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# SPECIAL NATIONAL INTELLIGENCE ESTIMATE

#13

## SOVIET CAPABILITIES FOR ATTACK ON THE US THROUGH 1957



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CENTRAL INTELLIGENCE AGENCY

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## SOVIET CAPABILITIES FOR ATTACK ON THE US THROUGH 1957

### THE PROBLEM

To estimate the capabilities of the USSR to attack the continental US by open or clandestine means, through 1957.

### SCOPE

This estimate is concerned solely with Soviet gross capabilities for attack on the continental US during the period through 1957. It does not attempt to assess whether the USSR intends to attack the US during that period or what courses of action the USSR would adopt before, along with, or after such an attack. Furthermore, the paper estimates Soviet gross capabilities for attack on the US without references to any commitments of military forces which the USSR might make elsewhere and without reference to any advantages which the USSR might gain for an attack on the US by previously occupying territory that is not now within the Soviet Bloc.

### PART I

#### SOVIET GROSS CAPABILITIES

##### SOVIET MASS DESTRUCTION WEAPONS

###### Nuclear Weapons

1. *General.* The Soviet nuclear energy program will continue through 1957 to have one of the highest priorities in the allocation of Soviet resources. The program, which is continuing to expand, emphasizes weapon development and aims at reducing the relative advantage of the US both in weapon development and production. By the end of 1953 the USSR had established a substantial plutonium production capacity and achieved the production of weapon grade uranium-235. On the basis of data obtained from the 7 Soviet explosions detected to date, we conclude that by the end of 1953 the Soviets had reached a point in weapons technology at

which they were capable of producing weapon types with energy yields ranging from the equivalent of a few thousand tons of TNT up to the equivalent of one million tons of TNT. The numbers of these weapons would be limited by the supply of nuclear materials available rather than by technical limitations.

2. *Weapons Stockpiles.* While there is no clear evidence as to the specific types and the numbers of each type of nuclear weapon that the Soviets will actually stockpile, we believe the weapons stockpiled will probably have the general characteristics and explosive powers of the models already tested. There are many courses of action which the USSR might adopt in establishing its stockpile of nuclear weapons. The tables which follow are based upon four alternative hypothetical examples.

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## STOCKPILE EXAMPLE ONE

(Based on the assumption that the USSR continues stockpiling composite and pure plutonium fission weapons as tested in 1951 and yielding approximately the equivalent of 40,000 tons of TNT each.)

	<u>End</u> 1953	<u>Mid</u> 1954	<u>Mid</u> 1955	<u>Mid</u> 1956	<u>Mid</u> 1957
Unboosted composite plutonium weapons (40,000 tons each)	180	240	390	575	800
Total Yield (Million tons of TNT)	7.2	9.6	15.6	23	32

## STOCKPILE EXAMPLE TWO

(Based on the assumption that the USSR uses all its fissionable material with thermonuclear boosting as tested in 1953 to build a stockpile of plutonium component weapons of medium yield (60,000 tons of TNT) and small yield (5,000 tons of TNT), and uranium-235 weapons yielding one million tons of TNT each.)

	<u>End</u> 1953	<u>Mid</u> 1954	<u>Mid</u> 1955	<u>Mid</u> 1956	<u>Mid</u> 1957
Boosted uranium-235 (1 million tons each)	12	18	34	54	80
Boosted plutonium weapons (60,000 tons each)	60	85	125	175	235
Boosted plutonium weapons (5,000 tons each)	190	250	375	525	700
Total Number of Weapons	262	353	534	754	1,015
Total Yield (Million tons of TNT)	16.5	24.3	43.4	65.6	97.5

## STOCKPILE EXAMPLE THREE

(Based on the assumption that the USSR uses all its fissionable material to build a stockpile of large yield boosted weapons, e.g., uranium-235 weapons yielding the equivalent of one million tons of TNT each, and pure plutonium weapons yielding the equivalent of 60,000 tons of TNT each.)

	<u>End</u> 1953	<u>Mid</u> 1954	<u>Mid</u> 1955	<u>Mid</u> 1956	<u>Mid</u> 1957
Boosted uranium-235 weapons (1 million tons each)	12	18	34	54	80
Boosted plutonium weapons (60,000 tons each)	120	170	250	350	470
Total Number of Weapons	132	188	284	404	550
Total Yield (Million tons TNT)	19	28	49	75	108

## STOCKPILE EXAMPLE FOUR

(Based on the assumption that the USSR uses all its fissionable material to build a stockpile of small yield boosted weapons, e.g., composite and pure plutonium weapons yielding the equivalent of 5,000 tons of TNT each.)

	<u>End</u> 1953	<u>Mid</u> 1954	<u>Mid</u> 1955	<u>Mid</u> 1956	<u>Mid</u> 1957
Boosted composite pure plutonium weapons (5,000 tons each)	550	725	1,175	1,725	2,400
Total Yield (Million tons TNT)	2.8	3.6	5.9	8.6	12

3. *Margin of Error in Estimate.* While the figures given in the tables above represent the most probable estimates for the examples presented, the actual figures for weapons stockpiled at the end of 1953 may be as much as one-third lower or higher than those given. The uncertainty as to amounts of fissionable material produced increases proportionately as estimates are projected into the future. Thus the actual figures for 1957 may be as low as one-half or as high as twice the figures given in the tables above.

4. *Future Developments.* The USSR will probably continue work on small-yield and small-dimension weapons, and further developments of this type of weapon could be tested during 1954. The possibility cannot be excluded that the USSR will develop nuclear warheads for weapons other than bombs during the period of this estimate. The USSR will probably also continue work on developing weapons with energy yields in excess of a million tons of TNT. This program possibly could result in a prototype weapon by 1957. If this research is successful and as a consequence the USSR develops weapons in which thermonuclear reactions contribute directly a major portion of the energy yield, the energy yield of a portion of the Soviet weapon stockpile could be multiplied by a factor of approximately five without any increase in fissionable material production or in numbers of weapons. It is improbable, however, that conversion of weapons in stockpile in this way will take place on a substantial scale during the period of this estimate.

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### *5.1.2* Radiological Weapons

5. It is most unlikely, for technological reasons, that the USSR will have the capability to produce militarily significant quantities of radiological warfare agents during the period of this estimate. However, the USSR will have available small quantities of gross or separated fission products which might be employed as RW agents.

### Biological Warfare

6. The Soviet Union is in possession of all the necessary basic knowledge for the production of most BW agents. If they chose to do so, they would be able to construct or operate plants for BW production and weapons for dissemination could be available in adequate numbers. However, there is no evidence at present that such weapons are being developed. Since it is not feasible to stockpile large quantities of most BW agents in prolonged storage, operational requirements would have to be supplied largely from current production.

### Chemical Warfare

7. The USSR can probably engage in chemical warfare on a large scale. We assume that the stockpile of standard agents and munitions accumulated during World War II has been maintained and will be available for use during the period of this estimate. The USSR has the facilities and scientific knowledge necessary to produce at least one of the nerve gases, and could employ nerve gases during the period of this estimate.

### DELIVERY OF CONVENTIONAL AND MASS DESTRUCTION WEAPONS BY AIRCRAFT

#### Long-Range Aviation

8. *The TU-4.* Soviet Long-Range Aviation constitutes the long-range striking force of the USSR. It consists of 3 Air Armies, 1 in the Far East and 2 in the western USSR, plus 1 corps of undetermined subordination in the western USSR. The TU-4 medium bomber, which was copied from the American B-29, is the only Soviet bomber known to be in opera-

tional use and capable of carrying nuclear weapons to distant targets. As of 1 January 1954 a total of about 1,000 TU-4's was estimated to be available in operational units. (Table of Equipment strength of Soviet air regiments known to be equipped with or in process of being equipped with TU-4 aircraft totals 1,220 aircraft, but the TU-4 regiments are currently estimated to be at only about 85 percent of T/E strength.) As of 1 January 1954 approximately 180 TU-4's (six regiments with an aggregate T/E strength of 220) were located in the Far East. It is believed that deliveries of TU-4's to operational units are continuing.

