

LX. DEVELOPMENTS IN SOVIET AGRICULTURE\*

55. The growth of Soviet agricultural production, particularly of basic foodstuffs, has lagged consistently behind the growth of Soviet industry throughout the postwar period. During the early postwar period, when agriculture was recovering from war damage, gains were fairly easy to attain, but since 1950 agricultural production has remained at approximately the prewar level, <sup>although</sup> ~~though~~ the population is <sup>now</sup> ~~about~~ <sup>ten</sup> percent higher <sup>than in 1940.</sup> The inability of Soviet agriculture to advance over prewar levels in the production of foodstuffs has been due to several factors, chief among which were: (a) taxation and procurement policies which deprived broad segments of the rural population of incentives for greater production; (b) inadequate capital investment, particularly during 1950-1952 when the Korean War caused a diversion of resources to military production; (c) loss of adult males, particularly the skilled, to other branches of the economy; and (d) temporary disruption accompanying the amalgamation of collective farms.

56. In response to this situation, the post-Stalin regime has embarked on a program to strengthen what it now admits to be

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\* For graph showing trends in the USSR's production of selected agricultural commodities, see Appendix N, Figure 6.

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a weak link in the Soviet economy. The regime is attempting to increase agricultural output by: (a) providing greater incentives to the peasant population in the form of goods and payments; (b) channeling greater state investment to agriculture (75 percent more in 1954 than in 1953) in the form of mechanical draft power, machinery, fertilizer, and building materials; (c) providing the farms with a greater supply of labor and of qualified technicians; (d) improving farm organization and practices; and (e) bringing under cultivation vast areas of semiarid virgin land, particularly in Kazakhstan and neighboring areas. This program is designed to rectify some of the more pronounced shortcomings of previous agricultural policies, while leaving basically intact the collectivized system of Soviet agriculture.

57. In view of the Kremlin's public commitments to increase agricultural production, we believe that the Soviet regime will almost certainly continue the new program through 1955. Moreover, since the goals now set are unlikely to be achieved by 1956, the regime will probably continue the present program through 1959. However, the magnitude of resources allocated to agriculture will be determined by the Kremlin's estimate of its immediate strategic

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requirements, particularly by the amount of resources the regime feels it necessary to allocate to the military establishment.

58. The response of the peasant population to the new program will be an important factor in determining the degree of its success. In attempting to stimulate the cooperation of the peasant population, the Soviet regime faces serious problems. On the one hand, present concessions to the peasants may not provide sufficient incentives to bring about appreciably increased production, while further concessions might be considered by the regime as too costly or as politically inadvisable. On the other hand, greater reliance on discipline and coercion would tend to restore the conditions which the current program was intended to remedy and would probably result in another period of passive peasant resistance, with adverse consequences on agricultural production.

59. The expansion of cultivation in the semiarid steppe regions places an additional strain on agricultural resources which may affect unfavorably the implementation of other goals. We believe that the plan goal of an additional 18 to 20 million metric tons of grain annually from the newly reclaimed land is most unlikely of achievement except under unusually favorable weather conditions, and that a yearly average of some 6 to 10 million

metric tons, with wide annual fluctuations, is more likely during the period of this estimate.

60. On balance, taking into account the program for both old and new lands, we believe that agricultural production is unlikely (assuming average weather) to increase by more than about three percent annually during the period 1954-1959, making a total increase of 15 to 20 percent for the whole period 1950-1959 as contrasted with the Five Year Plan goal of about a 50 percent increase for the period 1950-1955. However, even the 15 to 20 percent increase would be large enough to achieve a moderate rise in the per capita availability of foodstuffs and textiles.

#### X. DEVELOPMENTS IN SOVIET FOREIGN TRADE

##### Trade Within the Bloc

61. The most important development in Soviet foreign trade since the end of the war has been the extension of the basic Soviet policy of autarky to cover the area of the Bloc as a whole. As a result, Soviet trade with other Bloc states has steadily expanded and by 1953 accounted for roughly 85 percent of total Soviet foreign trade.\* The USSR is the largest trading

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\* For trends in Soviet foreign trade, see Appendix B, Figure 7.

partner of the other Bloc states, accounting for at least 25 percent of each state's trade turnover. In three cases -- Bulgaria, Communist China, and Rumania -- Soviet trade in 1952 represented more than half of the total. On the other hand, with the exception of Communist China, no one Bloc state accounts for more than 20 percent of Soviet trade turnover. This situation has made it much easier for the USSR to exert control over the economies of the various Bloc states.

62. This vast reorientation of the trade of Bloc countries has been the decisive factor in the postwar decline in East-West trade.\* The Soviet-style programs of rapid industrialization in the European Satellites have greatly increased requirements within the Bloc for those industrial and agricultural raw materials which formed a large part of Eastern Europe's traditional exports to the West. It is unlikely that any short-term expansion in the volume of trade between the Bloc and the West will alter the basic postwar trend toward greater trade and closer economic ties between the USSR and the Satellite economies.

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\* As used here, the term "West" includes all countries outside the Soviet Bloc.

63. Sino-Soviet trade has increased appreciably in the last four years, reaching ~~about~~ <sup>almost</sup> one-quarter of total Soviet trade turnover in 1953. The USSR will probably export an increasing volume of capital goods and technical services to Communist China, partly in connection with the announced Soviet intention to assist the Chinese in constructing and equipping 91 new industrial installations and 50 installations already under construction. Military equipment will probably continue to constitute a considerable share of Soviet exports to Communist China. However, the USSR probably will not grant substantial further credits to Communist China, like the \$300 million provided in the 1950-1954 agreement. The USSR will probably insist on the financing of this trade, except possibly for some military items, through current exports to the USSR and European Satellites. Communist China's exports of agricultural products and industrial raw materials to the USSR will contribute toward strengthening the economic base of the Soviet Far East.

Soviet Trade Outside the Bloc

64. Soviet trade with the non-Communist world, as a result of the USSR's basic policy of autarky, has followed a long-run downward trend and reached its lowest point in 1950. In 1951-1952,

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however, the volume of Soviet trade with the West increased in response to the increase in world demand for raw materials and foodstuffs. In 1953, Soviet trade with the West again declined, and the USSR was faced temporarily with an unfavorable trade balance, largely due to a sharp decline in Soviet exports of grain. In order to finance even its small import program, the regime found it necessary late in 1953 to expand its sales of gold, and to sell increased quantities of precious metals and petroleum to the non-Communist world.

