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Air Intelligence Estimate

AIE-1

DIRECTORATE OF INTELLIGENCE

HEADQUARTERS UNITED STATES AIR FORCE

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AIR INTELLIGENCE ESTIMATE

THE THREAT OF ACTION FROM COMMUNIST AIR FORCES TO THE CONTINENTAL STRENGTHS OF NORTH AMERICA

AIE-1

1 October 1952

DIRECTORATE OF INTELLIGENCE
HEADQUARTERS, UNITED STATES AIR FORCE

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The Threat of Action from Communist Air Forces to the Continental Strengths of North America

INDEX

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The Threat of Action from Communist Air Forces to the Continental Strengths of North America

SUMMARY AND CONCLUSIONS

The Problem

1. To appraise the threat of preemptive action from communist air forces to destroy, neutralize, or seriously damage the psychological, economic, and industrial strengths of the North American Continent.

Discussion

2. It is assumed in this study that the only communist air force with any capability for a campaign to affect the continental strengths of North America will, at least for the foreseeable future, be that of the Soviet Union. The study, therefore, examines the following questions, considering each in a separate appendix: What do the Soviets have to deliver, both now and in the future? What delivery vehicles and supporting organizations do they have, or are they developing? How well can they be expected to utilize these vehicles? How, under what circumstances, and with what timing would the Soviets plan on utilizing weapons of mass destruction in intercontinental warfare? Any attempt to answer such questions necessarily includes an appraisal of the current and potential values of the threats under study.

3. It must be recognized that there are broad gaps in available intelligence on Soviet capabilities and intentions, and this imposes a limitation on the finality of the conclusions drawn.

4. "Weapons of mass destruction" are considered to include both atomic and thermonuclear explosives, plus radiological, biological, and chemical warfare agents. Aircraft and guided missiles are the delivery vehicles. Only the threat against the continental United States and Canada is considered, since Alaska is to be examined in a separate study. "Psychological, economic and industrial strengths" are identified as the morale and will to fight, the social and political cohesion, the complex of war supporting industries, the transportation and communication networks, and the productive capacity of the United States and Canada.

5. Detailed discussion of the various aspects of the problem are presented in the following appendices:

A. Soviet Mass Destruction Weapons

B. Soviet Capabilities for Intercontinental Delivery of Mass Destruction Weapons by Aircraft

C. Soviet Capabilities for Delivery of Mass Destruction Weapons by Guided Missiles

D. Soviet Capabilities for Clandestine Delivery of Mass Destruction Weapons Against Targets in North America

E. The Role of Air Campaigns in Soviet Planning and Strategy

Conclusions

6. The Soviet Union is estimated to have presently available somewhat more than 50 (composite and plutonium) atomic bombs. In view of the uncertainties in the production of fissionable materials, the Soviet weapon stockpile assumed may be as low as one half or as high as twice the figures stated.

7. There is no indication that the Soviets have tested thermonuclear weapons or that their program presently is directed toward the development of such weapons. It is considered almost certain that scientific problems pertaining to the development of thermonuclear weapons are being investigated by the Soviets. It seems unlikely that they will be able to develop and produce a practical thermonuclear weapon ahead of the United States.

8. The USSR has all the basic knowledge needed for the production, on any scale desired, of most known BW and CW agents and for the design of efficient disseminators of such agents.

9. Delivery of CW agents on targets in the North American Continent is considered to be within the capability of the USSR.

10. Although the Soviets have the facilities for the production of small quantities of radiological warfare agents, it is believed that the cost of such agents in terms of atomic bomb production will preclude their manufacture for a number of years, at least until the Soviet atomic bomb stockpile has been substantially increased.

11. It is considered that for the next several years the majority of the atomic bombs allotted to North America would be delivered by aircraft. The USSR presently has approximately 900 Tu-4 aircraft that can be used for bomb delivery to targets on the North American continent. Used on

one-way missions (3,960 nautical miles), these aircraft can reach all targets of major value for affecting the continental strengths discussed in this study. The use of airborne refueling techniques would enable Soviet aircraft to reach these targets and return to base.

12. By mid-1953, a small number (25-50) heavy bombers with 3,500 nautical miles radius may become available. By 1955 the number of heavy bombers may increase to 100-250.

13. Submarine launchings of guided missiles may be within the capability of the USSR at present; while there is no conclusive evidence that the USSR has an atomic warhead suitable for use in a ship launched missile, the construction of such a warhead is estimated to be within the USSR's capabilities. Intercontinental guided missiles are not expected to become available to the Soviets before 1956; however, subsequent to 1956 and probably prior to 1960, ballistic or glide missiles with ranges sufficient to attack some North American targets could be available.

14. The Soviet Tu-4 piston medium bomber, because of its resemblance to the U.S. B-29, could be disguised and employed for clandestine delivery of atomic bombs. The Soviets similarly could use a disguised transport type aircraft in clandestine delivery.

15. An atomic bomb, including the fissionable material, could be broken down into components and smuggled into the U.S. In theory, all components of an atomic bomb, except the fissionable material, could be manufactured clandestinely in the U.S. It is possible that U.S. transport type aircraft might be used to deliver such clandestinely manufactured and/or assembled atomic bombs on target.

16. The chief limitation on the Soviet atomic weapon delivery capability for the next several years will be the size of the atomic bomb stockpile.

17. The Soviets probably have concluded that the continental strengths discussed in this study are particularly vulnerable to weapons of mass destruction.

18. A quantity of weapons considered sufficient to prevent unacceptable launchings of atomic weapons against the Soviet Union probably would be allocated against appropriate targets both within and without the North American Continent. The number of weapons allotted to this task would be determined in part by Soviet assessment of the ability of Communist defenses to reduce bomb delivery and assessment of their capacity to absorb the remainder.

19. From any weapons remaining, the Soviets probably would allocate such numbers of bombs as they considered necessary to:

1) Destroy or neutralize the U. S. ability to sustain large-scale military operations in Eurasia;

2) Destroy or neutralize the U. S. ability to develop or produce weapons potentially decisive or stalemating;

3) Destroy or neutralize the psychological, economic and industrial strengths of the U. S. to the extent that governmental changes or decisions satisfying to the Soviet leadership could be brought about. In this phase of the attack an assault on population targets can be expected.

20. The view of Soviet war planners as to bombs required for these results cannot be determined. The number might be as small as 100, or could be many times that total.

21. The Soviets probably will refrain from attacking the U. S. so long as their techniques of threat, pressure, subversion and disruption are reasonably productive, or until they feel confident that they can produce at least the effects listed in paragraphs 18 and 19, 1), 2), above.

22. When the trend in allegiances and accretions of world power begin flowing in favor of the West, the chances of Soviet attack will increase provided they feel confident that they can produce the effect listed in paragraph 18 above.

23. Each gain in Western prestige and power will be viewed as a threat by the Soviet leaders. When a trend unfavorable to the Soviets is clearly discernible to them, and if the USSR has succeeded in matching, or nearly matching, Western capabilities to deliver atomic weapons, the probability of preemptive action from Soviet Air Forces to the continental strengths of North America should greatly increase.

Appendix A

Soviet Mass Destruction Weapons

CONTENTS

A. Soviet Atomic Weapons

1. BOMB STOCKPILE

a. Present Estimate[1]

The Intelligence Advisory Committee has outlined a fully integrated atomic energy program for the Soviet Union consistent with the known facts. This Committee estimates the cumulative Soviet stockpile of atomic weapons, as of mid-1952, to be as follows:

	Plutonium Weapons (30-70 KT)	Composite Weapons (40-100 KT)	Approximate Total
Mid-1952	[redacted]		50

In view of the uncertainties in the production of fissionable materials, the Soviet weapon stockpile of the specific models assumed may be as low as one-half or as high as twice the figures stated.

By changing the weapon design, it is possible to increase or decrease the number of weapons in the stockpile substantially, given a certain quantity of fissionable material. Such changes, however, alter the kilotonnage yield of the individual weapons accordingly.

OGA

b. Future Estimate[1]

For the purpose of calculating the Soviet atomic stockpile, it is assumed that they will fabricate both all-plutonium weapons and composite weapons and that they will produce as many composite weapons as possible.

The cumulative Soviet stockpile of atomic weapons for future years is estimated as follows:

	Plutonium Weapons (30-70 KT)	Composite Weapons (40-100 KT)	Approximate Total
Mid-1953	[redacted]		100
Mid-1954			190
Mid-1955			300

1. CIA/SI 118A-51 Summary of the Status of the Soviet Atomic Energy Program, 12 March 1952.

APPENDIX "A"

In view of the uncertainties in the production of fissionable materials, the Soviet weapon stockpile of the specific models assumed may be as low as one-half or as high as twice the figures stated.

By changing the weapon design, it is possible to increase or decrease the number of weapons in the stockpile substantially, given a certain quantity of fissionable material. Such changes, however, alter the kilotonnage yield of the individual weapons accordingly.

Soviet atomic bomb stockpile beyond 1955 cannot be estimated.

2. WEAPONS CHARACTERISTICS

a. Present Estimate

Initial Soviet efforts were directed toward the production of plutonium, culminating in the explosion of a plutonium bomb in August 1949. Soviet efforts were also directed toward the production of Uranium-235 for use in weapons. A second atomic explosion, possibly a composite weapon, occurred in September 1951. A composite weapon was exploded in October 1951.

Information obtained from Soviet weapons tests that have been detected indicates substantial progress in Soviet weapon designs. The Soviets have reached the point in weapon technology at which the specific models stockpiled can be dictated by military requirements rather than by limitations in their technical knowledge.[1]

b. Future Estimate

In view of the high efficiencies shown in the weapons tests that have been detected, the Soviets should have no difficulty in obtaining kilotonnage yields in the higher ranges. For the same reason, they should have little difficulty in making smaller weapons.[1] It is

1. CIA/SI 118A-51, "Summary of the Status of the Soviet Atomic Energy Program", 12 March 1952

probable that by mid-1954 the Soviet Union will have available a considerable and diverse arsenal of atomic weapons.[1]

3. MEANS OF DELIVERY

(1) It is considered that, for the next several years, the majority of the atomic bombs allotted to the United States and Canada will be delivered by bomber aircraft.

(2) The Soviet Union is estimated as of 1 October 1952 to have 36 Tu-4 equipped regiments, which at full TO & E strength would represent approximately 1150 aircraft. Present actual strength is estimated at between 75/80 percent of TO & E, or about 900 Tu-4's, but further build-up to full strength could occur within a relatively short time. Such numbers of these aircraft as would be required could be utilized for delivery of atomic weapons against the North American continent. Heavy bombers may become available in limited numbers in 1953.

(3) Submarine launchings of guided missiles are within the capability of the USSR at the present time. While there is no conclusive evidence that the USSR has an atomic warhead suitable for use in a ship-launched guided missile, the construction of such a warhead is estimated to be within USSR capabilities.

(4) Intercontinental guided missiles with atomic warheads are not expected to become available for use by the Soviets before 1956; however it is estimated that subsequent to 1956, probably prior to 1960, ballistic or glide missiles with ranges sufficient to attack North American targets could be available.

(5) The Soviet Tu-4, because of its resemblance to the U. S. B-29, could be disguised with U. S. markings and employed for clandestine delivery of atomic bombs.

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1. JIC 491/62 (ACAI 22) "Forms and Scales of Soviet Attack Against North America - 1 July 1954", (5 May 1952).

(6) The Soviet Union also could undertake clandestine attack with transport aircraft of a type used by U. S. or foreign transoceanic airlines.

(7) Atomic weapons may be laid as underwater mines in key harbors by merchant ships or may be detonated in the hold of a ship.

(8) An atomic bomb, including the fissionable material, can be broken down into small components which could be smuggled into the U. S. Although it would be theoretically possible to manufacture clandestinely within the U. S. all the components of an atomic weapon, except the fissionable material, it would be difficult to procure and process the necessary material.

(9) A U. S. transport type aircraft might be used to deliver an atomic bomb that had been clandestinely manufactured and/or assembled in the U. S.

APPENDIX "A"

B. Thermonuclear Weapons[1]

Though the present Soviet program provides certain raw materials of possible use in thermonuclear research and development, none of the detected Soviet weapons tests have shown any indication of the development of thermonuclear weapons. Obviously new approaches to the thermonuclear weapon problem cannot be ruled out, but there should be some detectable indication of such efforts in weapons tests prior to the production of stockpile models.