9. *Turboprop Heavy Bomber.* We have very little information on Soviet development work on new types of medium or heavy bombers. No medium or heavy bomber other than the TU-4 is known to be in series production in the Soviet Union. At the Moscow Air Show in 1951 a single four-engine aircraft considerably larger than the TU-4 was observed in flight and was designated by Allied intelligence as the Type-31. In mid-1953, 7 distinctive aircraft, with tails reported as being approximately 5 feet higher than the TU-4, were seen on the ground by competent observers. This and other information (including the sighting at Kazan Aircraft Factory of 5 aircraft reported larger than the TU-4) suggest that a bomber larger than the TU-4 may have entered series production in 1953. This aircraft could be a heavy bomber similar to the Type-31 and it could be powered by turboprop engines. The status of Soviet production of turboprop engines is unknown, but the USSR has developed and tested a prototype turboprop engine based on the design of the German JUMO-022.

10. *Jet Heavy Bomber.* Part of the configuration of a single new large aircraft with a swept-back vertical tail was observed at a Soviet experimental establishment in mid-1953 and designated by Allied intelligence as the Type-37. The aircraft appeared to be larger than the US B-47 medium jet bomber and could fall within the heavy or near-heavy bomber category.

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11. *Jet Medium Bomber.* Based on known development work stemming from German projects in the medium jet bomber field, it is estimated that a few Soviet bombers of this class will appear in operational units by mid-1955. There is no indication that it is at present in production.

12. *Summary Table.* The following table of estimated strength and composition of the bomber force of Soviet Long-Range Aviation is based on the assumptions:

- a. that series production of a heavy bomber with turboprop engines began in April 1953;
- b. that series production of a medium jet bomber will begin in 1954; and
- c. that series production of a heavy jet bomber will begin in 1956.

#### ESTIMATED STRENGTH IN OPERATIONAL UNITS

	<u>January 1954</u>	<u>End 1957</u>
Medium Bomber		
Piston (TU-4)	1,000	475
Jet	....	325
Heavy Bomber		
Turboprop (possibly a few)	500 <sup>1</sup>	(about 200 of these might have improved 7,000 ESHP engines)
Jet	....	(a few)
<b>TOTAL</b>	<b>1,000</b>	<b>1,300</b>

#### Aircraft Characteristics

13. *The TU-4.* The TU-4, under normal operating conditions, is estimated to have a combat radius of 1,700 nautical miles and a combat range of 3,100 nautical miles with a 10,000 pound bomb load. Under cruise control conditions necessary to reach distant target areas, its speed would be approximately 175 knots at an altitude of about 10,000 feet. However, it is capable of attaining a maximum speed of 350 knots at about 30,000 feet for short intervals. Although there is

<sup>1</sup>Should the USSR be able to shorten the period necessary to produce a long-range jet bomber, the USSR might not produce a turboprop long-range aircraft in this quantity.

no intelligence to indicate that it has done so, the USSR is considered capable of modifying the TU-4 to increase its range in the same manner that the American B-29A was stripped to produce the B-29B. This modification involves removal of defensive armament, except for the tail turret, and increase in the fuel capacity, with a net weight reduction of 2,600 pounds in take-off weight. So modified, a TU-4 would have markedly reduced defense capabilities against interceptor attack, but its combat radius would be increased to 2,150 nautical miles and its combat range to 4,000 miles carrying a 10,000 pound bomb load.

14. *Turboprop Heavy Bomber.* Assuming installation of a turboprop engine, a heavy bomber of the Type-31 class could have a combat radius of 2,500 nautical miles and a combat range of 4,800 miles, with combat speeds up to 325 knots at an altitude of 35,000 feet. By the end of 1957 technical modifications and improvements, particularly in the engines, on such a heavy bomber might permit a combat radius of 3,000 nautical miles, and a combat range of 5,600 nautical miles, with combat speeds up to 360 knots at an altitude of 35,000 feet.

15. *Jet Heavy Bomber.* Available information on the Soviet jet engine program is not adequate to determine when a Soviet engine suitable for use in a jet heavy bomber may be available. Based on an assumption of installation of a 10,000 pound thrust power plant believed to be under development, a jet heavy bomber could have a maximum speed of 450 knots at 40,000 feet, a combat ceiling of 44,000 feet; a combat radius of 2,500 nautical miles, and a combat range of 4,800 nautical miles with a 10,000 pound load.

16. *Jet Medium Bomber.* It is estimated that the jet medium bomber which the USSR could have operational by mid-1955 could have a combat radius of 1,500 and a combat range of 2,900 nautical miles carrying a 10,000 pound bomb load. A Soviet jet medium bomber having these characteristics could reach targets in the United States only from the Chukotski base area. On a one-way mission it could

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reach targets north of an arc drawn through Los Angeles, Denver, and Minneapolis. On a two-way mission with inflight refueling it could just reach Seattle.

17. *Inflight Refueling.* No intelligence is available concerning Soviet inflight refueling capabilities. However, inflight refueling techniques do not impose serious technical problems, and the USSR has had access to the techniques and equipment employed by the US in this field. It is therefore necessary to consider the effect of inflight refueling in extending the range of Soviet bomber aircraft. A fleet of tanker aircraft, and appreciable training in their operational use, would be necessary before two-way missions on a large scale could be conducted. The establishment of tanker units would require the conversion of TU-4's or production of new tanker aircraft. With one refueling the combat radius of the USSR's long-range aircraft, with a 10,000 pound load, could be increased as shown in the following table.

18. *Summary Table.* The estimated 1957 maximum performance characteristics of Soviet long-range aircraft are summarized in the following table:

Type	Combat Rad./ Range (n.m.)	Max Spd/Alt 10,000 lb. load (kn/ft)	Combat Ceiling (feet)
<b>Medium Bombers</b>			
(1) TU-4	1,700/3,100	350/30,000	36,500
TU-4 (Modified)	2,150/4,000	360/30,000	37,500
TU-4 (Modified, with one refueling)	3,000/5,800	.....	.....
(2) Jet Med Bomber (with one refueling)	1,500/2,900	500/30,000	48,000
	2,100 radius	.....	.....
<b>Heavy Bombers</b>			
(1) Type-31 class (with 5,600 ESHF turbo- props)	2,500/4,800	325/35,000	38,000
(with one refueling)	3,500 radius	.....	.....
Type-31 class (with 7,000 ESHF turbo- props)	3,000/5,600	360/35,000	38,000

Type	Combat Rad./ Range (n.m.)	Max Spd/Alt 10,000 lb. load (kn/ft)	Combat Ceiling (feet)
(with one refueling)	4,200 radius	.....	.....
(2) Jet Heavy Bomber (with one refueling)	2,500/4,800	450/40,000	44,000
	3,500 radius	.....	.....

It should be noted that the performance characteristics given for all aircraft are based on calculations which in turn depend on assumptions.

#### **Base Areas for Direct Air Attack on the US**

19. *General.* Three base areas, the Chukotski area in northeast Siberia, the Kola area in northwest USSR, and Soviet and Soviet-controlled territory along the Baltic and in Eastern Germany, are the closest to the United States.<sup>2</sup> The Chukotski and Kola areas are particularly advantageous as bases for surprise attacks since great circle routes would avoid initial overflight of nations friendly to the US. The extension of bomber ranges by the end of 1957 will not be great enough to allow the enemy to dispense with these areas if important targets in the whole of the United States are to be reached on other than one-way missions. It is therefore reasonable to suppose that at least until the end of the period of this estimate any large-scale attacks would involve the use of these areas. From any of these base areas the stripped-down TU-4 with one inflight refueling, and the Type-31 class and the jet heavy bomber, on one-way missions, could reach any target in the US. TU-4's having the 5,600 nautical mile range, and the Type-31 class could also operate from bases in the interior of the Soviet Union on one-way missions against the US.

20. *Chukotski Area.* Of the three base areas mentioned, the Chukotski area is nearest to the United States. The standard TU-4 on a two-way mission (with no inflight refueling) could not reach the United States. On a one-

<sup>2</sup> See Appendix A for maps depicting Soviet long-range bomber capabilities for attack on the continental United States from these bases.

