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INTELLIGENCE RESEARCH PROJECT

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5 MARCH 1958

SUMMARY OF SIGNIFICANT SOVIET WEAPONS AND EQUIPMENT (U)

50X1-HUM

UNABLE TO DETERMINE REGRADING DATE

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT CHIEF OF STAFF, INTELLIGENCE
WASHINGTON, D.C.

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FOREWORD

This is the fourth in a series of studies on Soviet weapons. Previous studies in the series were rendered out of date by recent information including that derived from the 7 November Parade in Moscow.

The purpose of the study is to summarize currently available information on all significant Soviet weapons and equipment of Army interest. Wherever possible the study also predicts developmental and production trends over the next 5 years.

Comments aimed at improving the usefulness of future publications in this series are needed and earnestly requested. Such comments may be sent direct to the Assistant Chief of Staff, Intelligence, Department of the Army, Attn: Technical Division.

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SUMMARY OF SIGNIFICANT SOVIET WEAPONS AND EQUIPMENT (U)

I. PURPOSE

1. The purpose of this study is to present a condensed summary of significant Soviet weapons and related equipment currently in operational use by the Soviet Army.

II. RELATED REFERENCES

2. Department of the Army Pamphlets, 30-3-1 through 30-20-1 (DAP 30-series), provide detailed data covering the technical, tactical, and recognition aspects of Soviet weapons and equipment. For the convenience of persons desiring to make a more comprehensive study of Soviet materiel, a listing is provided on the last page of this study.

3. The Army Technical Intelligence Bulletin, published since May 1955, now a bimonthly, provides interim, fragmentary reports on foreign weapons and equipment, including intelligence gaps. This Bulletin will cease publication with the March-April 1958 issue and will be replaced by a monthly Combat Equipment Technical Intelligence Bulletin effective 1 July 1958.

4. Summary of Intelligence Reference Data, Project 4831, provides current estimates of the quantities of major weapons in being in the USSR.

5. Intelligence Collection Memoranda (ICM's) provide specific intelligence collection requirements and guidance on foreign materiel.

III. SUMMARY

6. The Soviet Army today possesses a modern weapons system that has been drastically overhauled and improved since World War II. In some instances, the Soviets have retained World War II proven equipment, but by and large their present forces are equipped with new material that is best described as rugged, simple, of modern design, easily mass-produced, well made, and possessing full battlefield effectiveness.

7. The postwar weapons developments show clear evidence of a balanced program designed to achieve maximum mobility (a preponderant number of full-track laying vehicles, many of which are amphibious), standardization (particularly of gun tubes, ammunition, engines, and chassis), greater personnel protection, ease of maintenance, and increased fire power; all with a minimum increase in complexity of weapons and related equipment.

8. There have been notable improvements in related equipment, particularly in communications, transport, and mechanization of supporting functions such as logistical supply, mine laying, and providing fortifications by employment of large plows and ditching machines. The Soviet Army is well prepared for C-B-R warfare.

9. An effort has been made to provide trends to be expected during the next five year period. The over-all trends summarized in the paragraphs above have been evidenced since 1954 in many positive ways, particularly as postwar second and third generations of equipment became known. Pertinent major characteristics, operational availability dates, and production data are provided where this information is available.

10. One can only conclude after a study of Soviet materiel developments that have taken place since 1948 that they have taken full advantage of available technology to provide modern equipment in the requisite quantities to their army, and in many instances to the satellites. Practically all new items reflect native design to a degree unknown in the past.

11. Every major type of climate and terrain is to be found on the Eurasian land mass now under Communist domination. The Soviet Army is the only major force in the world today that has a completely new postwar arsenal of weapons, in being, in the hands of trained troops, capable of fighting either a nuclear or non-nuclear war, big or small, in any kind of climate or terrain.