65. Despite the long period of rapid industrialization, the commodity pattern of Soviet trade with the West remains virtually unchanged. Grain, timber, and furs remain the principal export items, although the USSR has attempted to substitute such industrial raw materials as petroleum and manganese for grain in its more recent trade agreements. Capital equipment, merchant vessels, and industrial raw materials have in the past constituted the bulk of Soviet imports from the West, although the USSR has recently contracted to purchase increased quantities of foodstuffs and manufactured consumer goods for delivery during 1954 and 1955. As in the past, there will probably continue to be spot increases

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in imports of selected consumer goods, but the composition of total Soviet trade will, <sup>probably</sup> retain through 1959 the traditional relationship between capital and consumer goods.

66. The outlook for an expansion of Soviet trade with the West depends on a number of factors. Even if Western export controls are further relaxed the Bloc's policy of autarky will almost certainly continue to prevent any large or lasting expansion in East-West trade. Nevertheless, the record number of trade agreements concluded by the regime in 1953 points to an increase in Soviet trade in 1954 and 1955 in both old and new markets. Soviet officials have stated that the USSR could increase 1953 trade turnover with the West, estimated at about \$800 million, by almost four times in 1954. Such an increase, ~~in Soviet trade with the west~~, however, would place a tremendous burden on the small number of exporting sectors of the Soviet economy and would also require a major change in Soviet trade policy. To date there is no evidence that such a change is taking place or is likely to take place. Moreover, the Bloc would encounter considerable difficulties, under normal economic conditions, in finding markets in Western countries for substantially increased amounts of its usual exports. In the light of all these factors, we

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believe that, even if the Soviet leaders are willing to expand trade appreciably, the probable maximum of Soviet trade with the non-Communist world for this period would probably be in the neighborhood of \$1.5 billion annually.

67. An additional and exceptional factor -- the level of Bloc gold sales abroad -- might bring about a rise over current levels of East-West trade during the period of this estimate. The Bloc will probably continue to use gold to pay for an excess of imports. In recent years Bloc gold sales have run at an estimated annual rate of \$60 to \$80 million; in 1953, however, these sales reached about \$150 million and apparently continued at a high rate during early 1954. At this rate receipts from gold sales enabled the USSR to finance over one-third of its 1953 commodity imports from the West. It appears that the increased gold sales were occasioned by balance of payments considerations and especially by a shortage of sterling within the Bloc. If the Bloc should decide to increase its gold sales abroad in order to obtain desired imports, then it has available gold reserves estimated at \$3 to \$5 billion and a current production variously estimated at from \$200 to \$350 million annually. We believe it unlikely that the Bloc would use any substantial portion of its gold reserves to raise the level of its imports during the period of this estimate.

XI. SCIENTIFIC AND TECHNICAL DEVELOPMENTS

68. Soviet scientific and technical capabilities have increased rapidly since World War II, and we believe that they will continue to increase throughout the period of this estimate. The USSR has given science and technology a high priority, emphasizing particularly their contributions to basic industry and military capabilities. This emphasis will probably continue during this period, although increased attention may be given to the application of science to agriculture, health, and light industry so long as current programs for raising standards of living continue.

69. Soviet scientific and technological capabilities are sufficiently well developed to provide effective support to industrial and military research and development. At present, the scientific assets of the USSR (the number and quality of trained personnel, facilities, equipment, and financial support) are smaller than those of the US, and the assets of the Soviet Bloc are far smaller than those of the West. However, with respect to scientists of the very top rank, whose numbers are few in any country, the USSR probably has in many fields men who are as able as their counterparts in Western countries. The USSR provides the bulk of Bloc scientific

assets, but East Germany and Czechoslovakia, and to a lesser extent Poland and Hungary, contribute a substantial increment. Communist China is unlikely to add significantly to Bloc scientific assets prior to 1960.

70. The USSR has a large number of organizations, laboratories, institutes, etc., engaged in research in all fields of science. Administration, control, and facilities appear in general to be sufficient for effective utilization of Soviet scientific talent. Although the USSR continues to import some scientific instruments from Western nations, it is now manufacturing or can obtain within the Bloc practically all types of scientific instruments for laboratory research, and also industrial instruments for plant operations and control. Complex research instruments and equipment are probably less readily available in the USSR than in the US or the UK. Consequently, some specialized research projects of low priority are probably delayed longer than similar projects would be delayed in the Western nations, but we believe that high priority projects are not hindered by lack of adequate equipment or facilities.

71. Prior to World War II the general quality of Soviet higher education and research in most scientific and technical fields was markedly below that of the US. In the postwar period, however, it

has been generally good, and has approached US standards. Only in some areas of biology, particularly in the agricultural sciences, does it appear that the present quality of Soviet education and research is decidedly below that of the US, but during this period, in view of the probable greater emphasis upon agricultural development, this deficiency is likely to be reduced.

72. Nearly 1,400,000 Soviet citizens have scientific or technical degrees from colleges and universities, of whom about 500,000 graduated in the postwar years.\* The number of university or technical institute graduates employed in the scientific-technical field in the USSR (1,035,000) compares closely with that in the US. It is estimated that 255,000 Soviet scientists are engaged in advanced research or teaching at higher level institutions in the USSR, compared to about 240,000 so engaged in the US. At this level, considering physical sciences alone, the USSR has 75,000 scientists, of whom 50,000 are estimated to be engaged exclusively in research. In the US, there are about 165,000 physical scientists in higher level institutions, and about 150,000 are engaged exclusively in research.

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\* Numerical estimates of Soviet scientific personnel are believed to be correct to within plus or minus 10 percent. For a detailed comparison of USSR and US scientific personnel, see Appendix C.

73. During 1954 and 1955 the USSR will probably graduate about 225,000 students of science, including about 140,000 in the physical sciences and engineering, as compared with 135,000 graduates, including 65,000 in the physical sciences and engineering in the US. We believe that during the period of this estimate the Soviet Scientific manpower pool will increase more rapidly than that of the US, although at a declining rate after 1955. However, in view of the increasing scientific demands within the Bloc, a shortage of scientific and technical personnel, although somewhat reduced, will probably continue throughout the period of this estimate.