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way mission it could reach targets within an arc drawn from San Diego to Lake Superior. The stripped-down TU-4 on a two-way mission could reach Seattle without inflight refueling. With outbound inflight refueling on a two-way mission, this type of aircraft could reach targets within an arc drawn from San Diego through Lake Superior. A one-way mission, without inflight refueling, would permit the stripped-down TU-4 to reach targets in all parts of the United States except Florida from the Chukotski base area. By 1956 the improved Soviet Type-31 class turboprop heavy bomber, operating from the Chukotski area on a two-way basis with inflight refueling, could reach targets anywhere in the US, and without refueling could reach targets north and west of an arc drawn from San Diego through Lake Superior. The jet heavy bomber operating from the Chukotski area on a two-way mission with inflight refueling, could reach targets north and west of an arc drawn through Dallas, Cincinnati, and Pittsburgh, and without refueling, could reach targets north of an arc drawn through San Francisco, Ogden, and Bismarck.

21. *Operational Conditions in the Chukotski Area.* Long-range air operations from the Chukotski area would encounter many difficulties because of basic logistic limitations and adverse climatic conditions. Logistically the area is served principally by sea-lift limited to the ice-free months of the year. Moreover, there are no known airfields which could be used for sustained operations from the Chukotski area, although it is estimated that the area contains four airfields capable of supporting limited medium bomber staging operations. There are additional airfields which could be improved to support long-range bomber operations. It is also possible that frozen surfaces might be employed during the Arctic winter to provide staging air strips or assembly parking areas.

22. *Kola and Baltic-East German Areas.* TU-4 aircraft sortied from the Kola and Baltic-East German areas could not reach the United States (except the northern tip of Maine) and return to their bases, even with one outbound refueling. From the Kola area, a stripped-down TU-4 on a one-way mission (range 4,000

nautical miles), could reach targets roughly north and east of a line from Charleston, South Carolina, through southern Oregon. From the Baltic area, such a range would enable TU-4's to attack targets north and east of an arc drawn from Charleston, South Carolina, through Montana. All of the northeastern industrial centers of the United States could be reached from either area. The Type-31 class heavy bomber, on two-way missions without refueling from either the Kola or the Baltic area, could only reach the northern tip of Maine. On two-way missions with one inflight refueling, the Type-31 class, operating from the Kola or Baltic areas, could reach targets in all of the US north of an arc drawn from Charleston, South Carolina, through Minneapolis. A jet large bomber operating from these areas could not reach the United States on two-way missions without refueling, but with one inflight refueling could reach the New England area.

23. *Operational Conditions in Kola and Baltic-East German Areas.* There are 2 airfields estimated to be capable of supporting medium and heavy bomber operations for at least a limited period from this area. In addition, there are 7 airfields of 4,000 feet or more in length, some of which could probably be improved and extended to support long-range bomber operations. Both Alakurtti and Murmansk-Vayenga are favorably situated logistically, and great circle routes from this area would avoid initial overflight of nations friendly to the United States. The Baltic-East German area has adequate bases to support large numbers of medium and heavy bombers. The Leningrad area contains at least 4 airfields which are presently suitable for long-range operations. Improvements of other airfields in the area could provide additional facilities during the period. The area including Poland and the Soviet Zone of Germany has at least 40 airfields that could be used for long-range bomber operations. These bases are favorably situated with respect to communications and weather and are adequately served by existing transportation facilities. A major disadvantage is that great circle routes to the United States from these

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bases pass over portions of Western Europe off Scandinavia, and any attempted air strike might be detected early enough to provide warning.

**24. Targeting and Bombing Accuracy.** Soviet long-range aviation has available through open sources virtually complete target and navigation data on North America and approach routes. It is even probable that in the event of a surprise attack, certain Western electronic navigational aids would be available, at least during part of the flight. Similarly, meteorological reports, including profile data at all altitudes, are regularly broadcast in the United States and Canada in simple cipher. We estimate the Soviet blind-bombing and navigational radar equipment is capable of at least equal or better performance than the US World War II equipment which the USSR acquired. It is also possible that clandestinely placed navigational beacons may be used for aircraft homing. The current Soviet training program points to continuing improvement in air crew proficiency. In view of these factors and Soviet ability to select a time of attack with respect to favorable route and target weather conditions, there can be little doubt that Soviet air crews would have the ability to navigate with sufficient accuracy to reach the major population and industrial centers of the United States and to achieve bombing accuracy, by either visual or radar means, generally within the effective radius of the weapons available, although the effectiveness of attack delivered by radar alone could be materially reduced by defensive electronic countermeasures.

**25. Availability, Abort Rate, Replacement Factor.** Maintenance of Soviet aircraft, although below US standards, has improved since World War II and is considered adequate. By the end of 1957 the Soviets should be capable of achieving in the forward staging areas a serviceability rate of 85 percent for an initial, deliberately prepared surprise attack against North America. The sustained serviceability rate for bombers is estimated at about 40 percent for normal operations. Cold weather operations might cause some reduction in the

foregoing figures. In addition, we estimate that up to 20 to 25 percent of the aircraft taking off would fail to reach target areas for reasons other than our air defense activity. In view of the fact that most US target areas could be reached only by one-way missions or on two-way flights employing range extension techniques, aircraft losses would be high. No appreciable reserves of TU-4's are believed to exist at the present time. If a tanker fleet is created, or TU-4's are converted for other special purposes, appreciable numbers of TU-4's, phased out of operational bomber units during the period of this estimate, would probably not be available as a reserve. There will be no appreciable reserves of any new types of aircraft introduced during the period of this estimate.

**26. Weather.** The USSR has consistently devoted considerable emphasis to both short and long period meteorological forecasting. Special techniques for upper air research and improved synoptic methods are being developed for use in weather forecasting for periods longer than one month, although we cannot estimate the degree of success which will be achieved during the period of this estimate. By 1955 it is believed that the USSR will have achieved a short period prediction capability in at least the European USSR of 85 percent reliability as compared with the present reliability of 60 percent. This prediction capability plus extensive experience in meteorological research in the extreme northern latitudes, good weather reporting facilities in Siberia, availability of records of weather conditions which have prevailed throughout North America for many years, and constant access to current North American weather conditions and forecasts should enable the USSR to predict both route and target weather with reasonable accuracy.

**27. Electronic Countermeasures.** The USSR has had access to a wide variety of US defensive radar and to some US jamming equipment. The USSR is apparently well aware of the tactical advantage to be gained by jamming defensive radar and other communications. We believe that the USSR is now technically capable of producing limited quantities

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of ground based and airborne jamming equipment to cover frequencies through 10,000 megacycles, and that the USSR can seriously disrupt long-range radio communications between the continental US and its overseas facilities. We further believe that the USSR will increase the effectiveness of its jamming equipment as well as the proficiency and number of its trained personnel throughout the period of this estimate. Airborne countermeasures are likely to be available for use against defensive radars and ground/air fighter control communications in use at the present time for the defense of North America. The effectiveness of the future countermeasures will depend on the degree of success obtained from Soviet analysis of signal radiations and from other means of obtaining technical data on the defense radar that will then be in use. It is believed probable that the USSR has produced sufficient electronic countermeasures devices to equip some TU-4 aircraft. It is not known whether Soviet TU-4's have in fact been equipped with such jamming equipment, or how effective those devices would be against US defensive radar. Use of effective jamming equipment probably would require the employment of extra aircraft equipped specially for this purpose.

<sup>m-3</sup> 28. Estimated Scale of Air Attack in 1954.<sup>3</sup> Soviet gross capabilities for air attack on targets in the continental United States are presently limited by dependence on the TU-4 bomber, by the apparent lack of a developed inflight refueling capability, and by the relatively undeveloped character of the Chukotski and Kola base areas. Nevertheless, it is estimated that the USSR, by a maximum effort, could launch approximately 300 aircraft from the Chukotski and Kola areas in a surprise attack against the United States. If the bulk of these aircraft were committed to one-way unrefueled missions, approximately 250 might reach target areas, not considering combat losses. If, however, approximately 50 aircraft were refueled inflight, requiring the use as tankers of 65 of the aircraft launched, the number reaching target areas might be approximately 200, not considering combat losses. Some of these aircraft reaching the target probably would not be bomb carriers,

since a number would be used for electronic countermeasures, escort, or diversionary tasks.