12. Two areas of development have not been apparent. There is no significant evidence that the Soviets have a transoceanic assault transport capability. Neither is there evidence of a large scale long range air assault capability; however, the short range small scale air assault capability is very real. It is important for Americans when comparing U.S. equipment to Soviet equipment to keep in mind the fact that we design equipment that can readily be transported to other shores whereas the USSR is supplied from interior lines of communication.

13. Every missile displayed by the Soviets to date has been manned by army artillerymen. The evidence that the Soviet Army will take maximum advantage of the capabilities of modern missiles is incontrovertible. It may be assumed that the tremendous national outlay that has been made for quantities of modern armor, full tracked vehicles, mobile weapons, amphibians, and the mobile related equipment is a calculated part of the Soviet master plan for world domination. The role of the Soviet Army in executing this plan is self evident.

IV. DISCUSSION

14. The discussion for this Project has been divided into the following sections:

Section A - Armored Vehicles

Section B - Artillery

Section C - Infantry Weapons

Section D - Aircraft and Airborne

Section E - Communications and Electronics

Section F - Guided Missiles

Section G - Nuclear Weapons

Section H - CBR

Section I - Related Equipment

SECTION A

ARMORED VEHICLES

1. General -- Today the Soviet Army possesses the world's most powerful armored fighting force. The Soviets emerged from World War II with an excellent medium tank, an outstanding heavy tank, and a family of heavily armored and armed assault guns to accompany and support their tank forces. Armored vehicle development has continued apace in the USSR since World War II. Taking advantage of the industrial base that has grown steadily since the war, the Soviets have produced in quantity a postwar successor to most of their World War II combat vehicles, and, in addition, they have developed and produced several completely new combat vehicles for which there were no older counterparts. Specifications and operational characteristics of Soviet armored vehicles, except for the latest models, are covered in Department of the Army Pamphlet Nr 30-40, Handbook on Soviet Armored Vehicles and Antitank Weapons, dated June 1954. See also Department of the Army Pamphlet Nr 30-3-1 with changes. (U)

2. Tanks[1] -- The Soviets classify their tanks, by weight, as follows:

Light tanks . . . . up to 20 metric (22 short) tons

Medium tanks. . . . 25 to 40 metric (28 to 44 short) tons

Heavy tanks . . . . over 40 metric (44 short) tons (U)

a. Light Tanks

(1) PT-76 Amphibious Light Tank[2] -- The Soviets abandoned the light tank as a combat vehicle in 1943. However, by 1954, a new light tank had been developed and issued for use as a reconnaissance vehicle. This tank, the PT-76, is now organic to the reconnaissance elements of all Soviet line divisions. A completely amphibious vehicle with a crew of 3 men, it features a distinctive boat-like hull with a flat top deck on which is mounted a small dome-shaped turret which houses a 76-mm gun. The tank's light armor is estimated to be only 1 inch thick. Amphibious operation of the tank is limited to relatively smooth inland waterways because the freeboard, when afloat[3], is only 4 to 6 inches below the top deck. Estimated maximum speed in the water is 5 miles per hour and a bow-vane attachment can be raised on the front