74. The USSR is not as well supplied with technicians, mechanics, and maintenance men as are the Western countries, where broader sections of the population have acquired mechanical skills over a considerably longer period. Standards of maintenance for all kinds of Mechanized equipment are probably considerably lower than in Western countries and rates of deterioration higher. In addition, the number of skilled mechanics and technicians which would be available to the armed forces in war is far smaller than in the West. However, Soviet engineers have sought to compensate for these deficiencies by building machines and equipment which are simple in design and easy to maintain and repair.

75. Soviet science and technology are subject to the same centralized planning and control as are all other Soviet activities. Even though Soviet scientists are a privileged group, their research is subject to many of the usual totalitarian restrictions. Some theories in chemistry, physics, and especially biology, have been attacked on ideological grounds. However, the present weakness in certain fields of biological science is probably due more to the heavy emphasis laid on other fields of research than to ideological restraints. There is no evidence that ideology has seriously hampered the development of the physical sciences, especially in applications directly affecting military weapons.

XII. SCIENTIFIC AND TECHNICAL CAPABILITIES IN PARTICULAR FIELDS AFFECTING MILITARY CAPABILITIES

76. The capability of Soviet scientists and technicians in most areas related to the development and production of weapons and military equipment is sufficient to insure modern arms to Soviet forces. We believe the USSR has the scientific and technological capability necessary to develop most weapons and military equipment equivalent to, and in certain cases possibly better than, those

of other nations. However we believe that the USSR does not have sufficient depth of scientific resources to program vigorous weapons and equipment research simultaneously in all fields. Important weapons developments which the USSR may achieve during the period of this estimate are discussed below.\*

#### Nuclear Weapons

~~77.~~ By the end of 1953 the USSR had tested small, medium, and large-yield nuclear weapons, and had employed thermonuclear boosting principles to produce energy yields in the range of the equivalent of a few thousand to at least one million tons of TNT. By the end of 1953, moreover, the USSR had reached a point in weapon technology at which it was capable of producing a wide variety of weapon types, and nuclear warheads for weapons other than bombs.

78. Within these technological capabilities, military requirements will govern the allocation of available Soviet fissionable material among various types and yields of weapons. We believe that the USSR will stockpile weapons of large, medium, and small yields; Column A in the Table which follows represents one method of distributing the estimated Soviet stock of fissionable material among them. Columns B and C show the total yields that would be available if the same amount of fissionable material were made up either into large and medium yield weapons only (Column B), or into small-yield weapons only (Column C).

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\* The effects of these possible developments on Soviet military capabilities are discussed in Section XVII.

	Mid-1954		
	A	B	C
Large-yield weapons (1,000 KT each)	18	18	-
Medium-yield weapons (60 KT each)	85	170	-
Small-yield weapons (5 KT each)	250	-	725
<u>Total yield</u> (millions of tons of TNT)	24.3	28	3.6

In view of the range of error applicable to our estimate of Soviet fissionable materials production, actual figures for numbers of weapons may be as much as one-third lower or higher than the figures given above.

79. The Soviet stockpile of fissionable materials will grow during the period of this estimate. Assuming that the Soviet weapons stockpile continues to consist of weapons of the general characteristics and explosive powers of those tested through 1953, the following table illustrates one way in which the weapons stockpile might be made up through 1957.

	<u>Mid-1954</u>	<u>Mid-1955</u>	<u>Mid-1956</u>	<u>Mid-1957</u>
Large-yield weapons (1,000 KT each)	18	34	54	80
Medium-yield weapons (60 KT each)	85	125	175	235
Small-yield weapons (5 KT each)	250	375	525	700
<u>Total yield</u> (millions of tons of TNT)	24.3	43.4	65.6	97.5

Our estimate of the total Soviet fissionable materials stockpile becomes more uncertain as it is projected into the future, and the

actual figures for mid-1957 may be as low as one-half or as high as twice the figures given in this table. Moreover, we estimate that by 1957 the USSR will have nuclear weapons with yields ranging from the equivalent of one-half a kiloton of TNT to the equivalent of 10 megatons or more. Availability of these weapons will introduce further possible variations into the stockpile examples given above.

81. The numbers of weapons above are calculated from the most probable size of the Soviet fissionable materials stockpile. However, in view of the range of error applicable to the estimates of Soviet fissionable material production, the actual figures for the end of 1953 may be as much as one-third lower or higher than the figures given above. Uncertainty increases as estimates are projected into the future, and the actual figures for mid-1957 may be as low as one-half or as high as twice the figures given in the tables.

82. The USSR will probably continue work on small-yield and small dimension weapons, and further developments along these lines could be tested during 1954. In view of this, the USSR could develop nuclear warheads for weapons other than bombs during the period of this estimate. The USSR will probably also continue work on the development of weapons with energy yields well in excess of a million tons of TNT. This program could possibly result in a test in 1954.

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80. There is no evidence available which indicates the course that the Soviet atomic energy program will take during the period 1957 through 1959. Nor are there any specific factors which can be considered as limiting on the growth of the program during this period. Nevertheless, long-range extrapolations can be carried out on the basis of assumptions of the growth pattern the program might follow during the period in question. Alternate assumptions, which indicate a range of growth capabilities, are:

- a. No expansion of Soviet fissionable materials production facilities after 1957; or,
- b. Continued expansion of Soviet fissionable materials production facilities after 1957 at the same rate as estimates for the period 1954 to mid 1957; or
- c. Expansion of the Soviet program after 1957 at a rate which will increase its requirements for uranium to approximately 7,000 to 10,000 tons per year by 1964.

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~~81~~. The Soviet fissionable materials stockpile estimated for 1959 on the basis of the <sup>above</sup> assumptions could be converted into weapons of the following types, based on the principles tested through 1953. Examples of such conversion follow:

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<u>1959</u>	<u>Assumption A</u>	<u>Assumption B</u>	<u>Assumption C</u>
a) Unboosted weapons 40 KT each	1250	1355	1700
Total yield (million tons TNT)	50	54	68
or			
b) Boosted U-235 1000 KT each	132	145	168
Boosted Pu 60 KT each	350	375	510
Boosted Pu 5 KT each	1050	1125	1525
Total yield (million tons TNT)	158	172	206

<sup>85</sup>~~84~~ The alternate assumptions on which the above table is based do not consider the possibility of rapid technological advances in the production of fissionable materials, nor do they reflect major advances in weapons development which must be anticipated. Developments in thermonuclear weapons with yields well in excess of one million tons of TNT, which could possibly be tested during 1954, could increase the total yield obtainable from the Soviet fissionable material stockpile by a factor of five to twenty-five over the figures given in Paragraph 84. In addition, Soviet nuclear capabilities may be increased by weapon developments which will permit the adaptation of nuclear warheads to many delivery systems.