<sup>m-2</sup> 29. Estimated Scale of Air Attack in 1957. The Soviets could, by a major effort, have sufficient facilities to launch a maximum of approximately 1,000 aircraft in an initial air operation against the US by the end of 1957, if their entire heavy and medium bomber force were employed. The number of mission aircraft in this total would vary considerably, depending on the types of missions employed. If a combination of missions designed to achieve optimum weight of attack with recovery of a sizable part of the attacking force were employed, approximately 550 aircraft could be mission aircraft with approximately 450 used as tankers. (This is a maximum capability under the stated conditions. Its exercise would involve very difficult operational and logistical problems, particularly those pertaining to the creation of a tanker

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\* The Director of Naval Intelligence and the Assistant Chief of Staff, G-2, Department of the Army, feel that available intelligence on over-all Soviet capabilities for long-range air attack is insufficient to warrant a finite estimate of the number of aircraft which might arrive over target areas in the US in 1954. They therefore believe that paragraph 28 should read as follows:

Soviet gross capabilities for air attack on targets in the continental United States are presently limited by dependence on the TU-4 bomber, by the apparent lack of a developed inflight refueling capability, and by the relatively undeveloped character of the Chukotski and Kola base areas. The Soviets have sufficient TU-4's to attempt the delivery of all or a substantial part of their atomic stockpile (the number depending upon types of weapons stockpiled) against the United States from bases in Soviet-controlled territory. This capability is dependent upon their willingness to accept the loss on one-way missions of a substantial portion of their long-range aircraft and to risk the loss of surprise for a portion of the attacking force by launching an attack from Baltic-East German bases, and upon their employment of range extension techniques. Such an attack might be launched without detection, although aircraft launched from European bases would in all probability be detected while transiting non-Soviet territory. Some of the aircraft reaching target areas probably would not be bomb carriers since a number would be used for electronic countermeasures, escort, or diversionary tasks.

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fleet and the training of both tanker and mission aircrews.) Of these 550 mission aircraft approximately 450 could arrive over target areas, not considering combat losses. If the USSR should decide not to create a tanker fleet, and to commit the bulk of its forces to one-way unrefueled missions, it is estimated that the magnitude of the attack might be on the order of 700 aircraft reaching target areas, not considering opposition or combat losses. Some of these aircraft reaching the target areas probably would not be bomb carriers, since a number would be used, as in 1954, for electronic countermeasures, escort, or diversionary tasks.

#### DELIVERY OF CONVENTIONAL AND MASS DESTRUCTION WEAPONS BY OTHER MEANS

##### Guided Missiles

30. *General.* There is no positive information that the USSR now has any guided missiles in series production. It is known that the USSR has been conducting an intensive research and development program, and has made certain developmental improvements on the V-1 and V-2 type weapons, which were used operationally by the Germans during World War II.

31. *V-1 Characteristics.* The USSR has continued development on the V-1 missile. A single pulse-jet version could carry a 2,000 pound warhead to a range of 210 nautical miles at a speed of 370 knots. A twin pulse-jet version has been developed which could carry a warhead up to 4,500 pounds for shorter distances. There is no positive evidence of Soviet experimentation in the field of submarine-launched guided missiles; however, it is estimated that the Soviet Union could equip a number of submarines for the launching of V-1 type missiles. It is probable that such missiles could be given some guidance up to a range of about 200 nautical miles, although accuracy limitations would probably preclude general use against other than area targets.

32. *V-2 Characteristics.* The USSR has carried forward the development of the German V-2 type ballistic missile. This missile, however, could not be a threat against the continental US during the period of this estimate.

#### CLANDESTINE DELIVERY

##### <sup>9</sup>Nuclear Weapons

33. *General.* The USSR is capable of producing nuclear weapons which could be smuggled into the US either as complete assemblies or as component parts or subassemblies. The assembled devices could range from small-yield weapons (equivalent of 5,000 tons of TNT or less) weighing a few hundred pounds to larger-yield weapons (possibly up to the equivalent of 1,000,000 tons of TNT) weighing several thousand pounds. Their size could range from that of a package small enough to fit into the luggage compartment of an automobile to that of a packing case large enough to contain an automobile. All of these weapons could be designed to break down into a number of relatively simple and readily transportable components. Those designed to give a relatively low yield would not require much labor or technical training assemble. Somewhat more labor and training would be required to assemble weapons designed to give high yields, and, once assembled, they would be more difficult to transport. It is conceivable that only the fissionable material, in small pieces, need be smuggled into the US, since other components could be fabricated or procured in this country. This scheme, however, would require careful advance planning and coordination by supervisory personnel with engineering skill and familiarity with the US sources of needed components, and would take a longer time to carry out. It would probably result in a reduced yield for a given amount of fissionable material. It would incur a substantially greater security risk than the clandestine introduction of all components.

34. *Methods of Delivery.* A variety of methods of clandestine delivery suggest themselves. Assembled weapons could be dropped by apparently friendly aircraft, could be detonated in the hold of a merchant ship, or could be sown as underwater mines. Either components or assembled weapons could be brought in under diplomatic immunity, smuggled across land or sea frontiers, introduced through normal import channels, or brought

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in as bonded merchandise awaiting transshipment. The selection of the method of introduction and of transport and assembly within the US would depend on the Soviet objective and the risk of detection which the USSR was willing to accept.

35. *Security Considerations.* Considering the known limitations of the means of physical detection, it is probable that the USSR could introduce into the US and detonate in place a considerable number of nuclear weapons by clandestine means. However, the USSR would have to take into account not only the estimated chances of detection, but also the consequences of possible detection in forfeiting the element of surprise in any intended overt attack and in provoking US counteraction. As the number of weapons clandestinely introduced was increased, the risk of compromise would increase. This increased risk would be less a function of US capabilities for physical detection than of the scope and complexity of the clandestine operations, particularly insofar as larger numbers of Soviet agents became involved. Considering the consequences of a breach of security, the USSR would probably be unwilling to risk the use of even selected and trained agents in such numbers as would be involved in a clandestine attack on a scale comparable to that which might be delivered overtly by aircraft. We conclude, therefore, that, although clandestine attack with atomic weapons might occur against specially selected targets as a supplement to overt delivery by air, such an attack, on a scale comparable to that which might be delivered overtly by air, would probably be precluded by security considerations.

36. *Lack of Evidence on Clandestine Delivery Plans.* We have no evidence to indicate whether or not the USSR has actually made any plans or preparations for the clandestine delivery of nuclear weapons.

#### **Biological Weapons**

37. Some BW agents are peculiarly adaptable to clandestine introduction. The introduction of small amounts of BW agents would be difficult to detect or identify as to source, but

Soviet operatives would be required for their dissemination. A large number of people would be required for extensive dissemination of BW agents, and Soviet security considerations would be a limiting factor in the scale and timing of such an attack.

#### **Chemical Weapons**

38. CW agents are not easily adaptable to clandestine use. In addition to the limitations noted above as applicable to BW attack, CW agents are easily identifiable by their immediate effects and it probably would not be feasible to build up sufficient supplies or to procure the means clandestinely for their dissemination against large population centers. The most practicable use would be against personnel in key installations, but even this would be difficult. We have no evidence to indicate whether or not the USSR is developing the means for the clandestine delivery of chemical weapons.

