatively soon after initiation of quantity production of the missiles required. In the absence of direct evidence that the USSR is now series producing or deploying air-to-air guided missiles, we cannot judge with confidence how the USSR now views the present or future role of these missiles in air defense.

21 May 1958

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Section II

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FACTORS AFFECTING SOVIET OPERATIONAL CAPABILITIES

WITH SURFACE-TO-AIR GUIDED MISSILES

(Section II of ORR Contribution to GMIC for NIE 11-5-58)

Information from recent returnees indicates that the USSR was engaged in at least limited series production of surface-to-air missiles and systems equipment for the Moscow defenses as early as 1953. Although production and installation of the ground equipment for the estimated 56 launching sites in these defenses appears to have been completed by the end of 1956, repeated observations consistently have revealed only a small number of missiles on site at any one time. This phenomenon, together with the absence of evidence of a significant off-site storage capacity, leads us to conclude that the USSR may not yet have produced the full number of missiles required for the Moscow system. We believe that full-scale production of the missile initially intended for the Moscow system may have been curtailed while awaiting the availability of a more advanced missile with improved operational capabilities.

In addition to the Moscow launching sites and associated equipment, the USSR has made a substantial investment in at least four and possibly more than six unique and large support facilities which are spaced along the inner Moscow ring. The function of these facilities may be for

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missile assembly maintenance and recycling, rather than basic missile production. On one occasion in late 1955, more than 450 missiles and/or trailers were observed at one of these facilities. This indicates that a total of two to three thousand missiles could be at these facilities at one time. While the small number of missiles observed on sites may result in part from the presence at these facilities of missiles undergoing processing, we do not believe that this would account for the consistently small number of missiles observed at sites unless the total number of missiles required for the Moscow system is considerably less than previously estimated.

The Moscow-type system has not been observed elsewhere in the USSR in a completed form even though more than two years have elapsed since the last site construction in the vicinity of Moscow. Although there is evidence that preliminary construction of a less extensive but similar system was initiated in the Leningrad area in 1955, air observation of the area has been thwarted consistently by the USSR and we have only fragmentary evidence of the existence of completed sites in this area. If site construction at Leningrad had progressed at a priority and pace approximating Moscow, the ground installations should have been completed by early 1957. We believe, therefore, that the USSR may have altered an earlier intent regarding Leningrad, and that the surface-to-air missile defenses of this area probably will employ a system with greater flexibility and less cost than that at Moscow.

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We believe that the dense and costly Moscow missile defense system has been a special case dictated by the importance and priority of that area to the USSR. The 7,000-8,000 square mile area defended by the Moscow surface-to-air missile system contains not only the center of Soviet administrative and political control and a large scientific research and design bureau complex, but an industrial concentration which accounts for almost one-fifth of Soviet gross industrial production. While these factors justify the unique and expensive defense effort applied to the Moscow area, we believe that for targets of lesser importance, as in the case of Leningrad, the USSR has possibly on economic grounds alone, a system with greater flexibility which in turn requires a smaller commitment of resources.

Within the next several years, the rapidity of technological change and the possibility of rapid obsolescence will increase the economic risks involved in committing large quantities of resources to defensive missile systems. We have no basis at present on which to judge the likely Soviet course of action in this regard. Our assessment of expanding Soviet industrial capabilities, however, leads us to conclude that the USSR will be able to produce and deploy in quantity the defensive missile systems estimated to be available in the 1958-1966 period. The numbers produced and deployed will be governed by the Soviet view of the benefits to be gained and the alternative use of the same resources for other purposes. We believe that, because of its special importance, the Moscow area will continue to be the initial recipient of advanced missile defense systems as they are placed in production.

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24 March 1958
CIA/RR M p 221 Section III

FACTORS AFFECTING SOVIET OPERATIONAL CAPABILITIES
WITH AIR-TO-SURFACE MISSILES
(Section III of ORR Contribution to GMIC for NIE 11-5-58)

we believe that the Soviet 55 mm subsonic air-to-surface missile is now in series production. However, we have no direct evidence regarding the Soviet facilities engaged in this production. The problems of producing this missile are similar to those encountered in the production of aircraft. Because of the limited number of missiles carried per aircraft, and the somewhat limited operational requirement for its employment, production of the over-all quantity required by the USSR should not impose serious economic problems.