Guided Missiles\*

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86. Indications are that after World War II exploitation of German developments in guided missiles led to the Soviets acquiring by 1948 a thorough familiarity with German program and by 1950 a capability for continuing work independently, except possibly in advanced developments of guidance and control systems. It is known that an independent Soviet research and development program is under-way. However, evidence is insufficient for an estimate of the priority which this program may enjoy as compared with other weapons development programs, or of the priorities accorded the various guided missile categories within the program. It is well within Soviet capabilities to develop numerous types of missiles within the period of this estimate, but at present we have <sup>little</sup> ~~no~~ information as to which types the USSR may be developing. ~~on a priority basis.~~

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87. We believe that the USSR could now have an improved version of the German V-1 pulse-jet winged missile with ranges up to 200 nautical miles, a warhead of 2,000-3,000 pounds and a CEP of 2 to 3 nautical miles. The USSR could also have now an improved version of the German V-2 with ranges up to 350 nautical miles, a warhead of 2,000 pounds, and a CEP of 2 to 3 nautical miles. ~~We have no firm evidence that the USSR has these weapons in operational quantities.~~

*The following paragraphs must be considered as tentative.*  
\* Detailed studies of <sup>all types of guided missiles</sup> ~~the subject~~ are currently in progress and will provide the basis of NIB 11-6-54, "Soviet Capabilities and Probable Programs in the Field of Guided Missiles," scheduled for production in the third quarter of 1954.

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85. During the period of this estimate we believe that the following surface-to-surface missiles could be brought by the USSR into limited operational use -- i.e., into a stage of development where small quantities of guided missile systems have been produced and are in the hands of trained personnel of at least one operational unit. It should be realized that subsequent large-scale production and troop-training may require several additional years. The dates given are the earliest probable dates, and are based on the ~~estimate~~ <sup>assumption</sup> that a concerted and continuous effort started by 1948.

- a. In 1955 the USSR could have an improved V-2 type missile with a range of 500 nautical miles, a warhead of 3,000 pounds, and a CEP of 2 to 3 nautical miles. Subsonic, turbo-jet powered pilotless aircraft missiles with a maximum range of 500 nautical miles and a warhead of 3,000 pounds could also become available in 1955.
- b. In 1957,\* the USSR could have single stage ballistic missiles capable of ranges up to 900 nautical miles, carrying 3,000 pound warheads, and achieving a CEP of 3 to 4 nautical miles.

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~~The~~ Director of Intelligence, USAF believes this missile could be available in limited operational quantities in 1955, and that a ballistic missile with a range of about 1300 n.m. could be available in limited operational quantities in 1957. This belief is based on intelligence of early Soviet exploitation in Germany, on Soviet interest in guided missiles up through 1952, and the demonstrated ability to follow a concerted development program as witnessed by rapid developments in aircraft, armament, and electronics in the past 8 years. It is also possible that accuracies better than these quoted will be within Soviet capability.

- c. In 1958-1960,\* the USSR could have a two stage ballistic missile capable of ranges up to 1,300<sup>nautical</sup> miles carrying a 3,000 pound warhead and achieving a CEP of 3 to 4 nautical miles.

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~~Our estimate of probable Soviet military requirements suggests that the priority accorded by the Soviets to development of a surface-to-air missile would be at least as high as that given development of a surface-to-surface missile. We believe that the USSR could now have a surface-to-air missile representing an improved version of the German Wasserfall missile, and having an effective range of 20,000 to 25,000 yards at fifty thousand feet. A Radar command technique <sup>or a</sup> proximity fuze could be employed with a warhead of approximately 600 pounds. There is no evidence that such a weapon has been produced in operational quantities.~~

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~~In estimating future Soviet capabilities in surface-to-air missiles, the projects undertaken by Germans while in the USSR offer the only basis for extrapolating <sup>on</sup> into the future. On this foundation, the following possibilities exist:~~

- a. In 1955, a further improved Wasserfall missile with effective accuracy at 35,000 yards, the maximum range of the missile.

\* Footnote on preceding page.

- b. In 1957-1958, a new type missile should begin to replace the Wasserfall, with a maximum effective range of 50,000 yards at 60,000 feet altitude and a war-head of about 500 pounds. This missile would incorporate terminal homing.

Aircraft

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92. The USSR will probably continue to give high priority to the development of new aircraft, especially jet types. During the period of this estimate we believe that the Soviet aircraft industry will be technically capable of completing development and placing in series production an all-weather jet fighter (1954), a turbo-prop heavy bomber (1954), a jet ground-attack aircraft (1955), and a turbo-jet heavy bomber (1957). Moreover, improvement of certain aircraft estimated to be entering production at present, including the recently introduced jet medium bomber, will result as modifications are made and as more advanced electronic equipment, and improved turbo-jet engines become available during this period.\*~~

Electronics

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98. The USSR has made substantial progress in expanding its electronics industry and in adapting Western equipment. The industry~~

~~\* See paragraphs 132-136 for a discussion of Soviet aircraft currently in operational use or in various stages of development.~~

is now capable of independent research and development, and electronic equipment of modern design is being produced. We believe that during the period of this estimate the USSR will have the capability of developing new or improved versions of radars for early warning, ground control intercept, airborne intercept, and blind bombing and navigation.

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93. Early Warning Radar (EW). The USSR has a large variety of EW radars in use. These include World War II sets, native sets based on Western designs, and sets of purely native design. It is believed that most of these sets will continue in use through 1956. Continued use of low-frequency radars (in the 72 mc/s region) through 1959 is indicated. It is estimated that, by 1958, the USSR will have several types of EW radar capable of affording fairly reliable range coverage up to altitudes of the order of 60,000 feet. These radars should be capable of detecting medium bombers and fighters at maximum ranges of about 200 and 100 nautical miles respectively, although specific range performances will vary with altitude and with individual equipment and installation. Low angle coverage will still be a problem, although current use of SCR-682 type radar for such coverage in coastal areas may be expected to expand. ~~The filtering phase of air raid reporting (combat information control) is expected to continue to be a major problem during the period of this estimate.~~

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Ground Control Intercept Radar (GCI). It is estimated that by 1958, the USSR will have GCI radars of several types, including the V-beam sets presently in use, which should be capable of coverage on medium bombers at maximum reliable ranges of 150-200 nautical miles and on fighters at maximum reliable ranges of 55 to 85 nautical miles depending on altitude, location, and other factors. The use of transponder beacons in Soviet interceptor aircraft, a development of which the USSR is capable, would increase range and altitude coverage for controlled interception. Maximum reliable altitude coverage up to 60,000 feet, though at less than maximum ranges, can be expected by 1959.