1. See table, page 6.
2. See photograph, page 7.
3. See photograph, page 7.

Figure 1. TABLE OF CHARACTERISTICS OF SOVIET TANKS

Designation	Weight Combat Loaded	Primary Armament	Secondary Armament	Engine Type	Max Speed	Cruising Range w/o Refueling	Operationally Available	Quantity Produced As of 1 Jan 58	Annual Rate of Production
Amphibious Light Tank, PT-76	15.5 Tons	1x76mm Gun, (model Unk)	1x7.62mm Coax MG	237 HP, diesel	25 mph	160 miles	1952	2,450*	500*
Unidentified Tankette	9 Tons*	1x45mm Gun*	1x7.62mm Coax MG*	Unknown	25 mph*	Unknown	Unknown	Unknown	Unknown
Medium Tank, T-34(85)	35 Tons	1x85mm Gun, M1944 (ZIS-853)	2x7.62mm MG's, Coax and Bow	493 HP, diesel	35 mph	185 miles	1943	40,050*	Note 1
Medium Tank, T-44	37 Tons*	1x85mm Gun, M1944 (ZIS-853)	2x7.62mm MG's, Coax and Bow	493 HP, diesel	35 mph	155 miles*	1946	2,000*	Note 1
Medium Tank, T-54	40 Tons	1x100mm Gun, M1944 (D-10T)	2x7.62mm MG's, Coax and Bow. 1x12.7mm, AA MG.	512 HP, diesel	30 mph	250 miles	1950	35,400* Note 2	4,000* Note 2
Heavy Tank, JS-3	50.6 Tons	1x122mm Gun, M1943 (D-25T)	1x7.62mm Coax MG. 1x12.7mm AA MG	512 HP, diesel	23 mph	80 miles	1945	7,670*	Note 1
Heavy Tank, T-10	53.5 Tons	1x122mm Gun, (Model Unknown)	2x12.7mm MG's, Coax and AA	690 HP, diesel	20 mph	140 miles	1952	5,390*	800*

* Estimated

Note 1. No longer in production.
Note 2. Included in the 35,400 quantity produced figure is any production of a newer medium tank. If a new medium tank is in production then the quantity produced and annual production rate will be lower than given due to loses during production conversion.

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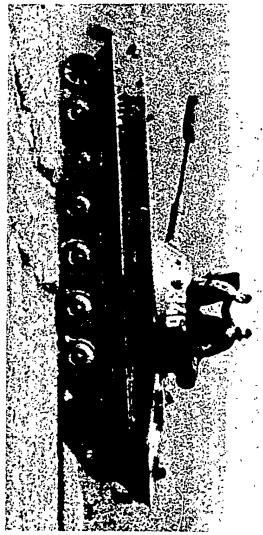

FIG 2. PT-76 Amphibious Light Tank. (C)

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FIG 3. PT-76 Light Tank in Water. (C)

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upper hull plate to deflect the bow wash away from the driver's hatch. The method of propulsion in water is believed to be by use of a hydro-jet principle; louvers on the rear side plates of the hull are believed to be the intakes and the outlets appear to be the twin shutter-covered openings in the rear hull plate. It is not anticipated that the PT-76 amphibious tank will undergo any major modifications in the near future; however, with the advent of Soviet heavy lift helicopters and assault transport aircraft, an attempt could be made to produce a miniaturized version of the amphibious tank for use by airborne units. (C)

(2) Unidentified Tankette -- In 1956, a miniature light tank, reminiscent of World War II tankettes, was observed in the hands of Soviet troops in East Germany on a few occasions. Estimated to weigh approximately 9 tons, it is not known if the tank is even of Soviet manufacture. It may be a one-time item produced by a Satellite country for test and experimentation. This tankette has not been sighted since the summer of 1956. With its poor over-all design, puny armament, and negligible armor this tank adds little to the effectiveness of Soviet armor, and its position in Soviet tables of organization and equipment cannot be detected. (C)

b. Medium Tanks

(1) T-34(85) -- This tank, mounting an 85-mm gun, was the workhorse of the Soviet Army during the later stages of World War II. It represented an excellent technological compromise of the conflicting requirements of tank design (fire power, armor protection, and mobility), particularly in view of its year of introduction (1943). This tank, which was continued in limited production until about 1950, has been widely distributed to Bloc and to certain non-Bloc countries. Although rapidly being replaced in the Soviet Army by the T-54 tank, the T-34(85) is still found in many Soviet divisions. (C)

(2) T-44 -- Late wartime and early postwar development efforts resulted in the introduction of the T-44 medium tank sometime prior to 1947. Although the T-44 was offered as an improvement over the T-34(85), it is believed that it did not prove completely satisfactory and that full-scale production was not undertaken. Small numbers of T-44 tanks were employed by Soviet troops during the 1956 Hungarian Rebellion. The principal differences of the T-44 from its progenitor are: (a) a larger and more sharply sloped turret mounted centrally on the hull; (b) greater frontal armor protection (3.5 inches on the hull); (c) the positioning of the driver's hatch on the left front of the hull roof instead of in the center of the hull upper front plate; (d) a slightly longer hull with vertical upper hull side plates; (e) a bow machine gun which fires through a hole flush with the hull upper front plate instead of from a ball-socket mount; and (f) a modified suspension arrangement (the spacing of the road wheels has been changed so that there is a greater distance