The Soviets have attached high priority to research and development and there is little doubt that vast effort is concentrated in the nuclear energy program; yet it seems unlikely that the Soviets will be able to develop and produce a practical thermonuclear weapon ahead of the United States. However, past Soviet successes in exploiting Western knowledge and combining it with their own in this field indicate that the Soviets may not be far behind in the development of these weapons.

1. CIA/SI 118A-51, "Summary of the Status of the Soviet Atomic Energy Program, 12 March 1952

C. Radiological Weapons

Although the Soviets have facilities for the production of small quantities of radiological warfare agents, it is believed that these will not be a factor at present.[1] The cost in terms of lost production of atomic bombs is believed to present a sacrifice which the USSR would not accept until their bomb stockpile has increased considerably.[2] Therefore, apart from the use of residual radiation from an underwater burst A-bomb to neutralize harbor installations, RW is not considered likely to be a factor in a campaign against the North American continent at least through mid-1954.[3]

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1. JTIS Working Group Briefing for JTIS, 21 May 52 (CW)
2. JTIS Working Group Briefing for JTIS, 21 May 52 (BW)
3. ACAI 22, JIC 491/62, Forms and Scales of Soviet Attack Against North America - 1 July 1954 (5 May 1952)

APPENDIX "A"

D. Biological Warfare Agents

1. KNOWN DEVELOPMENTS

The Soviets have been active in the BW field since the early 1930's. There can be no doubt that the Soviets have the scientific potential to develop appropriate BW agents. Intelligence reports and Soviet scientific publications indicate that the Soviets have extensive knowledge and experience with such things as botulism and other toxins, plague, tularemia, various quick acting intestinal diseases, brucellosis and some virus diseases.

2. POTENTIAL DEVELOPMENTS

There is no information on the existence of a BW stockpile in the Soviet Union and little information on Soviet production capabilities. It is estimated that the Soviets are approximately a year behind the United States production capability for BW agents and could mass-produce BW agents on a large scale if they desired to do so. BW agents cannot be stored for long periods and therefore relatively large scale production facilities would be required to support a major BW attack.

3. MEANS OF DELIVERY

The Soviets can adapt certain chemical warfare munitions for disseminating BW agents and reportedly they have in the past developed special biological weapons. These include bombs and artillery shells. They also could have developed special sabotage devices for spreading dry agents such as crop dusting materials. It is estimated that the Soviets have a capability for the employment of large-scale open attack using biological warfare agents. It is believed that the Soviets will elect to use the sabotage method in the initial stages of a major war and possibly some time

before the outbreak of hostilities. The main advantages of this method are that it is relatively easy to employ and very difficult to detect.[1] However, the capabilities of the Soviet air arm are such that its utilization in the delivery of biological agents, particularly in conjunction with atomic attacks, should not be underestimated.

1. JITS Working Group Stock Briefing for JTIS on BW, 21 May 1952

APPENDIX "A"

E. Chemical Warfare Agents

1. KNOWN DEVELOPMENTS

The Soviet Union is estimated to have the capability to engage in chemical warfare on a large scale. It produced large quantities of toxic chemicals during World War II and, unlike most countries, the Soviet Union did not destroy its stockpile after the war. Indications are that the Soviets have maintained this stockpile and have added to it by postwar production. The nerve gas agent under production by the Soviets is believed to be GA (tabun). The inclusion of GA in the CW training of the Soviet soldier suggests that, as early as 1950, it had become a standardized agent in the arsenal of Soviet CW weapons. The Soviets undoubtedly realize that GB (sarin) is a more effective agent, but are believed to have decided on the initial production of GA because of its greater ease of manufacture and because of the availability of German equipment and personnel for its production. On the basis of available installed plant capacity and critical basic chemicals such as chlorine, the Soviet orbit is believed capable of producing around 120,000 to 150,000 metric tons of CW materials, including nerve gases, during 1952.

2. POTENTIAL DEVELOPMENTS

Although the Germans discovered and developed the nerve gases, they utilized the research finding of a Soviet scientist, A. Ye Arbuzov, in developing the extremely toxic GB. Arbuzov is one of the outstanding organic phosphorus chemists of the world; since 1905 he has been working in the particular field of organic compounds related to chemistry of the nerve gases. He is presently directing a group of outstanding chemists and assistants in organic phosphorus

compounds research at Kazan. A close analysis of the numerous publications of this group in Kazan strongly suggests that they are endeavoring to synthesize a duplex or double nerve gas.[1] The actual progress this group has made is not known but their capabilities for development of advanced CW agents should not be underestimated.

3. MEANS OF DELIVERY

The Soviets are firm believers in the potentialities of aerial employment of toxic CW agents and through extensive development and testing they have perfected the requisite techniques for effective aerial dissemination. They have developed a variety of aircraft spraying equipment which is designed for low altitude operations. Also Soviet chemical materiel has been developed as multipurpose wherever possible. For example, flame throwers, both portable and mechanized, are designed to shoot a stream of either flame material, smoke, or persistent war gas.[1]

1. JTIS Working Group Stock Briefing for JTIS on CW, 21 May 1952

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Appendix B

Soviet Capabilities for Intercontinental Delivery of Mass Destruction Weapons by Aircraft

CONTENTS

Appendix B

CONTENTS (Continued)

APPENDIX "B"

A. The Long Range Air Force

1. MISSION[1]

Long Range Aviation is the strategic striking force of the USSR. Its primary mission in war would be to deliver atomic and other mass destruction weapons against distant targets. Other missions of Long Range Aviation units would include attacks with conventional bombs, long-range reconnaissance, and possibly aerial mining and participation in long-range airborne raiding operations. It is clear from such derivative evidence as that relating to the organization, equipment and training of Long Range Aviation that the Soviets intend that their long range units shall be capable of carrying out missions against distant targets by day or night in any weather.

2. COMPOSITION AND DEPLOYMENT

As of 1 October 1952, the Tu-4 strength available for operational use was estimated at 900 aircraft, based primarily upon the Table of Equipment strength of Soviet air regiments established by intelligence to be equipped or in the process of being equipped with Tu-4 aircraft. The Tu-4 is the only known Soviet bomber in operational units capable of carrying the atomic bomb to the United States.

1. A.I.S. No. 172/22B

APPENDIX "B"

Estimated deployment of Long Range Aviation Tu-4's (based on T/O & E strength) is as follows: 1st Long Range Air Army — Northwest Command — (Leningrad, Moscow, Baltic, Belorussia, Kiev, Volga) 390 Tu-4's; 2nd Long Range Air Army — Southwest Command — (Kiev, Carpathian, Volga, Transcaucasus) 390 Tu-4's; 3rd Long Range Air Army - Far East Command — (Far East, Maritime, Transbaikal) 190 Tu-4's. Undetermined subordination (Western USSR) 180 Tu-4's.

3. EXPECTED FUTURE COMPOSITION AND DEPLOYMENT

The conventional medium bomber strength of Soviet Long Range Aviation is expected to attain its maximum of more than 1000 operational aircraft in 1953. It is considered that jet medium bombers and piston or turboprop heavy bombers probably will appear in 1953 and that replacement of the early Tu-4's with these types may then begin. It should be noted that no prototype jet medium bomber has been observed, although there are indications that such an aircraft has been under development. A prototype heavy bomber, designated by U. S. intelligence agencies as the Type 31, appeared in the Moscow Air Show on 8 July 1951. The Type 31 was probably powered with conventional piston engines on this occasion, but it is believed that the more likely ultimate power plant for it is the Jumo 022 turboprop engine, which is reported to have passed Soviet acceptance tests in November 1950. An outstanding feature of the Type 31 is the fact that its airframe is built largely of Tu-4 and Tu-70 sub-assemblies and it could therefore be rapidly brought into production. If the Type 31 is considered satisfactory by the Soviets, it could be in production now at one of the several aircraft producing facilities on which intelligence is inadequate to determine the article being produced.

APPENDIX "B"

Estimated future Soviet long range bomber strength is presented in the tables below. The spread between the high and low figures is caused by the estimated possible high and low rates of production and early and late dates for the beginning of production — either figure — or any figure between them — is possible, and should the Soviets choose to devote additional resources to production of these types, the higher figures can easily be exceeded. However, it is considered that the figures given represent the more probable limits of the Soviet program.

	Mid-1953	Mid-1954	Mid-1955	Mid-1956	Mid-1957
Medium Bomber					
Jet	Possibly a few	50/150	150/300	250/500	300/600
Piston	1000/1100	1,100	1,000	800	500
Heavy Bomber	25/50	50/200	100/250	150/250	200/250

Since it is anticipated that the principal bases of Long Range Aviation units necessarily will remain reasonably near highly developed industrial and transportation centers in the USSR, it is likely that the pattern of present deployment of these units will continue in the future. It is possible that improvement of peripheral bases will allow some forward movement of medium bomber units in the next few years but such an eventuality should not seriously affect the basic pattern of deployment. In this connection it should be remembered that these bomber units can be quickly staged from one region into another in preparation for any possible attack.

Within the past year a gradual build up of medium bomber strength in the Far East appears to be under way following the first appearance of Tu-4's in 3rd Long Range Air Army units in the latter part of 1951.

APPENDIX "B"

B. Long Range Aircraft

1. PRESENT CHARACTERISTICS[1]

Except for small numbers of light bombers not included in these tables, the present estimated operating characteristics of bomber aircraft of Soviet Long Range Aviation are as follows:

	Combat Radius (NM/LBS)	Combat Ranges (NM/GALS/LBS)	Maximum Speed (NM/FEET)	Service Ceiling (Feet)
Tu-4	1900/10,000 2150/10,000[2]	3320/7748/10,000 3960/8268/10,000[2]	347/10,000	39,500

2. EXPECTED FUTURE CHARACTERISTICS

The possible operating characteristics of medium and heavy bomber aircraft of Long Range Aviation are shown in the following table for the years indicated. It should be noted that the great majority of aircraft in Soviet units will be earlier types not capable of the maximum performances listed below:

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1. Air Technical Intelligence Center Study No. 102-Ac-52/1-34, "Estimated Characteristics of Soviet Air Weapons"

2. Special B-29 with all defensive armament except tail turret removed, crew reduced by one and take-off weight reduced by 2600 lbs. There is no information indicating that the Soviets have modified any Tu-4's in this manner. However, no technical difficulties stand in the way of the accomplishment of this modification.

APPENDIX "B"

BOMBERS[1]

Type	Power Plant	Maximum Speed SL (kts)	Maximum Speed 30000 ft (kts)	Combat Range (NM)	Combat Radius No Refuel (NM)	Combat Radius One Refuel (NM)	Bomb Load (lbs)	Service Ceiling (ft.)
				1953				
Medium	Jet	475	425	2100	1100	1550	6,600	40,000
Medium	Conv	285	360	4500	2400	3360	10,000	37,000
Heavy	Conv[2]	328	359	6500	3500		10,000	39,000
				1954				
Medium	Jet	500	450	2800	1500	2100	10,000	43,000
Medium	Conv	285	360	5000	2650	3700	10,000	37,000
Heavy	Conv	330	360	6500	3500		10,000	35,000
				1955				
Medium	Jet	525	475	3200	1700	2400	10,000	45,000
Medium	Conv	300	375	5000	2650	3700	10,000	40,000
Heavy	Conv	340	375	7000	3700	4900	10,000	40,000
				1956				
Medium	Jet	525	475	3500	1850	2500	10,000	45,000
Medium	Conv	300	375	5000	2650	3700	10,000	40,000
Heavy	Conv	350	400	8000	4000	5600	10,000	40,000
				1957				
Medium	Jet	535	485	4000	2100	2950	10,000	48,000
Medium	Conv	300	375	5000	2650	3700	10,000	40,000
Heavy	Conv	350	400	8000	4000	5600	10,000	42,500
Heavy	Jet	450	425	7000	3500	4900	10,000	45,000

1. Air Technical Intelligence Center Study No. 102-AC-52/I-34, "Estimated characteristics of Soviet Air Weapons."

2. Estimated performance with turboprop engine considered most likely engine installation for use in this aircraft.

APPENDIX "B"

C. Air Base Structure for MB/HB Operations

1. CURRENT BASE REQUIREMENTS

At present Soviet airfield capacities are such that the number of aircraft determined to be necessary for an atomic attack on the United States could be accommodated at existing facilities and staging areas.