### **ATTACK ON THE US WITH CONVENTIONAL NAVAL AND AIRBORNE FORCES**

#### **Conventional Naval Attack**

39. The submarine force of the USSR could, at least in the initial phases of an attack, inflict serious damage on US overseas communications and carry out offensive mining in the shipping approaches to US harbors, in addition to its potential for delivery of mass destruction weapons. It is expected that during the period of this estimate the submarine forces will be enlarged and strengthened by the addition of additional numbers of improved ocean patrol types, by the progressive modernization of existing types (including installation of snorkel), and by the possible adaptation of submarines to missile launching. The capabilities of surface naval forces for attack on the US are low. The Soviet surface fleet is geographically divided, lacks advance bases, and does not possess a shipborne air arm. Sporadic raider operations are possible, but the surface fleet in general, lacking aircraft carriers and long-range amphibious types, is unsuitable for transoceanic naval or amphibious attack on any significant scale.

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## Airborne Attack

40. Soviet capabilities for airborne attack upon the continental US (except Alaska) are also very limited. Attacks would require the use of TU-4's adapted for troop-carrying service and operating at the same ranges and un-

der the same conditions as the TU-4 bomber. We have no evidence to indicate whether or not the USSR had made any plans for the dropping of airborne forces in the US, but the USSR could, if it chose, drop small specially trained assault and sabotage forces for attack upon important but difficult bombing targets.

## PART II

CERTAIN FACTORS AFFECTING SOVIET EMPLOYMENT  
OF THE FOREGOING CAPABILITIES ASSUMING  
A SOVIET DECISION TO ATTACK THE US

41. The Soviet rulers would expect a direct attack on the United States to precipitate general war. In such a war the Soviet rulers would expect to have an initial preponderance of military power on the Eurasian continent, but in their attack upon the continental US would be concerned to prevent: (a) US air attack on the Soviet Union with nuclear weapons; (b) mobilization of the superior war potential of the Western allies, particularly that of the United States; and (c) US reinforcement of anti-Soviet forces in Eurasia.

42. The Soviet rulers have demonstrated their sensitivity to the danger of US air attack with nuclear weapons by the high priority which they have given to the development of defenses against such an attack. Despite the substantial progress already achieved in building up their defenses, it is unlikely that they would regard their defensive capabilities as adequate to prevent substantial numbers of attacking aircraft from reaching strategic targets in the USSR. It is likely, therefore, that in initiating nuclear warfare the USSR would be concerned: (a) swiftly to destroy or cripple US capabilities for retaliation in kind; (b) to deliver such an attack on industrial and psychological targets in the United States as would prevent, or at least hinder, the mobilization of the US war potential; and (c) to retain the means to counter any US reinforcement of Europe. Moreover, in any attack on the United States it is considered almost certain that some portion of the nuclear

stockpile would be employed against other objectives outside the continental limits of the United States, or retained against other contingencies.

43. As among the available forces and weapons for attacking the continental US, the USSR's highest capability lies in open military attack with nuclear weapons delivered by long-range aircraft, for the following reasons:

a. the limited capabilities of conventional naval forces and airborne forces;

b. the security difficulties inherent in the delivery of comparable numbers of nuclear weapons by clandestine means;

c. the insufficient development of other methods of delivery of nuclear weapons on a large scale; and

d. the insufficient development of other mass destruction weapons, or handicaps in their large-scale use.

44. The Soviet rulers might, however, employ other methods of attacking the US concurrently with or immediately following an open and direct nuclear attack. In the cases of guided missiles, airborne attack, submarine bombardment, chemical and biological warfare, Soviet capabilities appear to be relatively limited.

45. Clandestine attack in the form of sabotage or small-scale biological warfare might occur at any time, and without an overt attack

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ever being launched. The USSR must weigh the timing and value of the sabotage in relation to their complete plan of attack and its effect upon the capability of the United States to launch a retaliatory military attack. Clandestine attack with nuclear weapons might occur against specially selected targets as a supplement to overt delivery by aircraft.

Subsequent to an overt attack, clandestine attack in any form could be expected to the maximum practicable extent.

46. We believe that the considerations affecting Soviet employment of their capabilities will remain throughout the period of this estimate essentially the same as those outlined above.

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## APPENDIX A

Range Capabilities of Soviet Long-Range Bombers, Mid-1954 to End-1957<sup>1</sup>

## I. From Chukotski Area

- Map 1 TU-4 Standard
- TU-4 Modified
- Map 2 Type-31 class (5,600 ESHP engine)
- Type-31 class (7,000 ESHP engine)
- Map 3 Jet Medium Bomber
- Jet Heavy Bomber

## II. From Kola Area

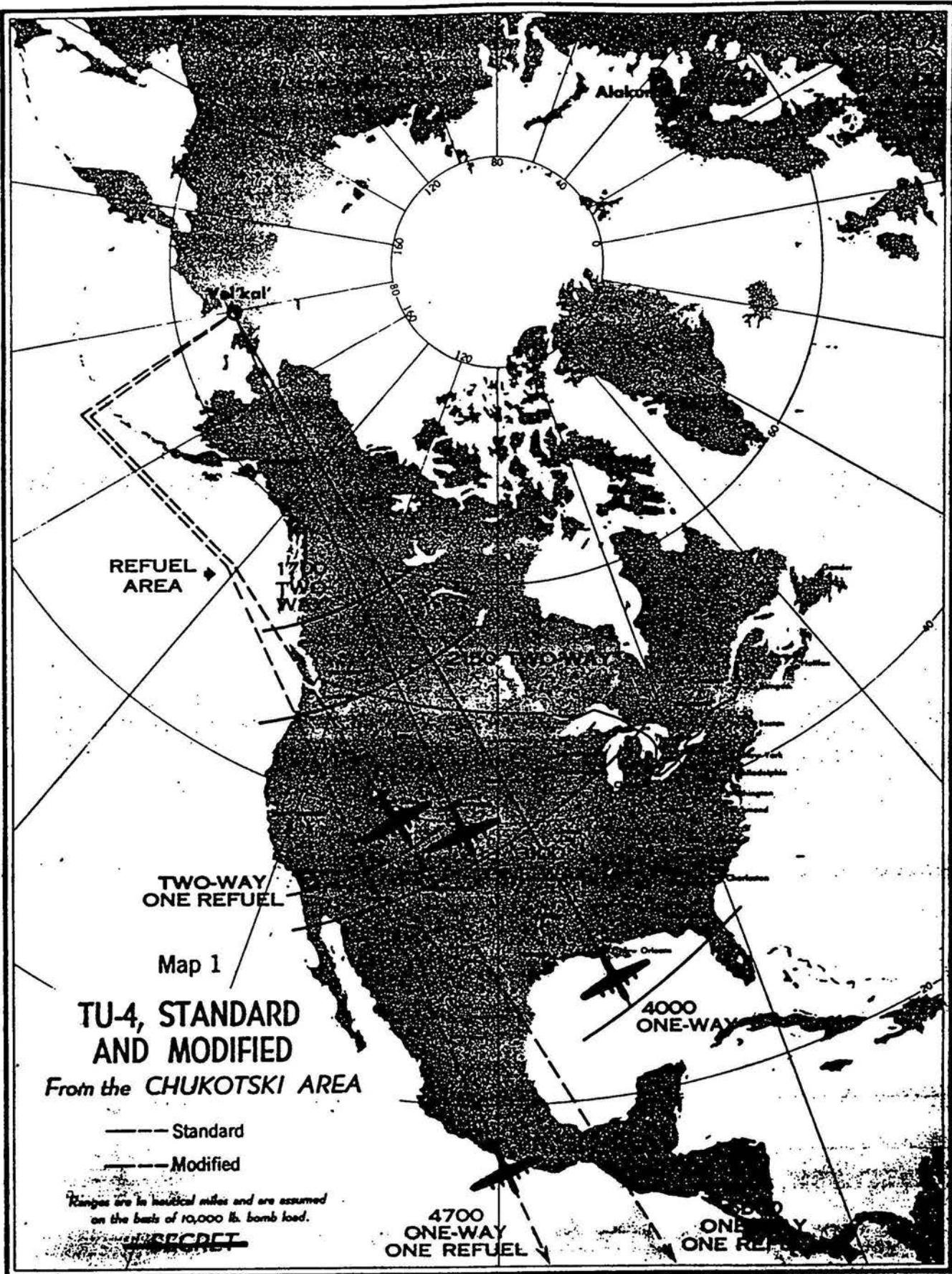
- Map 4 TU-4 Standard
- TU-4 Modified
- Map 5 Type-31 class (5,600 ESHP engine)
- Type-31 class (7,000 ESHP engine)
- Map 6 Jet Medium Bomber
- Jet Heavy Bomber