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FIG 4. T-54 Medium Tank With Bulb-Shaped Turret. (U)

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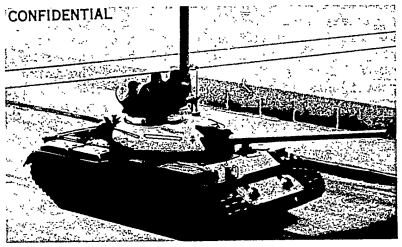

FIG 5. T-54 Medium Tank With Dome-Shaped Turret. (U)

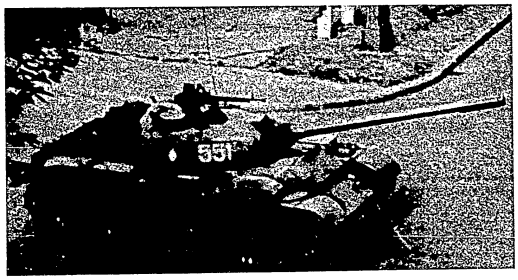

FIG 6. T-54 Medium Tank With Muzzle Counterweight. (U)

between the first and second road wheels to compensate for repositioning the turret farther to the rear). Most of the new features of the T-44 tank's hull shape and suspension system are to be found on the latest Soviet medium tank, the T-54. (C)

(3) T-54 -- This tank, which is believed to have gone into production in 1949, has been issued to Soviet tank, and mechanized divisions in large numbers. Based on a slightly modified T-44 hull, the T-54 incorporates considerably improved firepower and armor protection (3.75 inches on hull upper front plate) for a total weight increase over the T-44 of only three tons. It mounts a 100-mm gun in a turtle-shaped turret which is placed centrally on the tank hull. To date three variations of the T-54 turret and gun combination have been identified. The turret on one variety[4] is bulb-shaped with the lower part of the turret undercut to the turret ring. This variety has an external mantlet for the 100-mm gun and it is believed that this was the initial turret shape used on the T-54. The second, and most numerous variety observed to date, features the more turtle-like turret[5] with a hemispherical shape whose base is larger than the turret ring and overlaps the sides of the tank. This variety has an internal mantlet for the 100-mm gun. The third variation[6] is almost identical to the second except that the 100-mm gun has a counterweight sleeve welded along the tube near the muzzle. It is reported that tanks with the muzzle counterweight are provided with a gyro-stabilizer system for control of the gun in elevation. The designations T-55 and T-56 have been reported on occasions as pertaining to variations of the basic T-54 tank; however, to date, no confirmation or matching of these designations with the varieties of T-54s has been obtained. The 100-mm gun has been reported as the D-10T and is identical to the gun of the same caliber which is mounted on the SU-100 assault gun. The T-54 uses a standard articulated type telescopic sight for the main armament. No range drums, ballistic computer boxes, or optical range finders are provided. Kits have been developed for preparing the tank to ford water slightly deeper than the top of the turret through the use of a "snorkel" type attachment. A 45-mm subcaliber training device which is inserted inside the chamber of the 100-mm gun is a standard item of equipment. Infrared night firing and driving equipment has also been reported as an available accessory. (C)

(4) New Medium Tank (?) -- Reports which might indicate the testing, development, or production of a new medium tank are practically nonexistent. However, the T-54 is already over 8 years old and production commenced in Czechoslovakia and Poland in 1957. Replacement of T-34(85) tanks by T-54 tanks is still not complete in Soviet units and almost ceased in the Group of Soviet Forces in Germany in 1957. This may indicate that a changeover in production to a newer