Except for one-way, one-refueled missions, air attacks by Soviet Tu-4's must come from areas controlled by the Soviet Union which are less than 3,960 nautical miles from the important target areas in the United States. There are only three areas which meet this specification: Kola Peninsula in northwest USSR; Soviet and Soviet-controlled territory along the Baltic and Eastern Germany; and Chukotski Peninsula in northeast Siberia. Bases further in the interior of the Soviet Union could be utilized to launch attacks against those United States targets located at less than maximum range from the three base areas mentioned.

The extension of the combat range of the Tu-4 to 5,000 nautical miles through modifications and the use of aerial refueling, and the development of new longer range bombardment aircraft would afford the Soviets greater flexibility in the selection of base areas. From bases known to be capable of accommodating medium bombers in the Leningrad or Moscow areas, the Soviet Tu-4's on one-way, one-refueled missions could reach all targets in the United States. Under such circumstances, a large number of base combinations could be selected which would permit compromises between maximum range, ease of logistic support, maintaining security for the operation, more ample technical facilities for

special operations, and other features the Soviets might desire. Since aircraft may be staged rapidly from one region into another, the many possible combinations of air bases make it impractical to estimate the exact bases from which the Soviets would launch their attacks. However, it is considered that advanced bases on the periphery would give greater flexibility in operations, better target coverage of the United States, and multiple approach routes to confuse U. S. counter-measures.

2. POTENTIAL BASE AREAS FOR INTERCONTINENTAL OPERATIONS

a. Eastern Europe

The Soviets have built or improved a number of bases along the Baltic from Leningrad into East Germany that are adequate for staging the entire medium bomber force. These bases are favorably situated with respect to communications and weather and are adequately served by existing transportation facilities. The disadvantage of bases in the area is that the great circle routes to the northeastern parts of the United States pass over portions of Western Europe or Scandinavia and any attempted air strike might be detected early enough to provide warning.

Most significant of these bases are located in the Soviet Zone of Germany. The Soviet Zone now boasts 12 airfields capable of supporting sustained operations by medium bombers with runways 7,000 or more feet in length. The Zone also has 13 fields capable of supporting limited operations by medium bombers with runways of 6,000 feet or more in length. Representative of the class I fields are Zerbst, Brandenberg/Briest, Parchim, Rechlin/Larz, Dessau and Grossenhain.

b. Kola Peninsula[1]

The Kola Peninsula, the most northerly land mass on continental

1. Air Intelligence Information Report, Air Facilities Notes 4-52, "Air Facilities in the Kola Peninsula", 1 May 1952

European USSR, is roughly 3,500 nautical miles from the continental United States and offers the advantage of great circle routes which avoid overflight of nations friendly to the U.S. Of the thirty-five landing areas known to have been constructed on the Kola Peninsula, twenty-one are believed to be maintained in serviceable condition. It is not known whether any airfields on the Kola Peninsula have been used by medium bombers. However, two airfields — Alakurtti, at the base of the peninsula, and Murmansk/Vayenga, nine and one-half miles northeast of Murmansk — could be readily adapted to accommodate Tu-4's. In addition, eight airfields in 1945 offered runways or take-off areas 4,500 feet or longer in length. It is possible that all of these bases could have been improved to accommodate medium bombers. However, intelligence available in this area is insufficient to determine accurately the extent of actual development of these fields for medium bomber use. Scattered and unconfirmed reports of base improvements have been received and there are many indications that the area is closely guarded by the Soviets.

Because of lack of information concerning airfield capacities and local conditions, it is presently impractical to fix any arbitrary limitation on the number of aircraft that the Soviets could stage through these forward bases in a given time.

During the spring thaws and the summer months, which also present the worst flying conditions in the Arctic, the number of medium bombers that could be staged through Soviet bases in this area might be reduced since only permanent-type, all-weather runways of suitable length and weight-bearing capacity could be used. An additional and greater hindrance to large-scale air operations in those seasons would be the soft, boggy, and generally

flooded ground that would impede dispersal, servicing, maintenance, and logistic support.

Both Alakurtti and Murmansk/Vayenga are favorably situated logistically; Alakurtti is served by rail and Murmansk is an important year-round port connected to the interior of the Soviet Union by rail. While some stockpiling in advance might be necessary to avoid over-burdening facilities, there is no doubt that the present rail transportation facilities are adequate to support a large scale air attack from this area.

Nautsi (69-04N 29-10E), is another potential medium/heavy bomber airfield. Built by the Finns and enlarged by the Germans, it had a 5,500 foot graded gravel-and-sand runway when the Soviets began reconstruction of this war-damaged airfield in 1945. Pechenga (formerly Petsamo), which may now have concrete runways, is also a possible staging base for medium bombers. Still another potential medium bomber base is Ponoy (47-06N 41-07E), on the eastern extremity of the Kola Peninsula. Little information is available about this field except that it was still active in 1948 and its runway was over 5,000 feet long. As elsewhere throughout the Soviet Arctic, virtually all of these airfields are extensible and all will bear the weight of Tu-4's during the six or more months of the year that the ground is frozen. At many far northern airfields, snow cover, which may be rolled and then preserved by watering and allowing to freeze, may serve in lieu of other runway construction.

c. Far East[1]

From the standpoint of geography, the Chukotski Peninsula is the area of the Soviet Union most favorably situated for aerial attack on the United States. This area is the Soviet territory

1. Air Intelligence Information Report, Air Facilities Note 2-52, "Soviet Arctic Air Operations," 7 March 1952

nearest most industrial areas of the United States, and has the additional advantage of winds favorable to easterly flight most of the year. The great circle course from the probable bases in this area lies generally across Alaska north of Bering Strait and south of Point Barrow, and across Canada through Great Bear Lake and Lake Superior. There is insufficient firm information presently available on the airfields in this area to make possible the positive identification of any specific installation as a launching site or staging base for Soviet atomic attacks against the United States. It is possible, however, to select several airfields which might be considered as possibly capable of supporting medium bomber operations. Markovo (65-41N 179-15W) and Anadyr/Mys Nizmenny (64-48N 177-33E) would possibly support minimum operations by Tu-4's, at least during about nine months of the year. Other possibilities are the airfields at Magadan (59-38N 158-31E) and at Petropavlovsk (53-38N 158-31E) which offer the best potentialities for development as medium bomber bases of any of the air facilities of the Magadan-Kamchatka area. Unconfirmed reports indicate that Magadan airfield, which has been used by four-engine aircraft, may have a 5,000 foot temporary surface runway. Other fields include Velkal and Tanyurer. In addition to these airfields, it is entirely possible that new airfields have been built without detection. An 8,000 foot ice landing strip was known to exist off the coast of Wrangel Island, north of Chukotski Peninsula, during the spring of 1952. The Soviets have placed considerable emphasis upon the use of frozen surfaces in the Arctic, which makes possible a potentially large number of airfields which could be placed in operation with a minimum of preparatory effort. Such frozen surfaces might be utilized for medium bomber operations during the winter season.

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Logistic support for operations from the Chukotski Peninsula area, in which there are no known roads or railroads, would be unquestionably more difficult than for operations from other base areas of the Soviet Union. Supplies are moved by shipping and river boats in summer, by caterpillar trains in winter, and by air during all seasons. Barge traffic, which could presumably be used to supply both Markovo and Tanyurer during the ice-free months, is capable of moving large tonnages provided sufficient equipment is available.

In spite of the difficult supply situation, the Soviets are considered capable of providing sufficient stockpiles of all supplies necessary for staging from these bases a limited number of medium bomber aircraft on missions against the North American continent.

3. PROBABLE FUTURE DEVELOPMENTS

Geographical, economic and meteorological considerations will continue to influence the deployment and construction of principal Soviet Long Range Aviation facilities. It is considered probable that they will largely remain in well-developed areas in European Russia and the Soviet Far East. Principal base facilities undoubtedly will be continually improved as higher performance aircraft become available.

It is probable that staging bases in forward areas will be developed and stockpiled with the necessary supplies. In particular, it is considered that additional facilities will be developed in Northeast Siberia as the ability to supply that area improves. Intelligence now available does not serve as an adequate basis for predicting where, and to what extent, other forward staging bases

will be developed. Other than for these forward staging bases, which may already have been developed to some extent, there appears to be no need for development of new base complexes for long range operations.

Spitzbergen, Prinz Rudolf Island (Franz Josef Land), and Novaya Zemlya have all been considered as possible sites for mounting long-range air attacks against the United States. Spitzbergen, which belongs to Norway but on which the USSR has a concession, has no facilities for medium bombers. Although the airstrip on Prinz Rudolf Island is the northernmost terrestrial landing area in the world, it was designed for reconnaissance aircraft only and is now reportedly abandoned. The difficulty of supplying an air installation on Prinz Rudolf Island, because of the extremely short shipping season in years when the island is not icebound, would probably be a severe limitation on establishment of facilities for intercontinental bombing operations. At Novaya Zemlya, also, possible advantages in range must be weighed against the logistical disadvantages. From the airfields at Nordvik (at the mouth of the Khatanga River), Tyllyr (at the mouth of the Lena River), and Tiksi (on the bay of that name), the great circle routes to North America pass over the most isolated regions of the Far North. Little is known about these airfields except that they are used by civil and military aircraft and by airplanes engaged in ice and weather reconnaissance over the Laptev Sea.

APPENDIX "B"

D. Current Capability for Long Range Operations

1. OPERATIONAL READINESS

The entire operational strength, an estimated 900 aircraft, of the Soviet Tu-4 force could be utilized against the North American continent should Soviet plans require such an all-out effort -- unlikely in view of the estimated size of the Soviet atomic stockpile. The Soviets should be capable of achieving a serviceability rate of 90 percent for an initial, deliberately prepared surprise attack. The abort rate could be on the order of 20 to 25 percent of the aircraft sortied. The sustained serviceability rate for the Tu-4 is estimated at 40 percent for normal medium bomber operations with a sortie rate of seven per month.[1] These rates might be appreciably lower if a fairly large percentage of aircraft were used against very distant objectives and would, naturally, have no applicability to one-way missions.

A sufficient number of reasonably well trained aircrews probably are available to maintain the sortie rates outlined above and are of sufficient political reliability to execute one-way missions if ordered.

2. CREW PROFICIENCY

On the whole, the limiting factor in the operational capabilities of Soviet Long Range Aviation is likely to lie in the performance of aircraft and associated equipment rather than in shortcomings in training and techniques.

The progress of Soviet Long Range Aviation personnel toward a high level of combat effectiveness undoubtedly has been retarded by the absence of a background of combat experience in long range air operations and by restrictions on flying such as are imposed by the Soviet security system. The principal aspects of these

1. A.I.S. No. 172/22 B

operations in which the Soviets are weak apparently have been identified and an intensive training program has been underway for some time to correct them. In spite of these efforts the meager evidence available indicates that the combat effectiveness of the average Soviet medium bomber crew is below that of its U. S. counterpart.

It must be emphasized, however, that the number of crews available greatly exceeds the total stockpile of atomic weapons estimated to be available. The Soviets need thus employ only their best crews in attempting the delivery of their entire atomic stockpile, and they have had almost five years to conduct crew training with operational aircraft.

a. Navigation

Navigation to target areas in the United States from areas in the temperate zone under Soviet control poses no unusual problems. However, navigation from bases in the Soviet Arctic would require a knowledge of arctic navigation theory and crews trained in its practice. On the whole Soviet theoretical and practical knowledge of polar navigation, and the navigational equipment available to them, leads to the conclusion that Soviet air crews should be able to fly across the Arctic and stay on course.

The German Patin remote indicating compass, the German ARG-1 celestial computer (which can be used to solve any problem of spherical triangles) and the U. S. AN/APQ-13 radar are among the more important navigational devices available to the Soviets. The latter is of less significance in the Arctic, where coast lines are poorly defined because of snow and ice cover and where radar check points are as infrequent as visual check points. In addition to these devices which are installed in the aircraft, it appears that the Soviets may now have partially completed construction

of an electronic pulse navigational system.