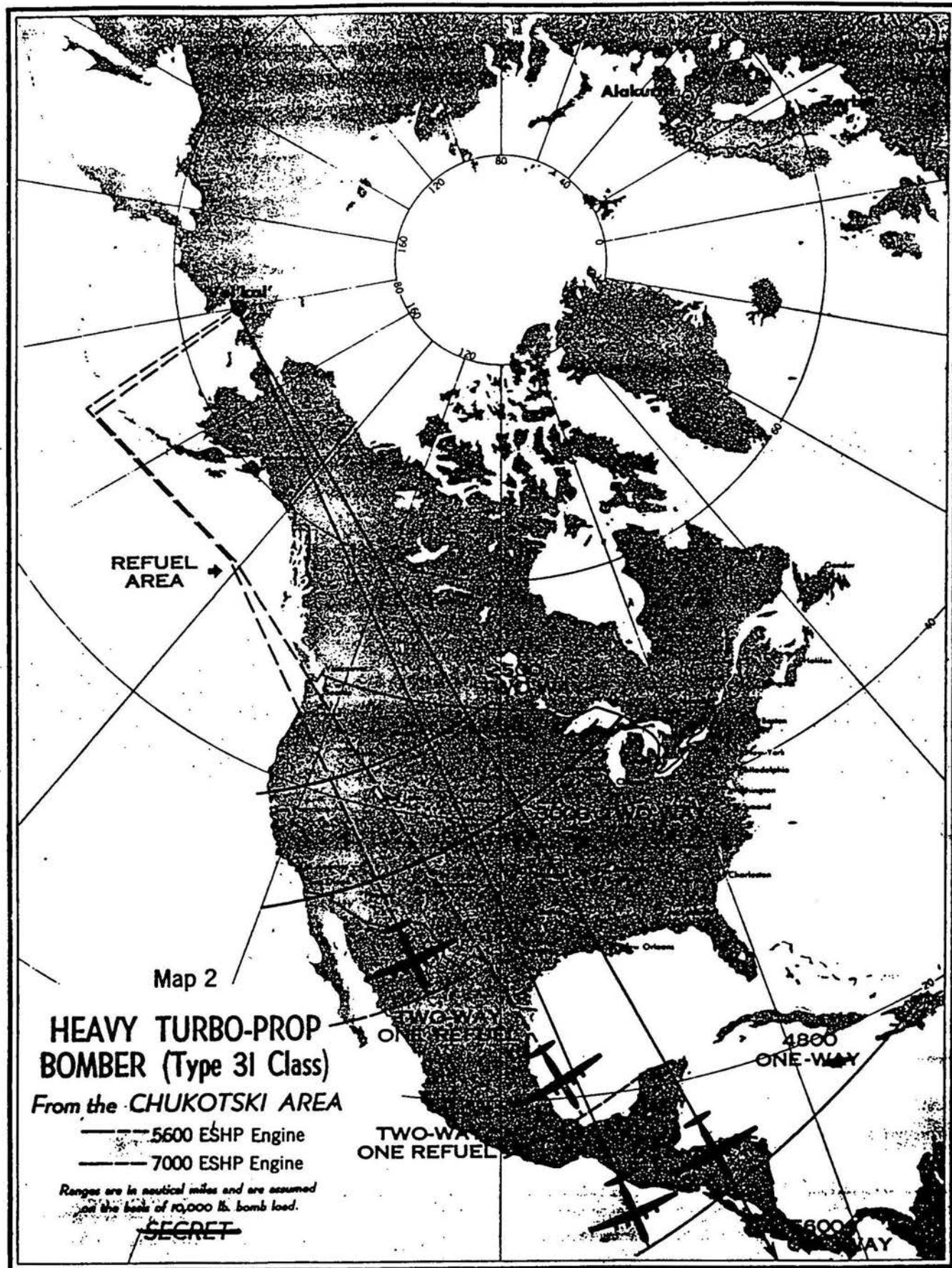
## III. From Baltic-East German Area

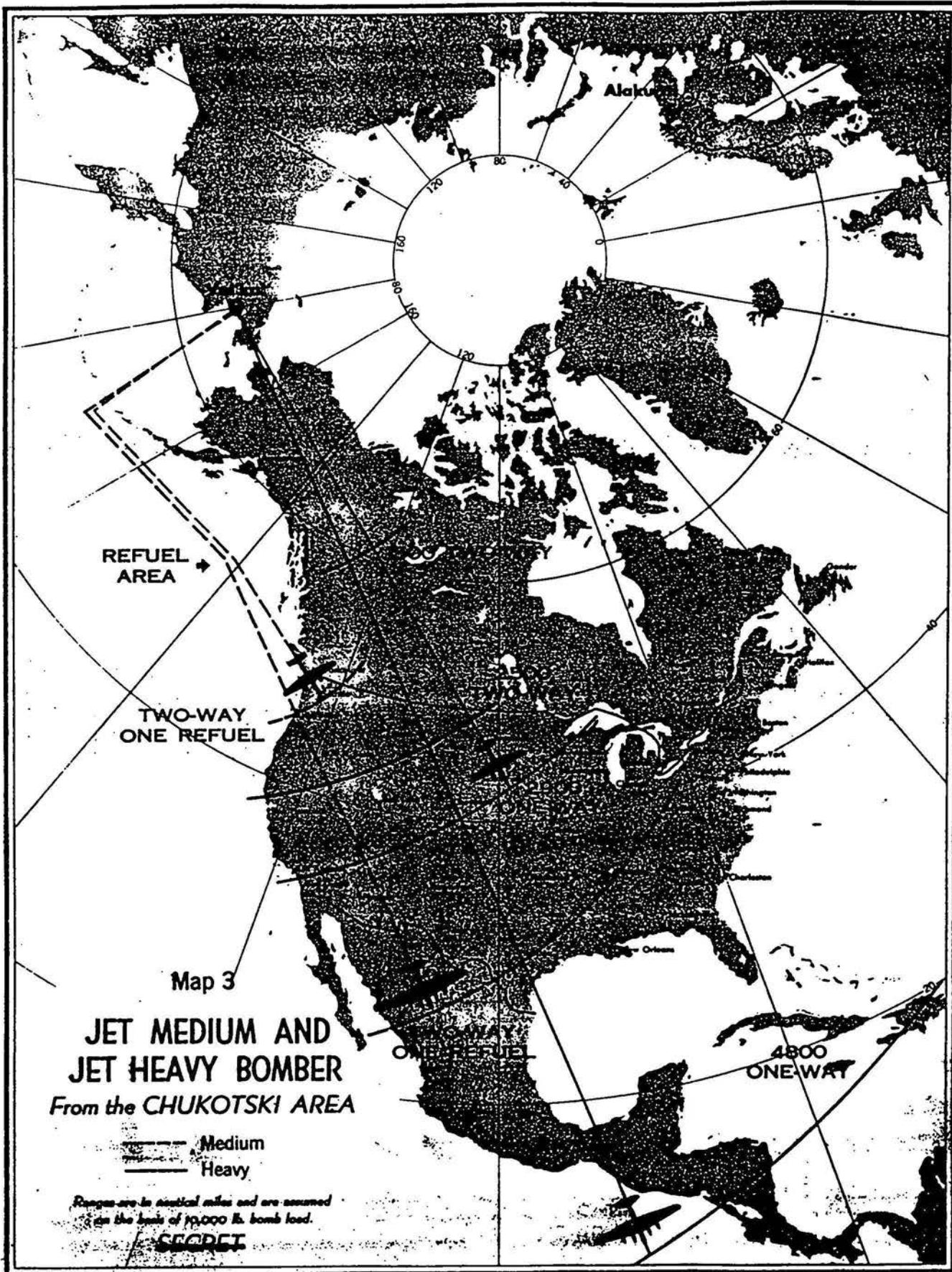
- Map 7 TU-4 Standard
- TU-4 Modified
- Map 8 Type-31 class (5,600 ESHP engine)
- Type-31 class (7,000 ESHP engine)
- Map 9 Jet Medium Bomber
- Jet Heavy Bomber