4. See photograph, page 9.
5. See photograph, page 9.
6. See photograph, page 9.

medium tank is already taking place. If the Soviets are in fact producing a new medium tank, it would probably include the following improvements over the T-54: (a) A new gun, the newest 100-mm Field Gun M1955, seems readily adaptable for mounting in a tank and should fire ammunition at higher muzzle velocities than the older M1944 100-mm gun (D-10T); (b) a new engine, the present 512-horsepower engine is only marginal power for a tank in the 40-ton range; and (c) thicker armor, the 3.75-inch armor thickness on the T-54's upper front hull plate is low and would probably be increased to approximately 4.75 inches. (C)

c. Heavy Tanks

(1) JS-3 -- The JS-3 made its appearance in the late stages of World War II as the successor to the JS-1 and JS-2 heavy tanks. The JS-2 and JS-3 heavy tanks are still in service in Soviet tank and mechanized divisions. The JS-3 heavy tank features armor protection of substantial thickness (4.7 inches sloped at 55° on the hull front) and a highly sloped armor arrangement, thereby creating difficult penetration problems. (C)

(2) T-10[7] -- This new heavy tank has been available as a replacement for the JS-3 since 1953. The T-10 appears to be a substantial improvement over the JS-3 and is assumed to have replaced it in production. Although only 3 tons heavier than the JS-3, the T-10 has a more powerful diesel engine and is estimated to have thicker frontal armor (possibly 5.5 inches on the turret and hull front) than the JS-3. The 122-mm gun is also believed to be a tank-mounted version of the new 122-mm Field Gun D-74 which should fire ammunition at higher muzzle velocities than the older D-25T 122-mm gun used on the JS-3. A cylindrical object mounted around the gun tube behind the muzzle brake is believed to be either a bore evacuator or a counterweight. This tank has only recently been observed with Soviet troops in East Germany (1957), and yet there is already one report that a successor to the T-10 heavy tank is now available. (S)

3. Armored Self-propelled Weapons[8]

a. Assault Weapons

(1) General -- By the end of World War II, the Soviet Army had developed and produced a wide range of heavily armored assault gun weapons. These included the SU-85, SU-100, JSU-122 (in two models; one mounting the A-19S gun without a muzzle brake and the other mounting the D-25S gun with a muzzle brake), and the JSU-152. The SU-85 and SU-100 are still used in the rifle divisions while the JSU-122 and the JSU-152 are used in the tank and mechanized divisions. (C)

7. See photograph, page 13.
8. See table, page 12.

Figure 8. TABLE OF CHARACTERISTICS OF SOVIET ARMORED SELF-PROPELLED WEAPONS

Designation	Weight Combat Loaded	Primary Armament	Secondary Armament	Engine Type	Max Speed	Cruising Range w/o Refueling	Operationally Available	Quantity Produced As of 1 Jan 55	Annual Rate of Production
SU-85	32 Tons	1x85mm Gun, M1944 D5-S85	None	493 HP, diesel	35 mph	185 miles	1943	3,200	Note 1
SU-100	33 Tons	1x100mm Gun, M1944 (D-10S)	None	493 HP, diesel	35 mph	185 miles	1944	9,705	Note 1
JSU-122 (A-19S)	51 Tons	1x122mm Gun, M1944 (A-19S)	1x12.7mm AA MG	512 HP, diesel	23 mph	80 miles	1944	4,330	Note 1
JSU-122 (D-25S)	51 Tons	1x122mm Gun, M1944 (D-25S)	1x12.7mm AA MG	512 HP, diesel	23 mph	80 miles	1944		Note 1
JSU-152	51 Tons	1x152mm Gun, How, M1943 (ML-20S)	1x12.7mm AA MG	512 HP, diesel	23 mph	80 miles	1944	6,590*	300*
SU-122 M1954 (S)	40 Tons	1x122mm Gun, (Model Unknown)	2x14.5mm AA and Bow MG's	512 HP, diesel	20 mph	175 miles	1954	1,700*	800*
Light 57-mm SP (Abn)	4-5 Tons	1x57mm Gun, (Model Unknown)	None	100 HP*, gasoline	40 mph*	200 miles*	1956*	Unknown	Unknown
ZSU-57-2 (S)	31 Tons	2x57mm Gun, AA Type, S-60	None	512 HP, diesel	30 mph*	250 miles*	1955*	4,450*	1,000*
15 Nautical Mile Rocket SP	17.5 Tons	1x15 NM Rocket	None	237 HP, diesel	25 mph*	140 miles	Unknown	Unknown	Unknown

* Estimated

Note 1. No longer in production.