If necessary, additional navigational assistance could be provided by planted navigational aids on land or on surface vessels or submarines. While it is considered that Soviet crews would have little difficulty in navigating accurately at lower latitudes, it is probable that they would make the maximum possible use of Canadian and U.S. navigational aids, and might also be assisted by clandestine electronic aids.

b. Bombing Accuracy

The Soviets are known to possess optical bombsights with performance characteristics at least equal to those of the Norden and Sperry sights used by United States forces during World War II. While there is no evidence concerning the accuracy obtained by the Soviets with this equipment, the Soviets have had ample time to train operators and it may be that accuracy will be much the same as that obtained by United States forces with the same equipment. Accordingly, it is considered that bombing accuracy under visual conditions probably would be not less than that obtained by USAF World War II crews.

During World War II the Soviets received a considerable amount of lend-lease airborne radar equipment such as the SCR-717 (Airborne Search Radar) and SCR-720 (Airborne Interception and Search Radar). U. S. aircraft acquired by the Soviets were equipped with AN/APQ-13, and possibly, AN/APS-15 radars. All Soviet Tu-4 aircraft observed have had a protuberance which could possibly house a radar scanner of microwave type, similar to that of the AN/APQ-13 radar. Therefore, it is considered that some Tu-4's may be equipped with blind-bombing and navigation type radars of the U.S. AN/APS-15

and AN/APQ-13 type radar, or possibly with a more efficient type. Although Soviet capability in the use of these instruments is not established, it is considered that a reasonable number of Soviet air crews may be capable of employing high altitude and instrument bombing techniques in a manner adequate to fulfill the requirements of a mission, particularly if the target is a city area rather than one requiring considerable accuracy.

c. Night and All-Weather Proficiency

Soviet Long Range Aviation training programs are known to call for bombing at all altitudes, by day or night, in any weather. Blind bombing and navigation radars are considered to be in use, although there is not sufficient evidence to determine the type of equipment or the extent of its availability throughout the long range force. It is concluded that Soviet attacks against the United States can be expected both during daylight and darkness or bad weather, with the degree of accuracy partly dependent on the extent of visibility.

d. Political Reliability[1]

Morale in the Soviet Air Forces is believed relatively higher than that of other components of the armed forces. The principal reasons for good morale, particularly among officer and flying personnel, are better food, pay, quarters, and job security than the average Soviet citizen is able to obtain.

It is apparent, however, that the morale of Soviet Air Force personnel is generally lower than the standard desired by the Soviet regime. This is evident from official Soviet acts and policies. Propaganda efforts to glorify military aviation and to honor patriotic airmen are continuous. In an effort to prevent possible defections, the Soviet High Command in 1948 issued an

1. A.I.S. No. 172/22/B, 1 Apr 1952

official order, apparently still in effect, stating that reprisals would be taken against the family of any person who defected. Strict measures to limit opportunities for flying personnel to attempt defection while flying aircraft are known to be practiced.

That these and other efforts are not wholly successful is evidenced by continuing instances of defection, particularly in units stationed outside the USSR. Defectors who have fled the USSR have reported that other personnel have considered defection. To date no member of a Tu-4 regiment has defected, but whether this reflects higher morale, more rigid controls, or generally greater distances from "safe haven," has not been determined.

Deficiencies in Soviet Air Force morale, moreover, do not appear to have reduced the effectiveness of Soviet air units to the degree that would be expected under similar conditions in Western nations. Severe and often cruelly enforced discipline does much to suppress overt expressions of discontent among enlisted men. The air officer, comparatively well fed and well paid, thoroughly indoctrinated politically, and himself subject to severe discipline, appears unlikely as a general rule to permit lapses in discipline among his men.

On the whole, while the morale of the Soviet Air Force personnel appears to be generally adequate for Soviet requirements, it still remains a matter of concern to the leaders of Soviet military aviation.

3. AIRCRAFT UTILIZATION

a. Availability and Abort Rate

The only known Soviet bomber in operational units presently capable of attacking the United States is the Tu-4, the Soviet copy of the U.S. B-29. There is no intelligence available

concerning the actual serviceability rate or the mechanical condition of the Tu-4 aircraft in Soviet units. The standards of maintenance and the serviceability rate in the Soviet Air Forces during World War II were somewhat below that which it is believed could have been achieved by United States units operating under similar conditions. However, at the end of the war the Soviets reportedly retained in service the best maintenance personnel and since have conducted an intensive training program aimed at improved maintenance throughout their air forces. The high priority given the development of Long Range Aviation, the presence of Tu-4 aircraft in operational units for more than four years, and the combination of previously skilled maintenance personnel and an intensive training program, should, by this date, have enabled the Soviets to achieve a satisfactory serviceability rate. The Soviets should be capable of achieving a serviceability rate of 90% for an initial, deliberately prepared surprise attack. Such a capability is in accord with U.S. experience with the B-29A and estimates of Soviet maintenance capabilities with the Tu-4. It is also consistent with German experience against Soviet units operating after a period of maintenance stand-down.[1]

The abort rate -- aircraft turning back prior to accomplishment of mission -- probably would be on the order of 20 to 25 percent of the aircraft sortied. This rate is based on USAF experience with the B-29 aircraft and a consideration of the combined effect of a lower level of Soviet maintenance efficiency and the operating conditions in northern latitudes. The percentage might vary somewhat depending upon such factors as the season, weather, time taken to prepare for the mission, altitudes flown, and other operational factors.

1. Air Intelligence Study No. 274 "Estimate of Forms and Scales of Soviet Atomic Air Attack on North America, 1 Jan 52 - 1 Jan 54," 18 Sept 51

b. Range Extension Techniques

Little information is available regarding Soviet development of aerial refueling techniques and equipment. Soviet interest in aerial refueling was evidenced several years ago, but no actual refueling operation has been observed. However, it is believed that the importance of U.S. targets to Soviet war plans plus present range limitations of Soviet long range bombers would warrant the assignment of a high priority to the development of operational aerial refueling techniques and equipment. The techniques involved are not difficult to master, as is evidenced by U.S. and British experience and there is an abundance of information available to the Soviets on U.S. and British developments in this field. Therefore, the Soviets are accorded the capability of developing equipment and techniques for operational use of aerial refueling.

A study of refueling tests conducted with the B-29B and KB-29M tanker by the USAF indicates that theoretical maximum range mission by Tu-4's might be as follows: On a one-way mission with the tanker and receiver taking off together, the tanker would refuel the bomber at approximately 1600 nautical miles from their take-off points thus giving the bomber a total range from point of take-off of over 5,000 nautical miles. On a two-way mission, in order to effect a maximum radius of action for the bomber the outbound refueling would take place about 1600 nautical miles from the point of take-off and the return refueling would take place at approximately 2100 nautical miles from the point of take-off. If both outbound and inbound refuelings were accomplished expeditiously, radius of action of the bomber would be approximately 3750 nautical miles.

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While operations based on in-flight refueling, particularly inbound, present operational problems which might result in the loss of a portion of the striking force, the Soviets might consider the recovery of some aircraft and crews an attractive alternative to the sacrifice of the entire striking force. The current Tu-4 operating force is sufficient to permit conversion of the necessary number of bombers to tankers without any sacrifice in the Soviet capability for delivering atomic weapons in the present numbers available to them.

c. Defensive Armament

It is believed that for maximum range missions the Soviets will employ Tu-4's stripped of all defensive armament with the exception of the tail turret. With the attainment of substantial increases in the maximum combat range through the development of Tu-4's of improved design, the development of new aircraft types with increased range performance characteristics, or the use of in-flight refueling of present aircraft, the Soviets could achieve the capability of employing bombers with full defensive armament on missions against the United States. Turrets are expected to be armed with two 23mm automatic guns with a cyclic rate of 480-550 rounds per minute and sufficient ammunition to sustain 12 to 15 seconds continuous fire. The ammunition load may be increased if weight or range limitations permit.

The fire control system probably will be a copy of the B-29 system, incorporating radar ranging equipment. Tail warning radar probably will be employed.

d. Electronic Countermeasures

The Soviets apparently are well aware of the tactical advantages to be gained from the effective employment of electronics

countermeasures. Soviet technical publications have discussed jamming and ferret operations and the Soviets have direct experience with the offensive countermeasures employed by the Germans in World War II. In addition to the German equipment obtained during and after the war, both U.S. and British war surplus equipment for use in electronics reconnaissance aircraft have been purchased by the Soviets. The Soviets have full knowledge of U.S. and Allied World War II radar search receivers. American airborne ECM equipment interned by the Soviets during World War II included AN/APT-5 (Jammer), AN/APR-5A (Ferret Receiver), AN/APA-11 (Pulse Analyzer), AN/APQ-2Q (200-550 Mcs Jammer). In addition, the lend-lease program supplied the Soviets with samples of U.S. "window" and specifications for its use. Thus, through lend-lease the Soviets acquired a wide variety of U.S. defensive radar, and through other sources, the Soviets have had access to both U.S. jamming equipment and some of the U.S. equipment which Soviet aircraft would be required to jam.

The Soviets are capable of large-scale jamming operations at frequencies up to 20 megacycles. Airborne jammers may be available, utilizing the same spectrum scale as airborne passive ECM. Since specimens of German World War II VHF jammers are considered available to the Soviets, this capability may well extend as high in frequencies as the VHF band. Directional equipment utilizing the common S and X bands, and possibly some of K band, may be available but large gaps in the spectrum will not be covered.

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A number of devices of value to a noise intercept program are known to be under development, but the state of their development is undetermined.

Recent appearances of a number of relatively advanced radar types, similar to the U.S. AN/CPS-6 and SCR-584, indicate that the Soviets have solved the problem of large scale production of radar magnetrons and have begun to produce radar equipment of advanced design. However, U. S. and British experience indicates that techniques in advance of those required for the production of radar magnetrons are required for the production of countermeasures magnetrons. In view of the fact that the Soviets have demonstrated a capacity for the production of magnetrons and have had access to foreign countermeasures equipment, it is considered probable that they have produced sufficient countermeasures devices to equip some Tu-4 aircraft. The intelligence presently available, however, is not adequate to determine the number which may have been equipped or the effectiveness which the equipment might have against U.S. defensive radar.

e. Replacement of Losses

The Soviets are estimated to have produced approximately 1150 Tu-4's since 1946. With attrition figured at 1.5 percent per 100 aircraft per quarter, the Soviets are estimated to have a cumulative inventory of about 1000 Tu-4's with an approximate 900 aircraft believed available to units. No appreciable reserve of Tu-4's is believed to exist, basic Soviet policy having been to assign available aircraft to training or operational units. Present production of Tu-4's is estimated at approximately 20 planes per month, although the one plant involved in this production is considered capable of an output about double the present rate.

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4. TACTICS AND TECHNIQUES[1]

No Soviet aircraft are known to be presently operating over or near the continental United States. Sightings of unidentified aircraft or unconventional objects have not been proved to have any connection with the USSR. However, there have been reports of unidentified aircraft in the orbit of the Alaskan Air Command and the Northeast Air Command. One unidentified B-29 has been seen 75 miles south of Thule, more than 2000 miles from the nearest Soviet base area. Also reports of false SOS's may indicate an effort to locate radar stations to test their alert procedures.

No intelligence is available as to tactics or techniques which might be used by LongRange Aviation in approaching the United States or in pressing home an attack on the continental U.S. The possibilities can be outlined briefly as follows:

a) Single aircraft will be unrestricted as to height of approach except insofar as such levels are dictated by the routes chosen. Single aircraft can be expected to take advantage of darkness or total obscurity due to cloud.

b) Formations will similarly be guided as to high or low level attack but should be expected only in daylight, or clear darkness. Formations will take advantage of obscurity due to cloud only if such cover is limitedly available prior to attack.

Use of ECM, use of USAF and SAC aircraft markings, use of English-speaking pilots for reporting ADIZ's and/or airways should be expected.