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Airborne Intercept Radar (AI). The USSR acquired World War II airborne intercept radar equipment from the Germans and through lend-lease. The USSR has the technical knowledge and production capability to produce AI radar superior to World War II types, as well as passive detection equipment of electronic, infrared, and possibly sonic types. We believe that the USSR has begun to introduce limited quantities of AI equipment into operational use, and ~~it is estimated~~ that AI equipment will be in general operational use by mid-1956.

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Blind Bombing and Navigational Radar. The USSR is making operational use of an X-band set and has the capability of improving this type of equipment. Its best blind bombing and navigational radar in use by the end of 1957 will probably be capable of

operating at altitudes up to 50,000 feet and will have a range of about 125 nautical miles for navigation. The performance of bombing and navigation equipment will be about equivalent to that of present Western equipment. The use of frequencies higher than X-band is unlikely before mid-1956, but might have operational significance by-1959.

Electromagnetic Weapons

<sup>93</sup> <sup>97</sup> ~~97~~ The USSR now has the capability of seriously disrupting Western long-range radio communications and certain navigation systems. On the basis of known or reported Soviet production of magnetrons, we believe that the USSR can now produce ground-based, shipborne, and airborne jamming equipment to cover frequencies through 10,000 megacycles per second. However, Soviet capabilities in related electronics fields indicate that the USSR could develop equipment for jamming frequencies up through 30,000 megacycles per second. We believe that such equipment will probably be in use during the period of this estimate.

achieve some success in electronic camouflage. Effective devices similar to WINDOW and other reflectors could be in operational use.

Biological Weapons

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98. The USSR has the technical knowledge, trained personnel, and facilities necessary for a program of research and development in biological warfare, and we believe that such a program is almost certainly in progress. Firm evidence on the subject is, however, exceedingly scanty, and is likely to remain so because of the relative ease with which such a program can be concealed. Our estimates must be almost exclusively of what the USSR is capable of accomplishing in this field, rather than of what it has in fact accomplished.

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99. The USSR is capable of producing BW agents and disseminating devices suitable for clandestine attacks against certain crops, against livestock, and against personnel in buildings or concentrated in relatively small areas. We estimate that, if the USSR in fact develops this capability, such attacks could be highly effective against livestock, moderately effective against humans, and possibly damaging against crops under favorable environmental conditions.

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100. Soviet capabilities for overt or large-scale attacks with biological weapons are more difficult to estimate. Against livestock, attacks whether overt or clandestine need not be of large-scale to be effective, since well-planned small-scale operations at several points against the US would probably result in widespread

epidemics. Anti-crop BW against the US, employing disease-producing agents, would probably not substantially affect U. crop production unless carried out on a very large scale and under favorable seasonal and environmental conditions. The USSR is probably capable of producing at least one type of agent, cereal rust, in amounts needed for such an attempt. For attacks against personnel the USSR is probably capable of producing BW weapons for operations on a large scale, but we are unable to estimate whether the effect of such operations, if carried out, would be likely to be significant.

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101. Soviet capabilities for defense against BW are believed inferior to those of the US because of Soviet deficiencies in public health, sanitation, livestock management, and plant protection. Present information indicates emphasis on correction of these deficiencies, and ~~it is estimated~~ that gradual progress in this direction will, <sup>probably</sup> be made during the period of this estimate. However, because widespread shipment of livestock is not practiced in the USSR, Soviet vulnerability to small-scale anti-livestock attacks is probably less than that of the US.

Chemical Weapons

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102. During World War II, the Soviet Union is known to have produced most of the standard chemical warfare agents as well as the necessary auxiliary equipment. The USSR has the facilities and

scientific knowledge necessary to produce at least one of the nerve gases and could employ these agents during the period of this estimate. Published Soviet research in fields closely allied to chemical warfare -- organophosphorus chemistry, aerosol formation, cholinesterase, alkaloids, and adsorption -- indicates a scientific capability for the development of new or improved chemical agents, dissemination equipment, and protective devices. We assume that the stockpile of standard agents and munitions accumulated during World War II has been maintained and that the facilities for CW agent production are being maintained on a stand-by basis or operated to produce other chemicals or materiel. The USSR is probably able to engage in chemical warfare on a large scale.

Radiological Weapons

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103. It is most unlikely, for technological reasons, that the USSR will be able to stockpile militarily significant quantities of radiological warfare weapons during the period of this estimate. Although not strictly within the category of radiological warfare, the significance of radioactive fall-out following large nuclear explosions becomes greater as the yield of nuclear weapons increases. This factor should be considered in connection with Soviet capabilities to produce explosions in the megaton range.

XIII. SOVIET BLOC MILITARY STRENGTH

General

<sup>100</sup>  
104. In the postwar period the USSR has maintained its armed forces at a high level of strength and combat readiness. Since

1945, the forces of the East European states under Soviet control, together with the forces of Communist China, have been added to the military resources available to the Soviet leaders. Soviet Bloc forces-in-being now total <sup>about 8,000,000</sup> ~~9,000,000~~ men.\*

<sup>105</sup>  
~~101~~  
105. As a result of the levelling off military expenditures in 1953, selective cutbacks are probably taking place in the production of some conventional armaments, many types of which are already stockpiled in quantity. Nevertheless, military procurement, even at the estimated 1953-1955 rate, would still permit the maintenance of the Soviet armed forces at present high levels and would allow continuous qualitative improvement in weapons and equipment.