The USSR has produced and is continuing to produce considerable numbers of TU-16 (BADGER) aircraft which could provide an adequate base for substantial 55 mm air-to-surface capability if the USSR chose. Production of the aircraft and associated navigation and electronic equipment represent the major portion of the investment required in establishing this missile system. This investment has been made. We cannot judge how many TU-16 aircraft have undergone the modification necessary for use with these missiles, but we do not believe that the application of such modifications would seriously hinder the establishment of an enlarged operational capability.

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We have no evidence to date which would indicate that the USSR is series producing a supersonic air-to-surface missile.

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26 May 1958
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FACTORS AFFECTING SOVIET OPERATIONAL
CAPABILITIES WITH SURFACE-TO-SURFACE
BALLISTIC MISSILES

(Section IV of ORR Contribution to
GMIC for NIE 11-5-58)

We believe that the USSR has the necessary capabilities to produce in quantity a wide variety of ballistic missiles, including the ICBM, if it elects to do so. Our assessment of the Soviet economy leads us to conclude that the USSR possesses the skills, facilities and other resources required to carry out a sizeable program of ballistic missile production and deployment throughout the period of this estimate. Newly acquired evidence indicates that the USSR probably possesses considerably more experience in the actual production of ballistic missiles than we have estimated previously. We now believe that the USSR initiated series production of a short-range surface-to-surface ballistic missile system as early as 1951.

In view of our estimate of Soviet over-all production capabilities, the principal factor affecting the scope and character of the Soviet ballistic missile program through 1965 will be the nature and timing of decisions made by Soviet planners on how to employ these capabilities. The USSR must make basic decisions concerning the size of the operational capability which it considers necessary to have in being at given times and the investment which it is prepared to make in initial production and deployment of missile systems and their replacement with more advanced types. These decisions will have to be modified in the



future as a result of progress in the development of newer missile systems, as well as changing international and internal conditions. We believe that the USSR has already decided to achieve a sizeable ICBM operational capability at the earliest possible date. Other ballistic missile systems which the USSR may judge to be of less critical importance, however, may not be produced in large quantities because of the costs involved and the rapidity of obsolescence. Because we lack information on the concepts which govern Soviet decisions on the production and deployment of ballistic missile systems, and on the timing of these decisions, we are able to estimate only in general terms Soviet intentions and to consider several equally probable choices among alternative, feasible programs. This has compelled us to select from among several equally likely choices the programs most favorable to the USSR, particularly in the case of the ICBM.

Short-Range Tactical Systems

We have no direct intelligence on the Soviet facilities engaged in producing the highly mobile short-range tactical missiles shown in the Moscow parade on 7 November 1957. We estimate, however, that the USSR is capable of producing these missiles in quantity if it chooses, and could now have them in operational units. A singular characteristic of the tracked carriers for the tactical missiles shown in the Moscow parade was that, in each case, they were adaptations of existing equipment also used with more conventional armaments. We believe that this reflects a general Soviet philosophy to adapt to guided missile use, wherever possible, already available equipment. This procedure would

minimize the number of new design, production and maintenance problems which must be solved, thereby considerably facilitating production and deployment of the weapons system.

200 n.m. to 350 n.m. Systems

As a result of recently acquired information which sheds new light on older evidence, we now believe that in 1951 the USSR converted the former Dnepropetrovsk Automotive Plant to the series production of modified V-2 type (200 n.m.) ballistic missiles which had been developed with German assistance at Plant No. 456, Khimki and Plant No. 88, Kaliningrad. Although we lack direct evidence, we must assume that other industrial facilities were also converted to the production of the necessary support and associated equipment for this system. The initiation of series production by 1951 indicates early Soviet acceptance of ballistic missiles as operational weapons systems and represents a Soviet production capability several years ahead of that previously estimated.