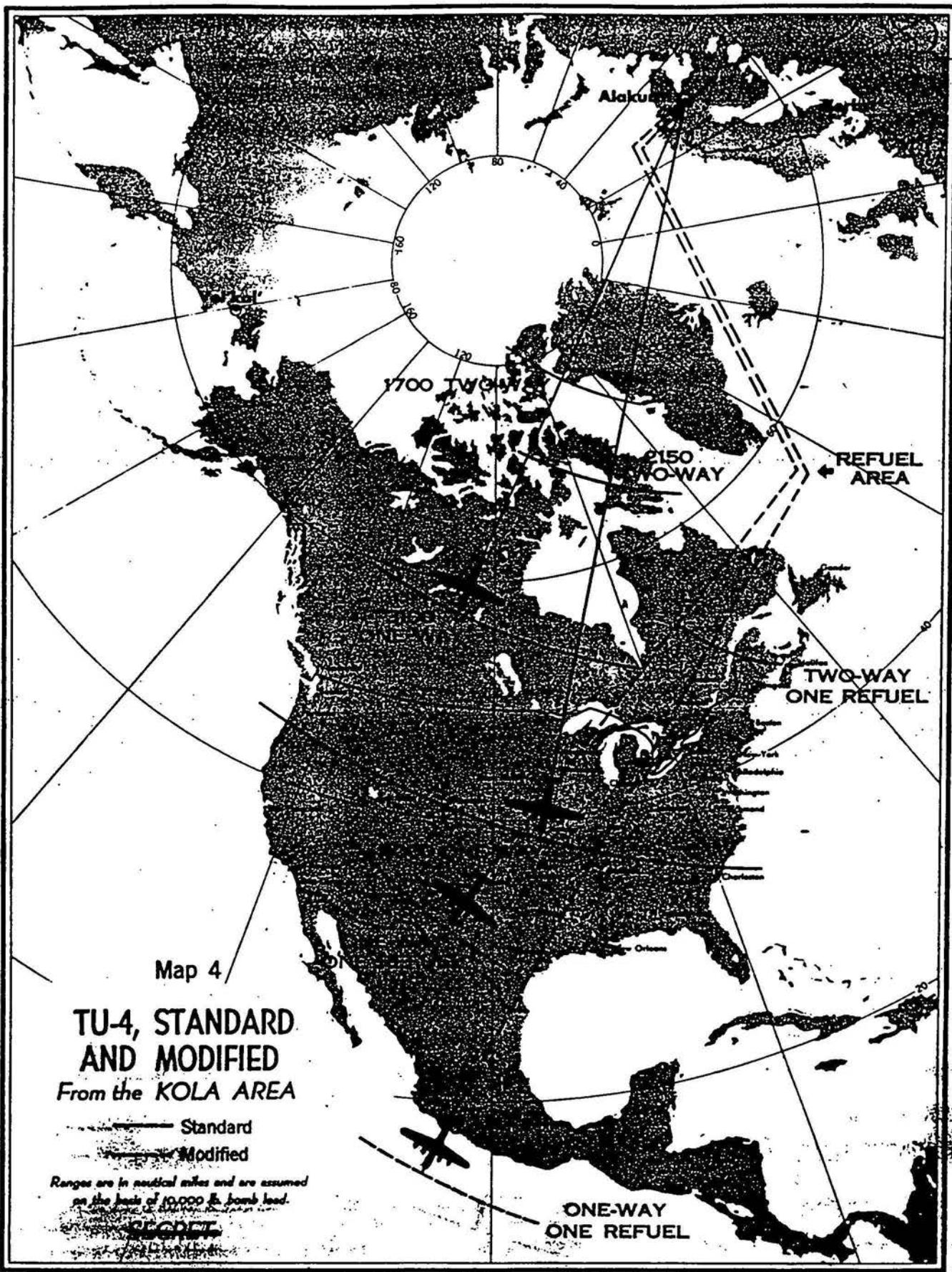
<sup>1</sup>The estimated capabilities of aircraft using inflight refueling are based on an assumed single refueling point for attacks launched from each area. The estimated area coverage is thus subject to considerable error.