5. THE WEATHER FACTOR

In the Kola Peninsula area and the area along the Baltic, operations would be rendered difficult by low temperatures in winter and by fog and low ceiling at other seasons. The Soviets are considered to have the ability and the resources to overcome

1. Intelligence Estimate, Air Defense Command, Revised 1 May 1952

these difficulties, at the possible cost of some degree of operational efficiency. During the spring and summer months, which present the worst flying conditions in the Arctic, the number of medium bombers that could be staged through Soviet bases in the Far North might be reduced substantially.

Seasonal weather conditions over the North Atlantic and the Norwegian Sea generally result during the winter months in favorable winds aloft for westerly flight over the latitudes north of the great circle routes from the Kola Peninsula and the Baltic and unfavorable winds directly along the great circle routes from these areas to northeast United States. A special Air Weather Service study of the net wind components over this route indicates that the net wind component during the winter season of the great circle route from the northwest Soviet Union to New York, based on a 10,000 foot flight level, ranges from a 32 knot headwind to a 16 knot tailwind with the median value being a seven knot headwind. During the summer season the median value decreases to a three knot headwind.

In the Chukotski Peninsula area extremely low temperatures prevail in winter. Fog and low ceilings in summer create additional difficulties, which the Soviets can overcome at the probable expense of some decrease in operational efficiency. During the winter months, a pronounced low pressure cell is generally centered over the North Pacific in the area of the Aleutian Islands, bringing with it widespread areas of bad weather and counter-clockwise rotation of the upper air. The normal result is a situation in which the best flying weather and most favorable winds for easterly flight are found at the more northerly latitudes. In general, the winds along the great circle course from the Chukotski Peninsula area to the northeastern United States are favorable for easterly

flight during both winter and summer, ranging from a net wind component value at 10,000 feet of a 12 knot tailwind during the winter to a net wind component of a 9 knot tailwind during the summer. Climbing to an altitude of 20,000 feet for the approach segment would increase the net wind component median value to a 15 knot tailwind. Therefore, bases in northeastern Siberia are the most favorably situated from the point of view of distance to the United States and prevailing winds.

Briefly, weather conditions are favorable to easterly flight from the Chukotski Peninsula area to the northeastern United States through the year, and it is improbable that normal seasonal weather would dictate course deviations. The Soviets are known to have excellent weather reporting facilities in the Siberian area and undoubtedly are capable of making reasonably accurate forecasts of general route weather conditions. The degree to which the Soviets might be influenced by cyclic or seasonal weather considerations in planning their operations cannot be determined on the basis of currently available intelligence, and it is not possible to establish firm conclusions as to the routes which might be followed at a given season.

No intelligence is available concerning Soviet doctrine or concepts for the tactical use of weather conditions. The Soviets might desire to use adverse weather conditions as a possible means of concealment both along the route and in the general area of the target. On the other hand, the need for accurate bombing might influence the Soviets to desire visual bombing conditions for the actual attack.

6. AVAILABILITY OF TARGET DATA

Most of the information necessary for the selection of targets

and target systems in this country and development of the necessary maps and folders is available from public sources. All the navigational charts and radio facility information necessary to navigation in the United States and Canada are for sale to the public by the respective governments. Aerial photographs of large cities and industrial installations are likewise sold publicly or published in magazines and newspapers. Radar scope photographs of some important areas have been published in American magazines. Privately owned aircraft large enough to accommodate the equipment for radar scope photography can move about freely in the United States, and it is possible that this means might be employed to secure additional radar photography. Covert sources in the U.S. armed forces might provide some radar photography.

While it is presumed that at least some of the information gathering measures discussed above are in progress now, there is no direct information which would establish the extent to which any of the above measures are planned or actually in operation.

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APPENDIX "B"

E. Expected Future Capability for Long Range Operations

1. 1953-1955

Through 1955 the chief method of delivery of weapons of mass destruction is likely to remain the aircraft of Long Range Aviation. It is considered that jet-powered aircraft types will receive increasing emphasis. In addition to extending the jet light bomber program into the medium bomber field, it is expected that by mid-1955 the Soviets will have developed a heavy bomber, which will be available in very limited numbers for operational use. However it is expected that the principal vehicle for Soviet long range air operations through 1955 will still be piston-engine bombers, represented by an improved Tu-4.[1]

The heavy bomber is expected to have a radius capability of about 3,500 nautical miles with 10,000 pound bomb load. Jet medium bombers with a maximum speed of 500 knots and combat radius of about 1500 nautical miles may become operational by 1954.

Additional steps designed to improve Soviet capability for two-way air attack against the U.S. should be expected during the period. These steps may include building of additional range into present bomber aircraft, use of aerial refueling techniques, and possibly the adoption of other two-stage methods of strategic attack, such as the use of mother aircraft with parasite aircraft or missiles for carrying out the combat stage of the mission.

Operational use of the controlled gliding or power-driven bomb is possible during the period. Such weapons will have an important effect on tactics, i.e., they would obviate the need for a fairly long and steady bombing run and rigidly maintained heights of run-in to the target.

1. JIC 506/8

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Efforts will be made to improve the accuracy of navigation and bombing by development of electronic devices superior to those now in service. Current effective operational strength is believed to be affected in part by a shortage of qualified personnel, especially technicians. Gradual improvement can be expected and it is likely that these personnel deficiencies will have been eliminated by 1955. Air crew proficiency and standards of maintenance and training will have improved.

Base complexes and facilities will have improved considerably by 1955. Peripheral staging bases probably will have increased in number and efficiency. The improvement of facilities will probably maintain pace with improvement in aircraft types and their increased base requirements.

2. 1955-1957

During this period the development of organizations designed to propound doctrine and train personnel for use in surface-to-surface guided missile programs may begin to affect the priorities and emphases under which Long Range Aviation operates. The subordination of such organizations cannot yet be estimated. However, during the period, Long Range Aviation, probably equipped with the Type-31 turbo-prop heavy bomber or a similar aircraft, armed with pulse jet and rocket propelled missiles in addition to conventional air weapons, probably will remain the core of Soviet capability in long range operations.

Jet heavy bombers may become operational by 1957. The maximum speed of these bombers should be about 450 knots, combat radius approximately 4,000 nautical miles and with an altitude capability of about 47,000 feet.

Perfection and standard utilization of inflight refueling techniques for both piston and jet types probably will be accomplished in the period.

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By 1 July 1957 it is anticipated that Long Range Aviation strength will comprise 300 to 600 medium jet bombers, 800 medium piston and 200/250 heavy bombers.

It is possible that some slight temporary decline in crew proficiency and operational readiness might be experienced during the period caused by the change-over from one weapons and aircraft system to another, but it is unlikely that such temporary loss of readiness would significantly affect Soviet long range air capabilities.

3. 1957-1960

The probable imminence, after 1957, of operational surface-to-surface guided missiles capable of intercontinental flight is likely to affect Long Range Aviation aircraft organizations. The ultimate arrangements for subordination and control of special organizations for guided missiles cannot yet be estimated. However, Soviet preference for developing a diversified attack capability is likely to result in continued development of piloted jet, ramjet and rocket aircraft. It is probable that mass destruction warheads will be carried chiefly by guided missiles with reconnaissance and some missile guidance functions assigned to piloted aircraft.

By 1 July 1960, it is estimated that Long Range Aviation strength may have stabilized with between 750 and 1300 medium jet bombers and 250/300 heavy bombers. Improvements should be anticipated in range, altitude, speed and bombload capabilities.

It is unlikely that operational readiness would be other than temporarily affected by the introduction of new weapons during the period.

Appendix C

Soviet Capabilities for Delivery of Mass Destruction Weapons by Guided Missiles

CONTENTS

APPENDIX "C"

A. Organization for Delivery by Guided Missiles

Nothing is known of special organizations established for the operational use of guided missiles. The delivery of the V-1 type missile, adapted for launching from a submarine, probably is a responsibility of the Soviet Navy. Operational responsibility for utilization of guided missiles in the "controlled gliding or power-driven air-to-surface category" probably has been assigned to the Soviet Air Forces. Operational responsibility for utilization of long range surface-to-surface ballistic missiles, when available, is not known.

APPENDIX "C"

B. Current Status of Soviet Guided Missiles Program

1. KNOWN ACQUISITIONS

At the end of World War II the Soviets had access to five significant classes of missiles:

1) The controlled gravity bomb.

2) The controlled gliding or power-driven air-to-surface missile.

3) The controlled air-to-air missile.

4) The controlled surface-to-air missile.

5) The controlled surface-to-surface missile.

Of these, the controlled gravity bomb was operational by the Germans as the FX-1400, a 3,500 pound controlled bomb. Development stopped on this weapon in 1942. The Soviets obtained all data on the bomb but no samples are known to have been obtained.

In the controlled gliding or power-driven air-to-surface category, the HS 29A-1, a 2,300 pound missile carrying 1,100 pound warhead was operational. The Soviets obtained all development data on this weapon as well as data on later types such as HS-294. No completed units of any air-to-surface missiles are known to have been obtained by the Soviets.

The surface-to-surface missiles — the V-1 and the V-2 — were both used operationally by the Germans during World War II. The V-1, a winged missile with a 1870 lb warhead and powered by a 700 lb thrust pulse jet was operated at about 350 knots. Its range was about 130 n.m. Flight was controlled by a preset mechanism which was in turn controlled by a magnetic compass. The controls were not subject to jamming.

The Soviets obtained all information and a large number of these missiles at the end of World War II. The V-2 (A-4) was a supersonic missile carrying a 2,150 pound warhead. The Soviets obtained parts and material to allow assembly of possibly fifty missiles in addition to data on the development program. In the over-all German missile program the Soviets obtained considerable test and manufacturing facilities as well as engineering and technical personnel.

The Soviets are not known to have obtained any detailed guided missile data from any other country. Sufficient detail on U.S. and British development programs has probably been obtained to give the Soviets at least the trend of development. Detailed development data are not known to have been obtained by the Soviets.

2. KNOWN FIELD OF EXPERIMENTATION

a. V-1

The Soviets have assembled and test launched a limited number of World War II type V-1 missiles. It is apparent that the main interest was in improving this missile. Power plant improvements (increased thrust from 700 to 1,100 pounds) and the fitting of double pulse engines are indicated.

b. V-2

The Soviets made immediate plans at the end of World War II for full exploitation of the German V-2 project. Limited production and testing of V-2 missiles have taken place in the USSR.

c. Original Work

The Soviets are not known to have accomplished any original work in guided missiles. It is known that development work was initiated on a high level after World War II. The extent of any developments are not known.

C. Soviet Guided Missiles

1. CHARACTERISTICS OF PRESENTLY AVAILABLE WEAPONS

a. V-1

The V-1 is a winged missile powered by a 700 pound thrust pulse jet which may have been improved by fitting an 1,100 pound thrust engine, and perhaps the fitting of double pulse engines. Aiming to improve accuracy and reliability, the Soviets may now have achieved 50 percent dispersion in .8 to 1.0 nautical mile radius at ranges from 120 to 200 n.m.

b. V-2

The V-2 is a supersonic missile carrying a 2,150 pound warhead with a range of approximately 600 nautical miles. Developments in the structure, power plant and guidance systems for the missile have been initiated. V-2 airframes of greater length than the German V-2 have been constructed, and a 35-ton thrust rocket engine to replace the 25-ton thrust German engine has been developed. Design work on a 100-120 ton thrust engine has been initiated and, apparently, experimental work was well along on this engine in 1950-51.

c. Guidance Systems

The principles had been established by the Germans for improved accuracy of V-1 and V-2 missiles. The types of guidance involved were the inertial and the improved radio-radar systems for V-2 types and an improved radio system for the V-1. There have been indications of Soviet effort in a celestial navigational system which would be applicable to guided missile flight with ranges considerably in excess of the V-1 and V-2 missiles. The Soviets have conducted development work on the German optical and radar systems for search and track

and on the radio command systems, possibly using decimeter wave lengths.

There is no evidence of further development of the German radio command or fire control guidance, which could be applied principally to air-to-surface missiles. There is, however, evidence of some development work being conducted on the application of television to guided missile control.

2. EXPECTED CHARACTERISTICS OF FUTURE WEAPONS

Certain tentative estimates concerning the probable characteristics of future weapons appear to have value. Indications are that the Soviets are programming long range delivery systems; apparently they will leave no stone unturned to achieve an effective intercontinental capability. If the Soviets have succeeded in developing a 120-ton thrust rocket engine (reports that cannot be accurately assessed have so indicated) the Soviets have achieved a very considerable advantage. Achievement of even larger thrusts would widen this lead.