While we have no evidence of production rates or the total quantities produced, we believe that this production was initiated largely as a reaction to the Korean War, and that the resources of the large Dnepropetrovsk facility were devoted exclusively to missile production from late 1951 until late 1953. In late 1953, following the series of sweeping decrees by the post-Stalin leadership aimed at bolstering Soviet agriculture, at least a part of the Dnepropetrovsk plant was reconverted to production of agricultural tractors. About 5,000 tractors were produced at this plant in 1954, with output increasing to

to about 30,000 per year in 1956 and 1957.

Even though tractor production has continued at a high rate, fragmentary evidence on the activities of the Dnepropetrovsk facility through May 1958 leads us to conclude that some type of ballistic missile production is also continuing. We believe that the large capacity of this plant has been divided and that it has assumed a dual role as a producer of both agricultural tractors and guided missiles. This is consistent with the observed Soviet practice of using part of the capacity of armaments plants in peacetime for civilian production, with the civilian portion of the plant representing a reserve military production capability.

There are several factors, apart from the immediate problems of Soviet agriculture, which may have influenced the selection of the Dnepropetrovsk missile production facility for tractor production in late 1953. Chief among these could have been a Soviet desire to phase out of series production a weapons system that by 1953 was becoming obsolete in the face of nuclear advances and improved missile systems under development, and was already stockpiled in greater quantities than would normally be required in peacetime.

Although we have no direct evidence, we believe that the Dnepropetrovsk facility is currently producing an improved version of the 200 n.m. (SS-2) missile, or perhaps the 350 n.m. (SS-3) missile estimated to have become available for operational use in 1954. Either of these missiles, or their components, could probably be produced without drastic changes in the production processes formerly employed on

modified V-2 type missiles. In view of the large portion of the facility allocated to tractor production we believe that series production of missiles is taking place at considerably reduced rates compared to the 1951-1953 period, with current output probably used for test and training purposes as well as the equipping of a limited number of operational units.

We estimate, however, that the USSR possesses an extensive short-range ballistic missile production capacity and trained labor force in reserve, possibly at a number of facilities, and that the USSR is capable of mass producing the 200 n.m. and 350 n.m. ballistic missile systems if it chooses. Furthermore, we believe that the USSR has military manpower with experience and training in the use of short-range ballistic missiles, and has had sufficient time to train existing operational units to a high degree of proficiency in the employment of the newer systems which could now be operational.

We have no information on the current status of the short-range (SS-2) ballistic missiles estimated to have been produced in the 1951-1953 period. Some of these missiles undoubtedly have been used in training troops, and to some extent others may have been modified to incorporate more advanced components. We believe that deployment of the older SS-2 missiles in the European Satellite countries, or China, is a possibility, and that the advantages which the USSR might hope to gain could even lead to the export of such missiles to other countries as Soviet military aid.

750 n.m. to 1000 n.m. Systems

We estimate that the USSR probably now possesses operational 700

n. m. (SS-4) ballistic missiles, although on the basis of available intelligence, we cannot judge the present scale of production or the number of operational units so equipped. We believe that many of the problems of production, operational troop training, logistics and deployment that could hinder the achievement of an operational capability with a missile system of this type, have been overcome by the adaptation of proven methods previously developed for the shorter-range ballistic missiles.

We have no evidence on which to base a judgment of the scale of Soviet production or deployment of the 1000 n.m. (SS-5) ballistic missile system estimated to become available for operational use in 1958. If this missile system is an adaptation of the 700 n.m. (SS-4) system, however, the USSR probably would face no new serious problems in production and deployment of the SS-5.

ICBM System

We do not know what production facilities are now devoted to the Soviet ICBM program, nor have we any direct evidence regarding Soviet preparations to produce ICBMs and systems equipment in quantity. We do know, however, that the USSR possesses a highly developed industrial base which includes all the skills and facilities necessary for quantity production of successfully developed missile systems. Furthermore, as indicated , we estimate that the USSR has a background of valuable experience in the production, logistic and training aspects of ballistic missile systems acquired as early as 1951-1953. The centralized planning of the Soviet economy will permit the USSR to

marshal economic resources very rapidly for the quantity production of ICBM capability is a major Soviet objective, we believe that the USSR will allocate the resources necessary to achieve the earliest possible operational capability.