FIG 7. T-10 Heavy Tank. (S)

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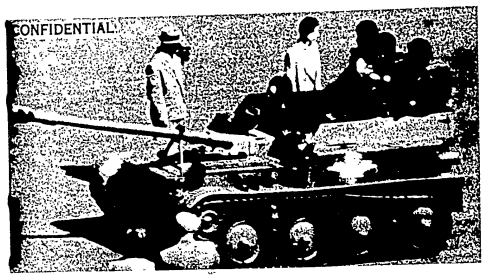

FIG 9. 57-mm SP Gun. (U)

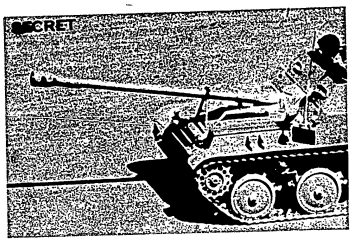

FIG 10. 57-mm SP Gun. (U)

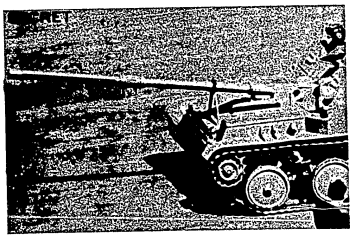

FIG 11. 45-mm (?) SP Gun. (U)

(2) SU-122 M1954 -- One postwar addition to the heavily armored World War II assault gun family has been reported. Called the SU-122 M1954, the new self-propelled gun is reported to consist of the T-54 tank chassis mounting a 122-mm gun. No photograph has been obtained of this vehicle. Because its weight is reported to be approximately 40 tons, it is probable that this self-propelled gun possesses the armor protection of the T-54 medium tank. Possessing the mobility of the T-54 medium tank and the firepower of the heavy tank, this self-propelled gun is assigned to Soviet tables of organization for the tank and mechanized divisions. (S)

(3) 57-mm SP Gun and 45-mm(?) SP Gun[9] -- These lightly armored vehicles first appeared in the 1957 May Day Parade in Moscow. Identical in other respects, the vehicles were equipped with two different guns. The gun on one type vehicle[10] (the most numerous one and the only type again displayed in November 1957) is believed to be an adaptation of the 57-mm Antitank Gun M1943 and is fitted with a standard type double-baffle muzzle brake (the interim designation for this vehicle is the 57-mm SP Gun). The gun mounted on the other type vehicle[11] has an unusual appearance and is of an undetermined caliber (estimates range from 45 to 57 mm). The muzzle section contains 34 slots or perforations and may be a detachable muzzle brake to facilitate loading within aircraft, or a squeeze-bore attachment, or a device for firing rocket-boosted, shaped-charge ammunition or fin-stabilized, high-velocity, kinetic-energy projectiles. There are some reports which vaguely suggest that this gun may even be a recoilless type. (The interim designation for this vehicle is the 45-mm(?) SP Gun.) Both vehicles appear to be fast, light, and highly manueverable. The light suspension system and thin armor protection, as well as markings, indicate that the vehicles are air transportable by new Soviet transport aircraft and possibly even by the Soviet HORSE helicopter. However, roles other than as antitank protection for airborne forces are probable as there are indications that a vehicle of this general type may be issued to the mechanized regiments of mechanized and tank divisions and to the rifle regiments of rifle divisions. The appearance of these small self-propelled guns is the first indication of a possible Soviet development trend toward lighter, air-transportable armored vehicles. (S)

b. Support Weapons -- The only modern armored support weapons (i.e., weapons mounted on armored chassis and primarily intended to deliver indirect fire against land targets or to deliver antiaircraft fire) identified to date are the ZSU-57-2 Antiaircraft SP and the self-propelled launcher carrier for the 15-nautical mile (Honest John type) rocket which are treated in the Artillery Section of this document.