Such large rockets can be used for the development of intercontinental rockets and aircraft-rocket and submarine-rocket combinations. It can be expected that, some time after 1954, the Soviets could attack targets on the North American continent with weapons operating at supersonic speeds. The U. S. may be trailing the Soviets in the development of some advanced delivery systems.

Lacking information that can be accurately evaluated it is nevertheless possible to construct a working hypothesis on which an estimate of future Soviet long-range delivery systems can be based. When the results of such an hypothesis are compared to U.S. achievements and programming, some general conclusions become apparent. In brief, this hypothesis and comparison indicate:

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	Soviet	U.S.
1954	Type-31 with bombs or pulse jets or rockets	RASCAL system
	Submarine systems	Submarine systems
1954-58	Bomber with missiles	SNARK, NAVAHO II (pilot production) 3 Mach missiles
	Submarine systems	
1956-60	Rockets plus aircraft Double rocket plus aircraft Triple rocket	NAVAHO III (pilot production)
After 1960	No comparative estimate possible	

For comparative purposes the following additional information on the U.S. program is set forth:

	TYPE	SPEED	RANGE	PILOT PRODUCTION
RASCAL	rocket parasite	2M	100	1953-54
SNARK	turbojet plus rocket booster	.9M	5,500	1954
NAVAHO II	2 ramjets plus 2 rocket boosters	2.75M	2,500	1956
NAVAHO III	2 ramjets plus 1 rocket booster	3M	5,500	1959-60
VULCAN-ATLAS	3 stage rocket 200 ton thrust	20M (terminal)	5,500	1960-62 ?

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D. Present Soviet Capabilities for Utilization of Guided Missiles Against the North American Continent

1. AVAILABILITY OF WEAPONS

The V-1 and V-2 type weapons are estimated to be the only missiles presently available to the USSR. Range and performance characteristics have been discussed in a preceding section.

Since the winged pilotless missile offers the best range for its weight and size, a logical development is a turbo-jet powered V-1 winged missile with improved aerodynamic characteristics designed for launching from a submarine. It would have folding wings and the lighter materials would be used in its construction. The fuels used would not present a storage and handling hazard that liquid rocket motor fuels do. The range could be increased to approximately 450 miles and the radio guidance would probably involve the use of beacon radio signals emanating from one or two sister submarines or from buoys dropped near the target. It is possible that a heavy rocket ballistic type trajectory missile could be adapted to submarine launching, however, the only advantage of such a missile is that it is not as vulnerable to defensive measures. Better methods of storage and handling of missiles aboard submarines could be devised.

OGA

The Soviets are considered to have the capability of equipping the submarine launched V-1 type missile with an atomic warhead. The [redacted] However, there is no actual evidence of Soviet development of missile atomic warheads of any type.

2. AVAILABILITY OF LAUNCHING PLATFORMS

A few reports are available indicating Soviet activity in launching

guided missiles from submarines. Most of these reports point to the V-1 type missile as being used. To date, no launching equipment, storage facilities or missiles have actually been sighted on Soviet submarines. Soviet and other foreign and unclassified literature indicates that the Soviets are aware of the various schemes for launching missiles from surfaced and submerged submarines. The V-1 type missile can be launched from a very short ramp, possibly zero-length launchers, by using booster rockets. This makes the launching of missiles from submarines practical. The Soviets have at the present time about 100 oceangoing submarines capable of being converted to this type of operation. It is estimated that, by 1955, the number of such submarines will be about 180 of which 80 per cent would be serviceable and about one-third on station normally at one time. This would make available about 45 submarines for launching attacks at any one time. All of the Soviet and ex-German ocean patrol type submarines are believed to be capable of carrying two V-1's in a topside hangar. By providing access from inside the submarine to inside the hangar, the missiles could be prepared for launching before surfacing. Then the missiles could be launched in approximately ten to fifteen minutes after surfacing.

3. EXPECTED ACCURACY OF DELIVERY

Present guidance can be employed with reasonable accuracy against an area target. The Soviets may now have achieved, with the V-1, 50 per cent dispersion in .8 to 1.0 nautical mile radius at ranges from 120 to 200 n.m. The submarines normal "fixes" would be sufficient for determining the settings prior to launching. Tests have shown that a V-1 type missile can be radio controlled for a distance of about

100 miles even with the launching submarine submerged to periscope depth and several times that depth if additional picket submarines are used to aid in the guidance. The radio control would be subject to jamming and the submarine would be more vulnerable in that it provides a "fix" for the enemy radio equipment, and the radio and radar antenna above water could be spotted during the guidance operation.

4. POTENTIAL TARGET AREA

There are approximately 200 primary targets which contribute significantly to the war-making potential of the United States. Some 50 per cent of these targets are within an area 150 miles inland from the coasts of the United States.

For example, within these coastal areas are 12 airframe plants producing 73 per cent of the total aircraft weight, and 24 aviation gasoline refineries accounting for 72 per cent of the total U. S. production. More than 34,000,000 people live in large population centers along the Atlantic, Pacific and Gulf coasts.

The government control structure of the U. S. also is located within this 150 mile belt. Washington, the seat of political, economic, and military control, is within this range and such principal subsidiary centers of the Federal Government as New York, New Orleans, San Francisco, and Seattle are accessible. Eighteen state capitals are within the 150 mile zone, plus the control centers of the territories of Hawaii and Puerto Rico. The Panama Canal Zone is within range of either Atlantic or Pacific attacks, or a combination of both.

Substantial segments of the U. S. armed forces in-being are contained in military areas along the coasts. Based on strengths

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of 30 June 1951, the number of bases and the per cent of the respective personnel and aircraft of each major ZI air command concerned are presented below:

Command	Number of Bases	Per Cent of Total Personnel	Per Cent of Total Aircraft
SAC	7	38%	54%
ADC	9	37%	34%
TAC	5	53%	55%
ATRC	7	42%	29%
AMC	5	33%	36%

Twenty-five major naval and marine bases are vulnerable to submarine launched guided missile attacks. These include Bremerton, San Diego, Pensacola, Camp Le Jeune, Norfolk, New York, New London and Boston.

A total of 35 major army installations lie within 150 miles of U. S. Coasts. These include such targets as Fort Dix, Aberdeen Proving Ground, Fort Monroe, Fort Bragg, New Orleans Port of Embarkation, Fort Lewis, and the Presidios of Monterey and San Francisco. Numerous headquarters and supporting units of our military mechanism also are within the 150 mile area. For example, the Air Research and Development Command bases at Edwards, California, and Patrick, Florida are vulnerable, as are the MATS Headquarters at Andrews Air Force Base and subsidiary commands at Westover, Massachusetts, West Palm Beach, Florida, and Travis, California.

Appendix D

Soviet Capabilities for Clandestine Delivery of Mass Destruction Weapons Against Targets in North America

CONTENTS

APPENDIX "D"

A. Soviet Delivery Capabilities

1. This phase of the Soviet threat was considered in NIE-31, "Soviet Capabilities for Clandestine Attack Against the U. S. with Weapons of Mass Destruction and the Vulnerability of the U.S. to such attack (mid-1951 to mid-1952)," published 4 September 1951. Conclusions of this study were as follows:

"1. The Soviets have substantial capabilities for the employment of atomic, chemical, and biological weapons for clandestine attack upon the continental U. S.

"2. The U. S. is vulnerable to such clandestine attack because existing and presently planned security measures do not provide adequate assurance that certain methods of clandestine attack would be detected and prevented.

"3. In a clandestine attack on the U. S., the USSR would probably attempt simultaneous delivery of a number of atomic weapons, possibly by several methods.

"a. The most likely method of attack, because the most feasible and potentially most effective, would be the use of disguised Tu-4 aircraft to deliver atomic weapons to a number of targets simultaneously as the initial act of general hostilities.

"b. The delivery of atomic weapons into key harbors by merchant ships is feasible and therefore constitutes a serious threat.

"c. Smuggling of atomic weapons into the U.S. under cover of diplomatic immunity, or in the guise of commercial shipments, or by landing at some secluded spot is also feasible. However, such operations are relatively unlikely because of their complexity and the number of individuals involved.

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"d. The launching of guided missiles with atomic warheads from merchant ships or submarines against near-coastal targets is a possibility.

"4. The only method of clandestine attack with chemical warfare agents likely to be employed by the USSR is the smuggling of limited quantities of nerve gas into the U. S. for dissemination against personnel in key installations.

"5. The USSR might employ biological warfare (BW) agents against personnel in key installations well in advance of D-Day. Attacks against livestock and crops with dangerous diseases like foot-and-mouth disease and cereal rusts are a possibility at any time.

"6. It is believed likely that in clandestine attack the USSR would employ those methods not requiring pre-D-Day preparations in the U. S., since such methods entail the least risk of loss of strategic surprise."

B. Clandestine Use of Weapons

1. EXCERPT FROM NIE-31

"The Soviet Union will have no scruples about the employment of any weapon or tactic which promises success in terms of over-all Soviet objectives. Clandestine attack with atomic, chemical, and biological weapons offers a high potential of effectiveness against a limited number of targets, particularly if employed concurrently with, or just prior to, the initiation of general hostilities. Hence in planning an attack upon the U.S., the USSR would undoubtedly consider clandestine employment of the various weapons of mass destruction available to them. Biological warfare probably, and chemical warfare possibly, could be employed without detection prior to open war. However, it is doubtful whether the USSR would attempt any operations which might be detected and identified sufficiently in advance of H-Hour to cause a significant loss of strategic surprise." [1]

2. DISGUISED BOMBER

Because of its resemblance to the U. S. B-29, the Soviet Tu-4 could be disguised with U. S. markings and employed for clandestine delivery of atomic bombs. Present flight regulations of the Civil Aeronautics Administration and the military services require that both military and civilian aircraft follow a previously filed flight plan and enter the U.S. by specified routes. Aircraft violating these requirements, if detected, are intercepted. A small number of disguised Tu-4's might escape such detection.

3. GUIDED MISSILES

It is estimated that the USSR has V-1 type missiles with ranges of at least 100 miles which could be launched from merchant ships

1. NIE-31

or submarines. Such missiles could operate at low altitudes and could have considerably better accuracy than the German operational missiles of World War II. While there is no conclusive evidence that the USSR has an atomic warhead suitable for use in a ship-launched guided missile, the construction of such a warhead is estimated to be within USSR capabilities. A Soviet vessel could reach its launching position with little chance of detection by maintaining radio silence and avoiding normal shipping lanes. Therefore, this method of clandestine attack appears well suited for employment of atomic weapons against critical near-coastal targets including key harbors.

Appendix E

The Role of Air Campaigns in Soviet Planning and Strategy

CONTENTS

APPENDIX "E"

A. General

No single development in the post-war period has been more charged with significance for the security of the United States than the steps taken by the Soviet Union to build a stockpile of weapons of mass destruction and an air arm capable of delivering them against vital targets in the continental United States.

The significance of this situation stems not only from the existence of Soviet Long Range Aviation as presently trained and equipped, but also from what appear to be Soviet concepts for the use of air power, and what can be deduced as to probable Soviet target selection.

B. Background Beginnings -- World War II

In the Soviet Union, as elsewhere, size and geographic position have been important determinants of military doctrine. The vast land area of the Soviet Union, and -- until the past several years -- the presence on the Eurasian continent of one or more neighbors possessing powerful land armies, have engendered a traditional and deeply established conviction that the primary defense of the Soviet homeland rested with the Army.

Historically, this conviction gave rise to the concept that the primary role of aviation was to furnish support and protection to the Soviet Army. This concept governed the design, organization and employment of the Soviet Air Forces in World War II. Air units were regarded essentially as auxiliaries -- indispensable, just as artillery, to the successful prosecution of a military operation, but nonetheless subordinate to the ground forces they were designed to assist.

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That Soviet air doctrine proved successful in the kind of war the Soviet Union fought in 1941-1945 is a matter of history. While the USAAF and the RAF waged a telling air campaign against Germany from the other side of Europe, the Soviet Union achieved its war objectives without being obliged to develop any arm for such a campaign or to resist one.