The USSR will determine the peak production rate for ICBMs on the basis of Soviet planners' judgments, primarily with respect to Soviet requirements for various numbers of missiles at selected points in time, together with their capabilities to meet these requirements. These capabilities will include not only the production of ICBMs but also launching facilities, production and installation of equipment, training of troops, and establishment of logistic lines.

We estimate that a sufficiently high priority will be assigned to nuclear warheads so that they will be produced for stockpiling on at least a one-to-one basis for ICBMs intended for operational use. Prior to January 1959 these warheads would be fabricated by essentially hand-production methods. In the period January 1959 to January 1960 serial production could begin, the rate thereafter being dependent upon the scale of the production effort.

Fragmentary evidence indicates that the Soviet concepts of ICBM deployment include use of a semi-mobile, rail-supported system. We believe that planning of deployment was being carried out concurrently with the preliminary and detailed design of the ICBM and associated ground equipment, and further, that by 1956 hardware design could have been sufficiently firm to permit the USSR to make basic decisions regarding projected ICBM deployment. Such decisions include the location of operational launch points, general operational concepts, and

logistics. At that time the detailed layout of many elements of a rail-supported launch system could have been determined, and the implementation of such a program could have been initiated. We conclude that the USSR has had ample time to complete the preparation of some launching facilities already, and could now be engaged in providing the additional launching facilities needed for future deployment.

The economic resources required for a rail-supported system of this type would come principally from the heavy machinery sector of the Soviet economy. We believe that this sector is capable of sustaining a program of this magnitude and character with only minor delays in the over-all investment program.

A Soviet ICBM production and deployment program of the scope necessary to achieve an operational capability rapidly would require the highest order of planning and accomplishment. Considering the various factors discussed above, we estimate that if the necessary decisions had been made early enough, the USSR could produce ICBMs, complete launching facilities, and train operational units at a rate sufficient to have an operational capability with 100 ICBMs in 1960 (about one year after its first operational capability date), and with 500 ICBMs in about 1961 or at the latest 1962.

21 May 1958
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Section V

FACTORS AFFECTING SOVIET OPERATIONAL CAPABILITIES
WITH NAVAL LAUNCHED GUIDED MISSILES

(Section V of ORR Contribution to GMIC for NIE 11-5-58)

We have no firm evidence of missile launching and guidance systems installed on surface vessels or submarines of the Soviet naval fleets. There have been inconclusive reports, however, of sighting of Soviet vessels which may indicate experimental installations on a few selected vessels.

Soviet submarines fitted with possible missile hangers and launching ramps have occasionally been sighted in the Baltic, Northern and Pacific fleets. Sightings in the Baltic and Pacific areas of new Kotlin-class destroyers indicate the replacement of the after gun mount by a "catapult" or launching ramp on at least two such vessels.

In view of the construction and development in the free world of nuclear-powered, guided missile, and hunter-killer type submarines, together with current trends observed in the USSR, we estimate that the USSR is more likely to produce a newly designed submarine incorporating one or more of the above characteristics than to attempt to convert existing vessels. Factors that support this premise are:

- 1) the sharp reduction which has occurred in Soviet production of conven-

tional long-range submarines; 2) the lack of evidence of a program of mass conversion of conventional long-range types to guided missile submarines; 3) the extreme difficulty of converting existing submarines to nuclear propulsion, which suggests that nuclear power and missile launching and guidance equipment will both be provided for in a new design; 4) the advanced stage of both nuclear power and guided missile development in the USSR; 5) the inability of the present Soviet naval fleet to engage in nuclear-missile warfare; and 6) which is by no means the least important, prevention of a deterioration of the international prestige of the USSR.

Many problems face the shipbuilding industry in the construction of nuclear-powered and missile launching vessels. The application of these new systems, to both surface vessels and submarines, involves certain basic design changes in the characteristics of vessels of the heretofore conventional types. The principal problem facing Soviet engineers is that of developing nuclear reactors, missiles, and missile launching and guidance systems for marine use. A second, but less difficult problem, is modifying naval vessel design to accommodate the adapted propulsion and weapons systems. There is insufficient evidence at this time to enable us to judge the extent of Soviet success in solving these problems or the probable Soviet course of action in this regard.

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