<sup>106</sup>  
~~102~~  
106. During the period of this estimate we believe that the size of Bloc forces-in-being and expenditures for weapons production will remain substantially unchanged. However, the over-all effectiveness of <sup>Soviet armed forces</sup> ~~Bloc ground, naval, and air forces~~ will almost certainly continue to increase during the period of this estimate <sup>mainly because of</sup> ~~as a result of~~ the following factors: an increase in the numbers and types of nuclear weapons; and increase in the numbers of modern aircraft, especially bombers and all-weather fighters; an increase in the long-range submarine forces; progressive modernization and standardization

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\* For detail on strengths of USSR armed forces and those of other members of the Soviet Bloc, see Appendix D, Table 1.

of weapons and equipment, particularly those incorporating electronic guidance and control; increasing combat efficiency of the European Satellite and Chinese Communist forces; and some improvement of the Bloc logistical position including facilities and possibly stocks of essential war material.

<sup>107</sup>  
<sup>103</sup>  
~~107~~. The principal limitations of Bloc armed forces during the period of this estimate will be: deficiencies in experience, training, and equipment for long-range air operations and air defense; lack of capability to conduct long-range amphibious and naval operations and the logistic problems, especially for operations in the Far East, arising from the size of Bloc territory and the relatively inadequate road and rail network and merchant fleet. ~~The combat effectiveness of the Eastern European Satellite and Chinese Communist forces will remain inferior to that of Soviet forces.~~

#### XIV. BLOC GROUND FORCES

##### Soviet Army

<sup>107</sup>  
<sup>104</sup>  
~~108~~. The Soviet Army has been reorganized and modernized since the end of World War II. We estimate that the Soviet ground forces now total about 2,500,000 men. The estimated maximum mobilization potential is about 12,500,000 men. In the absence of general war we believe that the Soviet ground forces will remain at approximately

their present size and disposition through mid-1959.<sup>1/</sup> The concentration of Soviet ground forces in East Germany, the Western USSR, the Caucasus, and the Far East provides for the defense and security of the most important and vulnerable areas of the USSR.

<sup>109</sup>  
~~105~~  
109. The Soviet Army probably has a sufficient stockpile of weapons and equipment, ammunition, and supplies (except POL) to maintain a force of 175 line divisions in Europe and Asia for an extended period (i.e., up to one year, depending upon the intensity of the combat). POL stockpiles are probably sufficient to maintain operations from four to six months. The USSR is now manufacturing substantial quantities of all types of basic ground force weapons.<sup>2/</sup> During the period of this estimate production of ground force weapons is not expected to increase, and may decline somewhat. Conversion to full-scale production of these weapons could probably be effected quickly and efficiently.

<sup>110</sup>  
~~106~~  
110. The combat effectiveness of the Soviet Army is high. Its senior command is able and experienced; junior officers can be expected to execute orders faithfully; the individual soldiers are courageous, and have good physical stamina. Discipline is good and morale almost certainly high. Current Soviet line divisions possess

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1/ For detailed estimates of strengths and dispositions of these forces, see Appendix D, Tables 1 and 2.

2/ For estimated 1953 production of tanks and artillery, see Appendix D, Table 5.

good equipment, generally of World War II design, in adequate quantity. The combat support services -- artillery and engineers -- are comparable to the quality of the Soviet Army as a whole. Mobilization would lower individual unit efficiency but the rapid increase in the numbers of units would tend to offset this even in the short term.

111. During the period of this estimate the readiness of Soviet ground forces for sustained combat will continue to grow, largely because of the increase in armament, <sup>maneuverability</sup> mobility, and numbers of competent technicians. *The USSR will probably also develop changes in the equipment* Thirty Soviet divisions are located in East Germany and the European Satellites. It is known that these units are well-equipped, well-trained, and combat ready. Intelligence concerning the remaining divisions, particularly those in the interior of the USSR, is not as extensive. However, we believe that the latter are not significantly inferior in effectiveness to the Soviet forces in East Germany and the Satellites.

*And tactics of the ground forces designed to improve their effectiveness in nuclear warfare.*

112. Certain weaknesses of the Soviet Army will continue to limit its potential under full war requirements during the period of this estimate. The great extent of Soviet territory and the limitations of the road and rail networks present difficult logistic problems, especially for operations in the Far East. The Army lacks experience in large-scale combined amphibious operations, and

it has never conducted successful large-scale airborne operations in wartime. The Army would suffer from a shortage of technicians in the event of full mobilization.

Soviet Security Forces

113. Soviet internal security forces are controlled by the Ministry of Internal Affairs. We estimate that these forces number about 400,000 uniformed men organized in military units. About 150,000 of these are in the border troops, disposed along all accessible land and sea frontiers. The remaining 250,000 include: troops responsible for suppressing any organized resistance in the country, for guarding shipments of prisoners and strategic cargoes, and for maintaining the security of high-level government and military communications. These troops are a select group, well-trained and equipped, and politically loyal to the regime.

European Satellite Armies\*

114. Satellite ground forces, now composed of 1,115,000 men organized in 82 line divisions, constitute a substantial addition to Soviet military strength in Europe. During the period of this estimate Satellite ground personnel strength will probably increase to about 1,265,000. The Satellites are almost completely dependent on the USSR for major equipment items, including tanks, self-propelled

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\* For detailed strength figures by country see Appendix D, Tables 1 and 2.

guns, heavy artillery, and some light artillery. No substantial war reserve stocks of modern equipment have been made available to the Satellite countries. By mid-1956 the Satellite armies will be almost completely equipped with equipment of Soviet origin and design, mostly of Soviet World War II standard. Although some quantitative and qualitative improvement of weapons inventories will probably occur during the period of this estimate, major deficiencies in motor transport, heavy armor, artillery, and communications equipment will probably continue.

115. During the postwar period the Satellite forces have been reorganized to conform to the Soviet pattern. However, the national units exhibit marked differences in training, equipment, and morale, and their combat effectiveness is greatly inferior to that of equivalent Soviet units. ~~The Bulgarian Army is considered the best of the Satellite forces, followed by those of Hungary, Czechoslovakia, Poland, Rumania, East Germany, and Albania.~~ The combat effectiveness of Satellite forces will improve, but ~~it is unlikely that many of the divisions would be suitable for offensive operations.~~ *will remain only fair. It is unlikely that many of the* Moreover, in case of war the Satellite forces would be dependent upon the USSR for logistical support.

*The Questionable*  
116. ~~Possible political unreliability within the Satellite armed forces places a limitation upon their military capabilities.~~ *of significant their military usefulness.* At present the Kremlin could probably not rely upon the majority of the

Satellite armies in a general war except for employment in secondary roles or in a defensive capacity. However, against traditional enemies (e.g., Poles and Czechs against Germans; Bulgarians against *Yugoslavs*, Greeks, and Turks) Satellite armies would probably fight well, at least as long as victory appeared likely.