9. See photograph, page 14.
10. See photograph, page 14.
11. See photograph, page 14.

Figure 12. TABLE OF CHARACTERISTICS OF SOVIET ARMORED PERSONNEL CARRIERS

Designation	Weight Combat Loaded	Max Armor Thickness	Armament	Engine Type	Max Speed	Cruising Range w/o Refueling	Operationally Available	Quantity Produced As of 1 Jan 58	Annual Rate of Production
BTR-40 APC, 4x4	5.8 Tons	0.5 in*	1x7.62mm Heavy MG	70 HP, gasoline	50 mph	175 miles	1951	7,800*	1,200*
BTR-152 APC, 6x6	9 Tons	0.5 in*	1x12.7mm AA MG or 1x7.62mm Heavy MG	110 HP, gasoline	45 mph	360 miles	1950	17,600*	2,500*
BTR-50P APC, Full-tracked	15.5 Tons	1 in*	1x12.7mm AA MG	237 HP, diesel*	25 mph	140 miles	1954	2,200*	1,000*

* Estimated

To date no Soviet armored self-propelled artillery weapons of the divisional artillery type have been identified. Unconfirmed reports have been received of the existence of a lightly armored, full-tracked, self-propelled 85-mm gun vehicle with a weight of between 7 to 10 tons and a maximum gun elevation of 70°. There are also unconfirmed reports which indicate the development of an antiaircraft rocket launcher to be mounted on the T-54 tank chassis. This rocket launcher is reported to fire a 120-mm beam-riding, homing type missile at aircraft between 1,000 and 8,000 meters in altitude or to be able to fire 120-mm rockets against ground targets to a range of 8,700 yards. The launcher is reported to have been developed in both a 12-round and a 20-round version, either of which can be fired individually, in ripple, or in salvo. Considering the current trend toward increasing the organic mobility of all Soviet combat units, it is very possible that the near future may reveal the existence of a new Soviet family of lightly armored, fully tracked, self-propelled artillery or antiaircraft artillery vehicles. (S)

4. Armored Personnel Carriers[12]

a. Wheeled Carriers

(1) BTR-40 -- This 4 x 4 wheeled armored vehicle resembles the World War II United States M3 scout car and is assembled by applying armor plate to the chassis of the GAZ-63 cargo truck. Called the BTR-40, it is found in greatest numbers in the rifle divisions and in lesser numbers, usually with reconnaissance elements, in the tank and mechanized divisions. Normally observed carrying up to eight men and mounting a 7.62-mm heavy machine gun, it has also been seen carrying a dual 14.5-mm machine gun mount (possibly a vehicular-mounted version of the ZPU-2 antiaircraft machine gun). (C)

(2) BTR-152 -- This 6 x 6 wheeled armored vehicle has been the Soviet's principal postwar armored personnel carrier. It has been widely distributed throughout the Soviet Army, particularly to the tank and mechanized divisions. It has also been distributed to other Bloc and to certain non-Bloc countries. The BTR-152 is assembled by applying armor plate to the chassis of the ZIS/ZIL-151 cargo truck. Although designed primarily as a personnel carrier for 12 men, a variety of other roles have been observed: (a) As a carrier for a dual 14.5-mm machine gun mount; (b) as a prime mover for antitank guns or heavy mortars; and (c) even as an armored cargo carrier and battlefield evacuation vehicle. Normally the personnel compartment is provided with only a canvas covering; however, recently a completely inclosed model, with a very top-heavy silhouette, has been observed in use as a command or radio vehicle. In recent years, an outrigger-type modification has been extended from the hull to the wheel hubs to permit automatic deflation or inflation of the tires by the driver from within the vehicle. (C)