The fact remains, however, that the beginnings of a Soviet concept of long range air power made their appearance long before the close of World War II.

The Soviets demonstrated interest in large airplanes and long range flights during the 1930's. They built the L-760, an experimental 8-engine plane in 1934, and in 1937 they set long distance flight records crossing the North Pole from the Soviet Union to California.

Prior to the war the Communists had a small "heavy bomber force," equipped originally with four-engined TB-3's, which were larger than the contemporary American B-17, and twin-engined aircraft. The TB-3 had a range of 1,430 miles with two tons of bombs -- at a cruising speed of 98 miles per hour. Peacetime activities of this "heavy bombing force" were largely concerned with civil transport, but it presumably was intended to operate in wartime as a bomber force and a carrier of airborne troops.

The "TB" series had reached TB-7 by start of World War II. This aircraft, redesignated the PE-8 was the principal -- though ineffective -- Soviet "heavy" bomber throughout the war. Somewhat larger than the B-17 (span 129 feet and length 76 feet, as against the B-17's 104 feet span and 75 feet length), the PE-8's had a maximum speed of 209 knots as against the B-17's 255 knots. Maximum range of the PE-8 was 2,500 miles, and with four metric tons of bombs aboard it still had a 1,250 mile range.

Available evidence indicates, however, that the Germans took a very heavy toll of this force in the early months of the war (many of the losses being on the ground) and that activities of "heavy bomber" units were limited to small scale strikes disconnectedly delivered to meet immediate needs.

This largely ineffective force was reorganized in 1942 into an independent agency known as the Long Range Force (ADD). Its 1942 strength did not exceed 600 aircraft, and its basic equipment was the IL-4, an airplane comparable to the British Wellington and one which is still in service in some Soviet twin-engine units.

By the close of 1944, the Long Range Force had a strength of almost 1,600 aircraft, including considerable numbers of B-25's and A-20's acquired under lend lease. At this time it was redesignated the 18th Air Army and subordinated to the Chief Directorate of the Soviet Air Force.

Throughout this period the Long Range Force and 18th Air Army was commanded by Alexander Golovanov. A colonel when placed in command of the Long Range Force in March 1942, he had risen by August 1944 to the rank of Chief Marshal of Aviation -- comparable to American four-star rank. Golovanov was the only officer other than Alexander Novikov -- who headed the Soviet Air Forces -- to receive that rank.

Actually, however, neither the Long Range Force or its successor, the 18th Air Army, ever functioned in an air campaign.

It was neither designated as, nor had the capabilities of, a bomber force as such was understood by the Western Allies.

In the early phases of the war, a number of attacks were carried out against German towns, but the strikes were delivered

without any observable connection with one another. They were, moreover, without any identifiable strategic purpose, unless it was that of demoralizing the German civil population and producing some degree of industrial dislocation by haphazard night bombing of a city.

The most purposeful series of attacks was made against Finnish cities with an aim to bending Finnish public opinion towards acceptance of Soviet peace terms. This was in 1944, but the attacks were poorly planned and largely ineffectual.

From then on, operations of the 18th Air Army were tied directly to objectives of particular ground offensives. During the last year of the war it was carrying out reasonably effective night operations against targets lying at a distance of 50 to 100 miles in rear of the battle lines. Railway facilities, control points and rolling stock were the principal targets.

No formations were used, and takeoff time determined the interval in the bomber stream. Missions were planned so as to get the bombers across the main defense line as soon as possible after dark. No operations were flown if lengthy flight under conditions of poor visibility would be required and unless there was good night visibility over the target area.

Altitude of attack was always stipulated, and ranged from 1,600 to 6,600 feet for objectives in the main fighting zone and from 10,000 to 16,000 feet in rear areas.

A-20 patrol regiments provided indirect protection by attacking searchlights, antiaircraft installations and night fighter fields, but there was no direct provision for fighter escort.

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It is difficult to assess the value which the Soviet high command itself put on the Long Range Force. The creation and subsequent growth of the Long Range Force evidently indicated a considerable interest in its progress and a high confidence in its ultimate operational effectiveness.

Personnel for the force were picked on a selective basis and there appeared to be expectation that it would emerge as an elite corps. At the same time, however, needs of the air armies for aircraft and equipment were given a higher priority than were the Long Range Force requirements.

There were those who, noting that the Long Range Force was neglected over long periods in favor of the air armies, believe that the prominent position given the long range units in Soviet propaganda was connected with the existence of a worldwide knowledge of the power of the bomber forces of the Western Allies.

In any event, the Long Range Force failed to make an adequate return in terms of operational effectiveness for the labor and attention expended upon it.

Reasons for the low efficiency appear to be many -- and should be noted briefly since they may affect the thinking and planning of officers now attaining key positions in Long Range Aviation.

During the first half of the war the Long Range Force command apparently failed to appreciate either the capabilities or limitations of the force. The ill-conceived and scattered operations which made up the Long Range Force's strategic contribution to the war were a serious dissipation of effort. Many of the tasks attempted were beyond the capacity of the force to perform, no

task was performed thoroughly, and the aggregate effort was of little account. All through the war, operational control was centralized in the operations staff of the Long Range Force at Moscow. Within the operating units themselves, the low level of efficiency resulted from a combination of inadequate training and a lack of the refined equipment which plays such a large part in the execution of modern long range bombing. Even when certain relatively modern equipment did become available it appears that crews were not systematically trained in its use, so that air crews remained incapable of deriving full benefits from their mechanical aids.

Mental limitations of the personnel were one factor in this, for the Long Range Force crews did not measure up to an educational level which, by western standards, could be regarded as adequate. Crews relied on the simple, the well proved and the familiar.

Inefficiency in navigation was, more than any other single air crew factor, responsible for the poor striking power and fighting value of the Long Range Force. Poor navigation was usually the major cause of poor performance and relatively high wastage. There was an extreme reliance on good weather for operations and dead reckoning navigation, but radio bearings were also used. There is no established evidence that any operational aircraft of the Long Range Force were equipped with radar navigational apparatus.

C. Post World War II - The Situation Changes

With the close of World War II two factors almost immediately resulted in increased Soviet attention to the creation of a significant long range air force -- one was a reevaluation of

the strategic situation in which the USSR found itself, and the other was acquisition of a proved long range aircraft in the American B-29.

The crushing of Germany and Japan and the immediate post-war military impotence of Western Europe left the Soviet Union for the first time in modern Russian history unthreatened by formidable land armies. Absorption of Eastern Europe into the Soviet system and the extension of Soviet influence deep into China provided a further buffer which greatly diminished any land threat to Soviet security.

The only formidable contenders remaining upon the international scene were the United States and, to a lesser extent, the British Commonwealth -- neither of them posing great land power threats on the Eurasian continent but possessing, instead, far superior air power, sea power supremacy, and a vital headstart in atomic weapons.

In considering the impact of this change upon the next phase of their struggle for world domination, Soviet planners evidently -- on the basis of limited information and what can be deduced therefrom -- assessed the situation somewhat as follows:

First, no combination of ground armies within sight would be capable of effective offensive action against the Soviet Union, nor could non-Soviet ground forces prevent the armies of the Soviet Union and its satellites from overrunning key areas of Europe, the Middle East and the non-Communist Far East.

Second, American naval power, with or without the assistance of other Western Fleets, could prevent any overwater assault except certain airborne operations, and amphibious assaults across very narrow waters -- such as from Sakhalin Island to Hokkaido, or in sheltered waters -- such as against the Black Sea coast of Turkey.

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Third, the only immediate military threat to the USSR would come from Western air power, at least in the early stages of a major war. Also, Western air power would weigh heavily in the scales against the Soviet Union over the long pull in any global war.

And fourth, while non-military Soviet weapons (subversion, sabotage, politico-psychological assault and so on) were already global in character, Soviet military power still lacked intercontinental reach and capabilities.

The implications of this situation with respect to the postwar development of Soviet air power are fairly obvious.

It is not surprising that the Western world has been witnessing -- insofar as chinks in the Soviet security armor permit -- the development of a broader Soviet concept of the role of air power, involving:

a. Development of a long range air arm which, using atomic bombs and other unconventional weapons, will provide the capability for direct attack against the United States.

b. Development of a defensive interceptor force which, coupled with antiaircraft artillery and other ground defenses, will attempt to provide protection against the air power of the West.

An air force capable of fulfilling such missions as these could not be built without considerable re-arrangement of the air organization, a tremendous amount of work in the design and production of new types of aircraft and equipment, and extensive training of the men who must handle the aircraft and equipment.

On all these counts there is evidence that the Soviets have been exerting great effort.

Further, with the initiative for the next phase of armed struggle largely in their own hands, the Soviets have been free to reformulate their air doctrine and undertake a new air program specifically designed for the tasks which would confront them in a new war.

The fortunes of war gave the Soviet Union a good start toward the development of the post-war long range air force by making available several American B-29's, which were promptly copied and put into operational use.

In the summer and fall of 1944, three U.S. B-29's made wheels-down forced landings in Soviet Far East territory and were immediately interned. A fourth B-29 crash landed in the Soviet Zone of Korea in August 1945.

No information regarding the ultimate disposition of these aircraft was ever received.

The Soviet Union was at that time still a neutral in the war with Japan, and turned a deaf ear to requests that the United States be allowed to repair the aircraft and fly them out.

Cumulative evidence over the next several years definitely established, however, that Soviet acquisition of these aircraft was the starting point for a high priority production program aimed at meeting immediate Soviet requirements for a long range bomber of proved design.

The first tangible evidence of Soviet interest in the B-29 came to light as early as August 1945, when a Soviet Air Force officer who entered the crash-landed aircraft in North Korea demonstrated his intimate knowledge of the plane to the American

crew -- commenting that the position of certain gages had been moved, and making mention of other minor modifications.

German intelligence learned that in March 1945 a new four-engined bomber, designed by Tupolev and designated the Tu-4 was reported to be undergoing flying trials. This new aircraft was to carry a crew of eight and a bombload of 9,000 to 11,000 pounds. What the Germans may have gotten wind of was Soviet testing of the B-29 -- for the Soviet copy was designated the Tu-4.

In 1946 the Soviets attempted to secure license rights for the R-3350 engine which powered the B-29's they had interned, and tried to purchase wheel assemblies for 25 B-29 type aircraft in the United States.

In August 1947, four B-29 type aircraft were photographed by US attaches near Moscow.

While it was then believed the Soviets may already have built copies of the B-29, this could not be definitely established until two more concrete bits of evidence became available in the Fall of 1947.

These consisted respectively of the sighting by US observers of 14 B-29 types at Ramenskoye airfield near Moscow in September, and the sighting of six of these aircraft in flight in October 1947.

From early 1948 on, confirmed sightings of the Soviet B-29 copy multiplied and by April 1950 as many as 64 had been seen in the air in a single formation.

By this time also, other data had made it possible to reconstruct an approximate history of the Tu-4 project indicating that the first prototype had been begun around the middle of 1945 and that the first series aircraft was completed about the middle of 1947.

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The copying and output of a production model of an airplane as complex as the B-29 within a period of approximately 33 months was an industrial achievement which furnishes positive evidence that the project was accorded the very highest priority. Such a priority would not have been granted unless the Soviets already were developing a strategic concept requiring for its execution the utilization of long range bombers.

In view of its characteristics, the B-29 can be considered only an interim long range bomber for Soviet intercontinental use since advance bases of the type utilized by the United States Air Force are not available to the Soviet Union. Over a period of less than five years the Soviets are estimated to have produced in excess of 1,000 Tu-4's, and it is currently estimated that production is continuing at a rate of approximately 20 per month.

D. Soviet Air Theory

Use of atomic weapons in connection with land campaigns may be developed by the Communists along lines similar to those being followed by the United States, but it has been the West -- not the Soviets -- which has been under the imperative to overcome the imbalance of forces on the battlefields of a future war. The imperative under which the Communists are laboring is to develop a military force that will be effective against the "life forces" of their major opponent in the next, not the last, war. Such a force is air-atomic power -- and since there is considerable evidence that the weapons are being forged, so also must concepts and doctrine for their employment be in the process of formation if not already prepared.