Chinese Communist Army\*

117. During the period of this estimate the Chinese Communist Field Forces, which now number an estimated <sup>2,812,000</sup> ~~2,041,000~~ men, will probably increase to about 2,385,000. Chinese Public Security Forces total approximately 1,000,000 men. However, the wide dispersion of these forces on security duty, their light equipment, and lack of unit training limit their combat potential to employment as local auxiliaries to the field forces. Communist China has no system of organized reserves and the estimated 6,000,000 to 20,000,000 men in the militia cannot be classed as trained reserves since they receive little military training and have almost no equipment. Further mobilization of Chinese forces would be largely dependent upon acquisition of weapons and equipment.

118. The Chinese Communist forces are basically infantry and their weapons are a heterogeneous assortment of European, American,

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\* For details as to strengths and disposition, see Appendix D, Tables 1 and 2. For strengths of additional Bloc forces in Asia, see figures for North Korean and Viet Minh armies given in the same tables.

Japanese, and Soviet manufacture. Extensive Soviet equipment of Chinese forces has taken place since the beginning of the Korea War, but this aid, while continuing, has probably diminished since hostilities ceased. The marked disparity between the equipment of average Chinese Communist and Soviet divisions will probably not be reduced significantly during this period. Moreover, in case of war the Chinese Communists will continue to be heavily dependent upon Soviet logistic support and technical aid.

119. The Chinese Communist Army is well adapted by tradition, training, and the characteristics of its individual soldiers to the type of warfare likely to be encountered in the extremes of weather and terrain of the Asian region. Morale within the Chinese Communist forces appears to be high. The combat effectiveness of the troops which fought in Korea (over 50 percent of total Chinese forces) was fairly high despite major deficiencies in logistics, communications, and combined-arms technique. During the period of this estimate combat effectiveness will probably increase. However, deficiencies in training, equipment, and logistical support, and dependence upon outside aid will continue to be major limiting factors upon the full exploitation of the organized Chinese manpower strength.

XV. ELCC NAVAL FORCES\*

Soviet Navy

120. ~~In comparison with that of the US~~ The Soviet surface fleet during the period of this estimate will remain ~~small~~ deficient

\* For strengths in ships and personnel as well as dispositions see Appendix D, Tables 1 and 3.

in capital ships, and almost certainly without aircraft carriers. However, the Soviet submarine fleet is large and growing, containing many long-range craft of which a significant and increasing proportion are of modern types. Most of the major surface vessels and all of the modern submarines will probably be kept active, and the present rate of new construction will permit the creation of a substantial reserve fleet. It is believed that all such reserve or inactive units could be activated by M / 180.

121. The Soviet Naval Air Force, comprising approximately <sup>18</sup>/<sub>17</sub> percent of the total strength of Soviet military aviation, is equipped with modern jet aircraft of the fighter and light bomber categories as well as piston engined attack, mine and torpedo, and reconnaissance type aircraft. This force is expected to remain approximately constant in strength throughout the period of this estimate; however, improved all-weather jet fighters will probably be introduced.

122. Since 1946, 9 light cruisers, 75 fleet destroyers, and 65 long-range submarines, all of postwar construction, have been added to the fleet. Naval construction in the USSR is presently estimated at about 175,000 NEDT which represents about one-third Soviet capacity, and one-fifth total Bloc capacity. Battleships and carriers could be built in all fleet areas except the Far East. ~~Especially in the~~

~~TOP SECRET~~

~~There are~~ a few indications of ~~the~~ construction of a ship larger than a cruiser, and such a vessel could become operational during the period of this estimate. We believe, however, that the USSR will place primary emphasis upon the construction of destroyer types and long-range submarines.

123. The Soviet Navy is apparently concentrating on the construction of two long-range submarine types developed since World War II. These are equipped with snorkel and have operating radii of about 4,700 and 6,700 miles respectively. By early 1954, 47 of these had joined the fleet and the present building rate is estimated as 46 per year. The Soviets are known to have continued development of the Walther closed-cycle engine for submarine propulsion and an experimental submarine powered by such an engine could be operational now. It is also possible that, *during the period of this estimate,* by mid-1955, nuclear propulsion for submarines will have been developed by the USSR. However, there is *that the USSR is constructing* no evidence ~~of Soviet development~~ of submarines equipped with either of these types of propulsion.

124. Soviet naval capabilities can be expected to improve throughout the period due to the building program, technological development, and intensive training. While the operational efficiency of the Soviet Navy is still below that of the navies of the major Western Powers, it will continue to improve during this period. Little is known of the operating efficiency of the Soviet submarine

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~~TOP SECRET~~

force. It is probably still inferior in proficiency to the US and German forces of World War II, but performance standards should steadily rise during this period. Personnel of the submarine force are the pick of the Soviet Navy, and their morale is high.

125. ~~The principal weakness of the Soviet Navy derives from the~~ wide physical separation of the sea frontiers of the USSR. The inability of the USSR to control the water routes between these areas forces it to maintain four separate fleets and supporting facilities. This seriously complicates administrative control, logistic support, and strategic mobility, although the development of the inland waterway system and the increased use of the Northern Sea Route now permits some interchange of vessels by routes under Soviet control. The lack of adequate supply lines to the Northern and Far Eastern areas is an additional handicap. Other weaknesses derive from the land-locked positions of the Baltic and Black Sea fleets, which make egress to the world sea-lanes difficult for both surface and underwater units, and the lack of advanced submarine bases to provide support for long-range boats. The long-range capabilities of the Soviet Navy are also hampered by lack of aircraft carriers, modern capital ships, <sup>and</sup> auxiliary vessels suitable for underway logistic support, and by lack of operating and combat experience in long-range operations.

126. There is no force in the Soviet Navy comparable to the amphibious forces of the US Navy, although the naval infantry components have received some training in amphibious warfare. While capable of mounting short-range lifts in considerable force, the Soviet Navy does not possess sufficient modern amphibious craft to launch and sustain long-haul amphibious operations.

Satellite and Chinese Communist Navies

127. The Satellite and Chinese Communist Navies, including their naval air forces, during the period of this estimate will remain small. The naval forces of the Satellites will probably be capable of aiding the Soviet Navy in minesweeping, minelaying, escort, and coastal defense duties. The Chinese Communist Navy, although small and ill-equipped, is capable of short-haul amphibious operations, coastal mining, motor torpedo attacks, limited escort work, and minor gunfire support. The Soviet Far Eastern naval forces are providing training, advisors, and logistic support to this force.