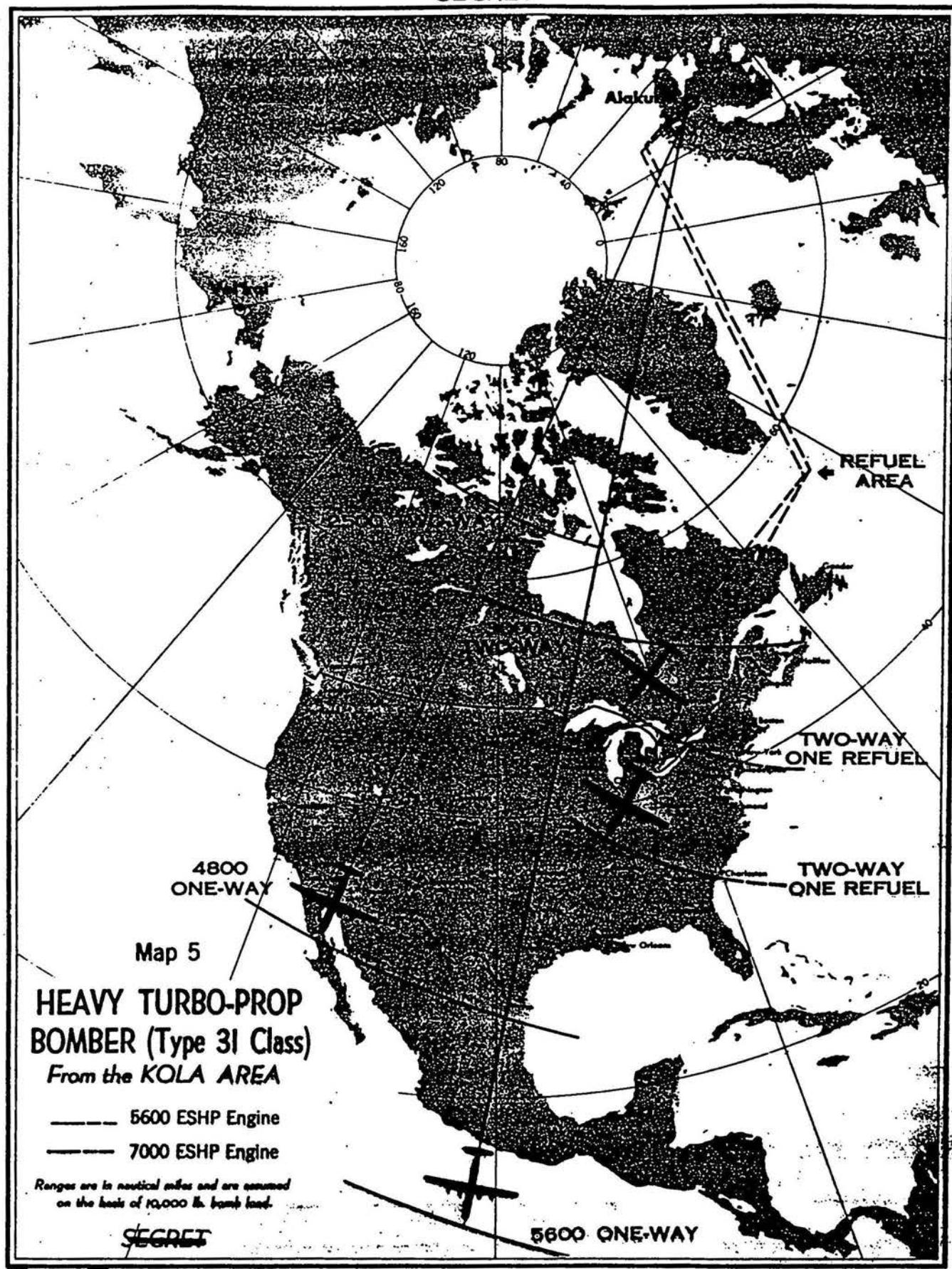
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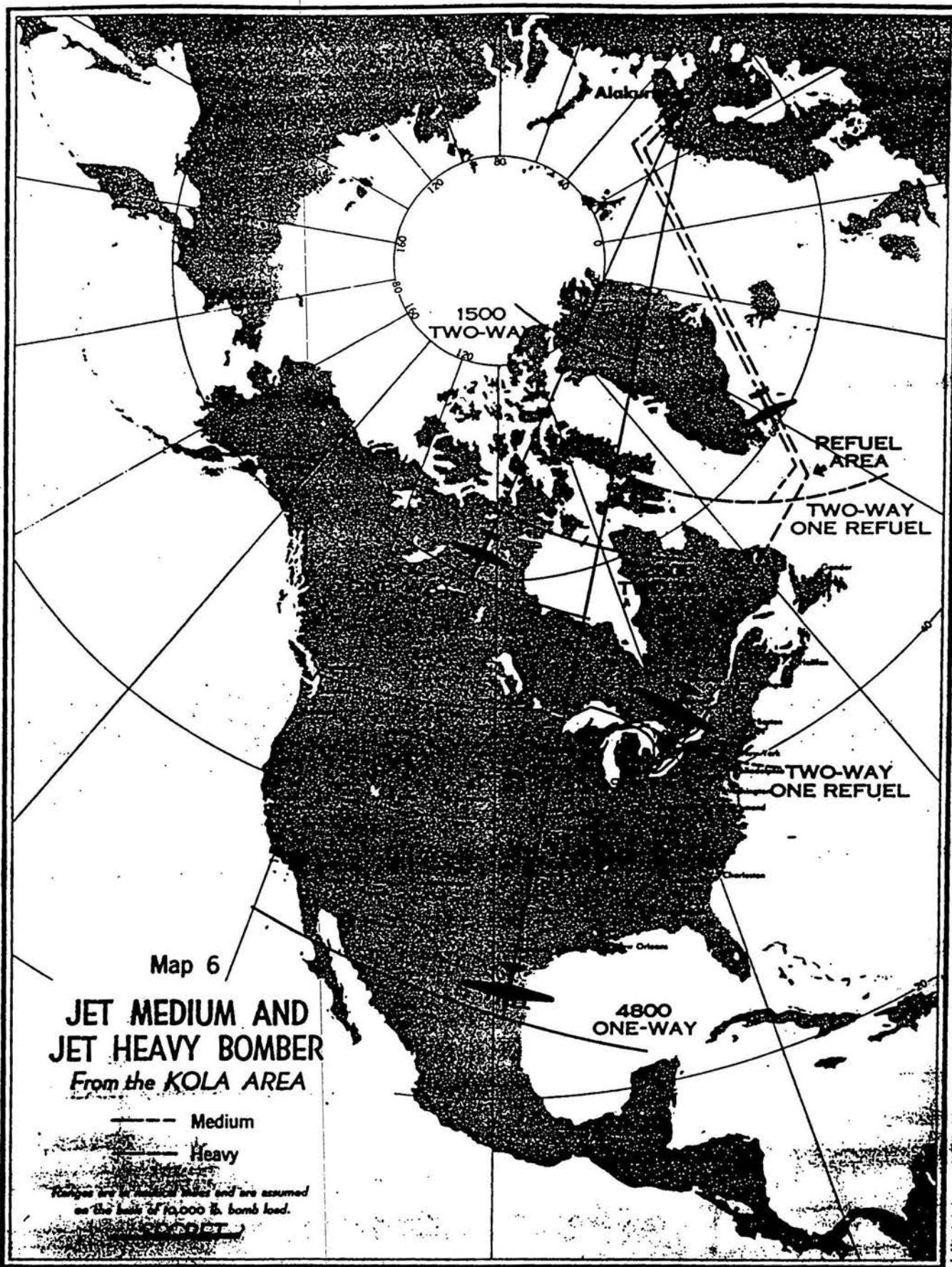
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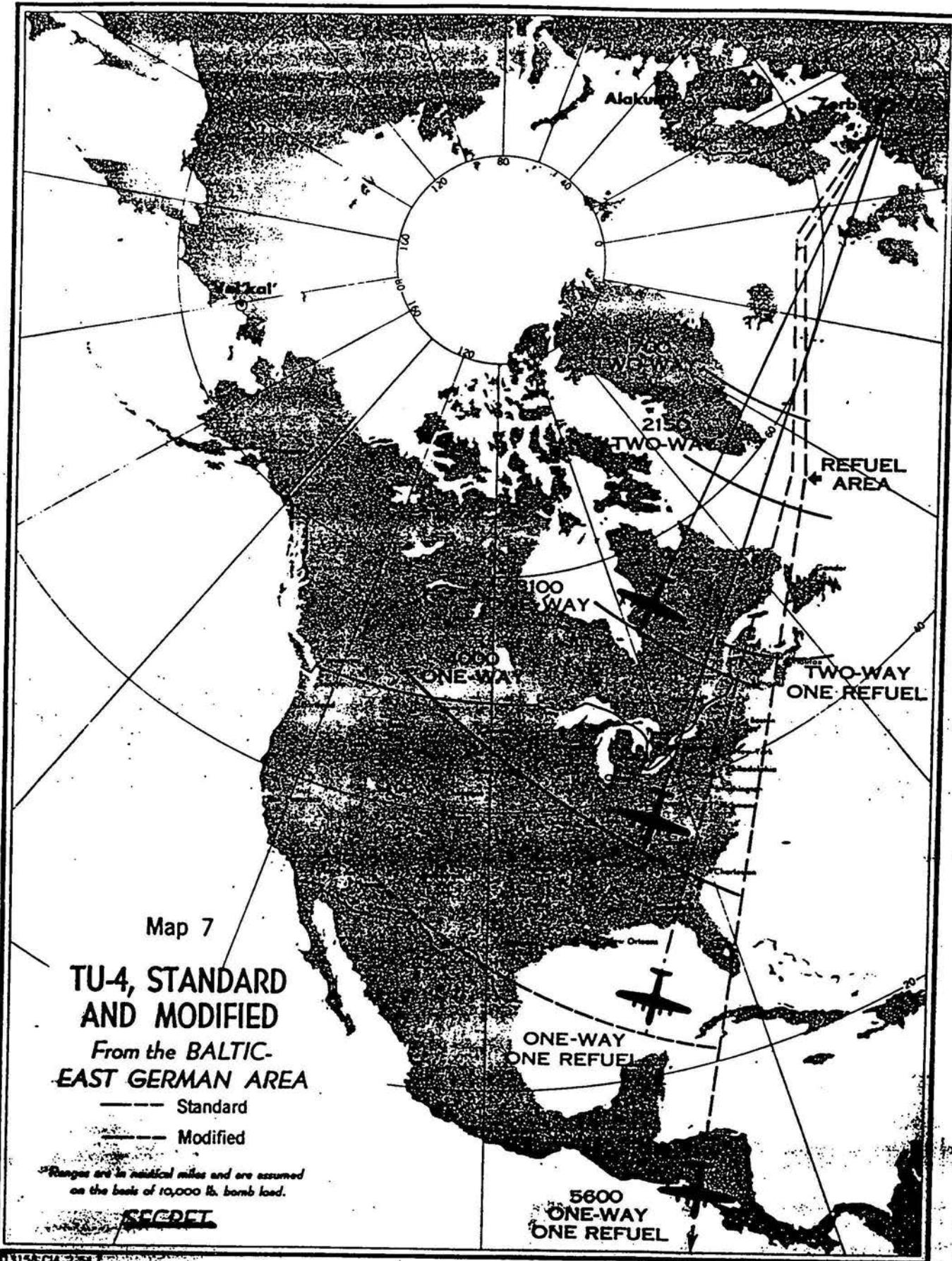
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