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What little concrete information is available concerning Soviet air power theory is derived primarily from World War II operations during which the Soviets had no occasion to develop or employ strategic bombing in the sense that the term is understood in the West. On the evidence provided by a war which the Soviets have already fought, it might appear that Soviet military thinking has been so weighted in the direction of land warfare that no room remains for an air warfare concept. Such a position, however, does not appear logical in the light of the titanic effort which the Soviet Union has put into the development of an atomic bomb industry and the production of aircraft capable of intercontinental delivery of these bombs.

Tukhachevesky, a leading Soviet military theorist as well as top-ranking army commander prior to his purging in 1937, studied the use of the air weapon as an instrument of revolutionary warfare and concluded that utilities and communications were the proper targets, since large scale attacks upon industrial plants would affect the industrial workers, who were considered the "natural allies" of the revolution. His thesis was that as regards the United States, New York, San Francisco and the Panama Canal were the most important targets.

Assessments of Soviet air operations in World War II sometimes overlook the point that the development of air strength and doctrine primarily for participation in land campaigns was a logical -- almost inevitable response to the kind of war the Soviet Union had chosen to fight, and that the Western Allies through their air campaigns against Germany spared the Soviet Union the necessity for correcting its plan.

Even so, the Soviets not only were fairly lavish in the allocation

of high caliber personnel and other advantages to the wartime Long Range Force, but also evidenced a tendency in post-war military literature to magnify, in retrospect, so-called strategic accomplishments of Soviet aviation.

Broadening of the Soviet concept of the mission of air power has resulted in part from the multiple impact of modern technology, the physical evidence of the results of bombing which Communist military leadership observed after the close of World War II, and the physical and political geography of the post-war world, but another major factor also may well have been at work.

This factor stems from the outlook of the handful of men who rule the Soviet Union.

Since World War II, Soviet leadership has shaped its strategy and judged its striking power chiefly in terms of a two-edged weapon, the military force and another edge that might be termed "social fission" -- involving a combination of political pressure, subversive psychological assault, sabotage, and disruption from within.

The military forces chiefly relied upon heretofore has been the Soviet Army, but it is a continental force, and events of the past decade have imposed upon the Kremlin a requirement for a global military arm, an extension of inter-continental dimensions.

"Social fission" -- an old standby in the Soviet armory, has global implications, but an additional global weapon -- modern air power -- is only now being shaped and fitted to the Soviet hand. It needs be recognized that the Soviets can be expected to make coordinated use of this new weapon.

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The pattern of air participation in a future war may well include: first, a general psychological assault, aimed at disrupting unity, purpose, and will to fight; followed next, perhaps, by a deliberately timed diplomatic overture for peaceful settlement of differences; then finally, the implementation of a set of more specific measures of air attack, such as might be made possible by subversion of personnel at a few key points in the radar net, sabotage of aircraft on the ground, and introduction of biological or chemical warfare agents at selected facilities. Weighing the probable combined effect of these measures -- air power applied externally and social fission as the force applied internally, the Soviets might conclude their chances for success were favorable.

In the global terms of the next war, which the Soviets may conclude they must fight on their road to world conquest, they will increasingly depend on a potent organization for conducting air campaigns.

E. Soviet Target Selection

1. MILITARY OBJECTIVES

It is considered that the following are the most likely Soviet objectives: 1) to defend the Soviet Union against attack, including preemptive operations against all Western forces significantly threatening to the Soviet Union; 2) to neutralize or disrupt and isolate the continental strengths of the United States and Canada for an extended period, or until 3) below is accomplished; 3) to establish Soviet control over the Eurasian land mass and to control or neutralize Great Britain and the island chain of the Far East.

In order to accomplish these objectives, the Soviets would have to undertake the following military tasks:

a. Attack the US capability to deliver atomic weapons. The principal means available and that which offers the greatest probability of success is atomic attack by long range aircraft.

b. Attack industrial, political, and logistics targets in the United States and Canada. The principal means available is atomic attack by long range aircraft and the greatest chance of success will lie in the use of this method.

c. Conduct combined operations against the Eurasian continent and the island chains of the United Kingdom and Japan. Action by Soviet ground forces, assisted by air and naval action, is the principal means for accomplishing Soviet military tasks on the Eurasian continent. Air action alone might accomplish Soviet tasks with respect to the United Kingdom and Japan, but air action followed by combined operations and occupation might be essential.

The surest basis for the accomplishment of all Soviet objectives would be the neutralization of the United States as a world power. Even though the Soviets might judge that the initial atomic attack would not achieve neutralization of the United States, they might reason that serious damage to the United States industrial potential would give them time to establish and consolidate a hold on Western Europe and to integrate its industry into a single Eurasian economic system. This would greatly increase the Soviet long term chances of success and confront the United States with the prospect of continuing the war without European allies. The Soviets thus might judge that the best chances of success in Europe would lie in concentrating their atomic attack against the United States.

APPENDIX "E"

On the other hand, if the Soviets concluded they could not significantly retard the United States war effort with the number of bombs available, they might choose to concentrate them on the European allies of the United States in an effort to remove them from the war quickly. This possibility grows more remote as the Soviet atomic bomb stockpile increases and their capabilities for delivering it in the United States improve. When -- and if -- the stockpile and delivery capabilities are sufficient to persuade the Soviets that a successful attack might largely eliminate both the retailiatory capability and the industrial strength of the United States, the likelihood of an atomic attack directed almost exclusively at North America should be greatly increased.

The preeminent position of the United States as a potential target for Soviet atomic attack is additionally supported by the probability that the ultimate Soviet goal goes beyond that of military defeat of the United States in the conventional sense.

The initial Communist aim in such an attack would be to destroy the "life force" of the West -- the organized force which offers the greatest counter-threat to the Soviet Union and is most likely to interfere with accomplishment of their objectives. In the event of war between the USSR and the United States, the "life force" targets in the American system would be, first of all, those forces and installations involved in the atomic delivery capability. With a considerable number of weapons available, this system of targets might be extended to include such related industries as aircraft and heavy armament. Likewise, a sizeable stockpile could enable the Soviets to extend the "life force" attacks to ports, naval bases, and

major logistics installations on both sides of the oceans in an effort to reduce if not destroy the development of any possible overseas extension of such American power as might remain.

Even with destruction of "life force" targets in the United States, it still would be necessary for the Soviets to attack the "links and keys" in order to eliminate the cohesion of American society and make possible the final attainment of Soviet goals.

Achievement of Soviet objectives will involve destruction rather than neutralization or capitulation of the United States. It can be expected the Kremlin will seek to eliminate any American capability to recreate a military threat against the Soviet Union, to destroy the "capitalist" structure of American society, to eliminate those persons who are not considered to be assimilable in a Communist structure, and to create a situation conducive to establishment of an overt or concealed Communist government in the United States.

Soviet target selection in an atomic attack against "links and keys" in American society would involve a variety of combinations, including industrial concentrations, specific industries, transportation facilities, government control centers, and major cities. Principal attention will be focused against what the Soviets considered to be the weakest links in America's social and economic armor -- and the Russian evaluation may well be that American morale and political resolution represent this link. If so, the inflicting of maximum numbers of casualties will be a basic Soviet objective -- an objective made easier of attainment by a large stockpile of atomic weapons.

A willingness to inflict heavy casualties in order to achieve a desired goal has marked past Soviet thinking and practice. The

concept of liquidation of class enemies can be extended to liquidation of a nation, particularly when such liquidation is considered an essential to the establishment of Communist world order. Before a Communist government could be established in the United States a revolutionary situation would have to be created, and the most rapid way in which the Soviets could create such a situation would be to inflict extreme hardship on the American population through atomic attack on cities. Even if the Communists achieved political power in the United States, the combination of the vitality and skills of the people and the nation's industrial structure would make it almost impossible for the Kremlin to control America effectively for any length of time. To avoid the threat of a Titoist super-rebellion started from the United States the Soviet leaders could deliberately plan to destroy the basic elements of American population as well as its industrial foundation and then restructuralize the nation in such a manner that predominance would rest with those who were tractible. Obviously, execution of such a war plan would call for delivery of a large number of atomic weapons against the United States.

2. ESTIMATE OF THE MOST PROBABLE ALLOCATION

It is considered that the most probable allocation of the Soviet stockpile of atomic weapons would be:

1) A quantity of weapons considered sufficient to prevent unacceptable launchings of atomic weapons against the Soviet Union would be allocated against appropriate targets both within and without the North American Continent, probably coincident with the initiation of hostilities in order to capitalize on the combined advantages of initiative and surprise. The number of weapons allotted to this task

would be determined in part by Soviet assessment of the ability of Communist defenses to reduce bomb delivery and their assessment of their capacity to absorb the remainder.

2) From any weapons remaining, the Soviets would allocate such numbers of bombs as they considered necessary to attain the following:

a. Neutralize or destroy the ability of the United States to sustain large-scale military operations in Eurasia.

b. Neutralize or destroy the ability of the United States to develop or produce weapons potentially decisive or stalemating.

c. Neutralize or destroy the political, social, and economic strengths of the United States to the extent that governmental changes or decisions satisfying to the Soviet leadership either would occur or could be brought about through additional pressures available to the Communists. It can be expected this phase of the attack will include an assault against population targets intended to create a maximum number of personal casualties.

3) If any weapons remain, a small quantity would be allocated for use in connection with a psychological-intimidation campaign in Europe and possibly in Japan.

4) If any weapons remain, a quantity would be allocated to force capitulation of the United Kingdom.

5) If any weapons remain, a quantity would be allocated for use in connection with land campaigns should conditions warrant such expenditure. Priority on this type of attack would increase if unacceptable threats to Soviet military forces were created in forward areas.

6) If any weapons remain, a general reserve might be held. It is probable that the allocations in 1) through 5) above would provide for a reserve for reattack or psychological purposes in those cases where it was considered desirable. It is probable that 1) and 2) above would require the expenditure of the major portion of a large stockpile of weapons.

Accordingly, it is considered unlikely that any large number of atomic weapons would be allocated to targets other than those outlined in 1) and 2) above. To state, as a numerical fraction, the number which might be allocated to each target area would imply an accuracy which the limited intelligence of Soviet capabilities, concepts and intentions does not permit.

F. Attack Timing Factors

The theory and strategy developed in the preceding sections leads to an hypothesis that may have value. The case may be stated as follows:

a) The Soviets will exploit to the utmost their highly refined techniques of threat, blackmail and subversion (the role of air-atomic power in this concept has already been outlined). During the time that this offensive has some reasonable chance of success in meeting the Communist desire to weaken the opposition, direct attack on the U.S. will be avoided. In this connection it is likely that from the Soviet point of view the present situation is such as to call for further political rather than direct military action.

b) At some point during this process, it is possible that the Soviets may decide that a massive, direct, surprise attack could abruptly tilt the U.S. into oblivion and give them the rest of the world

by default. The selection of such an hour in world history will depend largely on the ambitions, fears, patience, ignorance and insight of the leaders in the Kremlin.

c) When the threat, intimidation, propaganda, and subversion offensive has reached a stalemate, when the perimeters of the "two camps" forecast by Stalin have been clearly established and completely integrated, the Soviets -- by the tenets of their faith -- will not rest. On the contrary it is probable that when the stalemate can be foreseen by the Soviets as representing an eventual certainty, the chances of overt attack on the U.S. will abruptly increase. From the moment that the trend of allegiances and accretions of world power starts flowing away from the USSR and toward the West, the chances of attack must be carefully re-assessed.

The establishment of secure, stable, potent, Western-oriented regimes in Korea and Indochina; final victory for the West in Malaya and the Philippines; the evolvement of prosperity, contentment and enlightened administration in the Middle East, Africa, India and Burma -- these will be representative of indicators of increased danger. Each of these events -- and U.S. policy intends that they shall eventuate -- will be regarded by the USSR as threatening the security and need to expand of the "socialist" state.

If, within the next several years, American foreign policy succeeds in reversing the trend that has recently given the USSR control of huge populations and land masses; if, during that time, the Soviets succeed in matching, or nearly matching, U.S. intercontinental air-atomic power, the danger of Soviet preemptive air action will be very great. Such a direct, frontal challenge means, finally, military conflict between the centers of power, the homeland of the USSR and the United States itself.