XVI. BLOC AIR FORCES\*

Soviet Air Force

128. During the postwar period the USSR has maintained and continually improved its large air force. Although in World War II

\* For strengths of Bloc air forces in aircraft and personnel, see Appendix D, Tables 1 and 4.

the USSR was giving primary emphasis to the ground support role of air forces, in the postwar period increasing attention has been given to the development of the interceptor and strategic bombing arms. Re-equipment with jet fighter types proceeded rapidly in the period 1950-1953 and is now virtually completed. Replacement of the TU-4 aircraft by more modern types in the long-range bomber force, and the growing numbers of all-weather jet fighters will almost certainly be the most important developments in the Soviet air forces during the period of this estimate.

129. The Soviet aircraft industry has accounted for about 95 percent of total Bloc aircraft production in the postwar period. Estimated Bloc production of fighter and bomber aircraft during the period 1946-1953 has been roughly equal to that of the NATO countries in numbers of aircraft, although substantially below that of NATO in terms of total airframe weight.\* During 1952-1953 Soviet Bloc production of fighters and bombers, both in numbers and weight, was considerably below that of NATO. During the period of this estimate Soviet aircraft industries will probably continue to operate at about 30 percent of capacity, with an annual production of about 10,000 to 12,000 aircraft, including about  $\frac{5,500}{5,000}$  to  $\frac{6,500}{7,000}$  combat aircraft. Aero-engine industries will probably continue to operate at about  $\frac{35}{30}$  percent of capacity with a total output of about  $\frac{30,000}{35,000}$ .

\* See Appendix D, Table 6.

engines, including about 15,000 combat types. In view of the factor of obsolescence and of the high requirements of the operating forces, these rates of production are insufficient to permit any significant stockpiling of aircraft, engines, and electronic devices.

130. Airfield development in the USSR and the European Satellites during the postwar period has kept pace with demands created by the introduction of jet aircraft and medium bombers into operational units. The USSR, under this program, has created an interlocking network of airfields along perimeter areas in Europe and internal approach lines within the USSR. During the period of this estimate, the airfield construction program in the Far East and in the Soviet Arctic will probably be accelerated.

131. Combat effectiveness of Soviet military aviation is, on the whole, not as high as that of the air forces of the US and UK. The chief limiting factors have been lower average aircrew proficiency, lower standards of maintenance and training, and lack of certain modern aircraft types. During this period the continued replacement of piston by jet types and the introduction into operational units of new jet types including an all-weather fighter, and medium and heavy bombers, together with the training appropriate to these types, will lead to a significant increase of combat effectiveness. However, the Soviet lag in producing many of the latest aircraft types, and the operating problems accompanying the introduction of advanced

and complex equipment in new aircraft, indicate that over-all Soviet air combat effectiveness will remain below that of the US and UK during this period, especially in night and all-weather operations and in long-range operations.

132. The MIG-15 and MIG-17 are now standard equipment of Soviet Fighter Aviation of Air Defense as of other components of the Soviet Air Force. The USSR is also believed to be developing an interceptor with performance characteristics superior to those of the MIG-15 and MIG-17. Limited numbers of aircraft with AI radar have probably been introduced into operational units. We believe that the USSR will have about 200 all-weather fighters by mid-1955, about 1,000 by mid-1957, and about 2,100 by mid-1959.

133. Soviet long-range aviation is now based on the TU-4, medium bomber, which was copied from the American B-29. This is the only bomber available to the <sup>USSR</sup> Soviets in large numbers and capable of carrying nuclear weapons to distant targets. As of 1 July 1954, a total of about 1,100 TU-4's was estimated to be available in operational units. (Table of Equipment Strength of Soviet air regiments known to be equipped with or in process of being equipped with TU-4 aircraft totals 1,340 but the TU-4 regiments are currently estimated to be at only about 85 percent of T/E strength.) As of 1 July 1954 approximately 210 TU-4's (eight regiments with a T/E strength of 260) were located in the Soviet Far

East. It is believed that deliveries of TU-4's to operational units have virtually ceased and that with the gradual phasing out of these aircraft as new jet models become available only 700 will remain in operational units by mid-1957, and 100 by mid-1959. \*

134. In the past four months there have been conclusive indications that a jet medium bomber equipment program has been initiated in Soviet Long-Range Aviation. During the 1954 Soviet May Day fly-by and the rehearsals preceding it, 9-11 twin jet medium bombers, designated by allied intelligence as the Type 39, participated. Subsequent intelligence has associated this type with a known Soviet Long-Range Aviation unit. We estimate that as of 1 July 1954 at least two regiments of Soviet Long-Range Aviation with a T/E strength of 60 aircraft were in process of equipment with Type 39 jet medium bombers. Total actual strength of these units is estimated at approximately 20 aircraft. Series production of the Type 39 is estimated to have begun in mid-1953, and total production as of 1 July 1954 is estimated at about 40 aircraft. It is estimated that Soviet Long-Range Aviation will contain an actual strength of 650 jet medium bombers by mid-1957, and 1,050 by mid-1959. \*

\* For radii-ranges and other performance characteristics of these aircraft, see Appendix D Tables 5 and 6.

135. The Type 37, which was initially observed on 30 July 1953 and later observed in flight on seven different occasions in connection with the 1954 May Day celebration, is a swept wing, four-engine, jet heavy bomber with an estimated gross weight of 365,000 pounds. The aircraft, considered presently to be in the prototype stage, is expected to appear in operational units by the end of 1956 building up to an actual strength of about 50 aircraft by mid-1957 and 250 by mid-1959. \*

136. There has been some evidence of the existence of a large bomber designated the Type 31. On the basis of present evidence, it is highly doubtful that any substantial re-equipment of Long-Range Aviation units with Type 31 class aircraft has occurred to date, though possibly 15 or 20 may have been introduced. The Long-Range Aviation re-equipment program to replace the TU-4 is more likely to be accomplished by introduction of the jet bomber aircraft which have now appeared, and the Type 31 class probably will not be introduced in numbers. \*

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\* For radii-ranges and other performance characteristics of these aircraft, see Appendix D Tables 5 and 6.