12. See table, page 16.

b. Tracked Carrier

BTR-50p[13] -- The introduction of a full-tracked armored personnel carrier has been anticipated for some time due to the limited off-road performance capability of the Soviet's wheeled armored personnel carriers. The BTR-50p, a full-tracked armored personnel carrier, capable of carrying a 3-man crew and 12 other passengers is reported to have been available to Soviet units since 1954. This vehicle was first reported in the hands of the Group of Soviet Forces in Germany in the late summer of 1957. This armored personnel carrier is fully amphibious and is constructed on the same basic hull design as the PT-76 amphibious tank. While not provided with a permanently attached overhead armor cover for the passenger compartment, there is a possibility that a detachable box-top-like armor cover or a system of support bows and an armor blanket may be provided for overhead protection. (C)

5. Special-purpose Armored Vehicles[14]

a. Lightly Armored Tracked Prime Mover[15] -- This vehicle has occasionally been mistaken for a new armored personnel carrier. It has been observed on several occasions in East Germany and Poland and in both the 1957 May Day and 7 November Parades in Moscow. In all instances it has been observed serving as a prime mover for the 100-mm Field Antitank Gun M1955 which is the principal weapon employed by the nondivisional antitank units. The vehicle is lightly armored with the maximum armor thickness reported to be less than one inch, except around the bow machinegun blister, where it is reported to be slightly thicker. The armor appears to protect only the forward portions of the vehicle which house the engine, the driver, the bow machinegun operator, and the vehicle commander. The vehicle is reported to be extremely fast and agile. The absence of visible means of water propulsion and the compactness of construction tend to discount reports of an amphibious capability. This vehicle is another excellent example of the current Soviet emphasis on mobility in the manuever and deployment of their supporting weapons as well as their primary battle vehicles. (C)

b. Miscellaneous -- The Soviet Army employs many varieties of special-purpose vehicles which are assembled on full-tracked armored vehicle chassis. These vehicles range from assemblies fabricated in the field by the using units to more sophisticated factory or depot applied installations. Turretless T-34 tank chassis are often converted to use as tank recovery vehicles, as armored command vehicles, and occasionally are equipped with cargo-type platforms for handling large fuel drums or ammunition loads during resupply operations. Short-gap assault bridges are mounted on tank chassis. Mine-clearing rollers and disks are frequently pushed in front of tanks.

13. See photograph, page 19.
14. See table, page 20.
15. See photograph, page 19.

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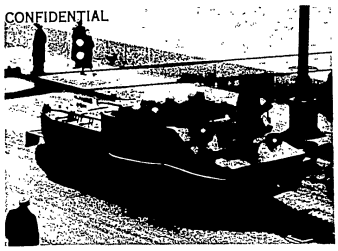

FIG 13. BTR-50p Amphibious APC. (S)

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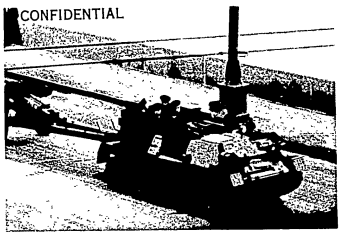

FIG 15. Armored Light Tracked Prime Mover. (U)

Figure 14. TABLE OF CHARACTERISTICS OF SOVIET SPECIAL PURPOSE ARMORED VEHICLES

Designation	Weight Combat Loaded	Max Armor Thickness	Armament	Engine Type	Max Speed	Cruising Range w/o Refueling	Operationally Available	Quantity Produced	Annual Rate of Production
Armored Full-Tracked Prime Mover	7 Tons*	1 in*	1x7.62mm Bow MG	130 HP, gasoline*	40 mph*	200 miles*	1955*	1,000*	500*

* Estimated

SECTION B

ARTILLERY

1. General

a. Since 1950 the Soviet Army has revealed many new artillery weapons, including heavy mortars, rocket launchers and free rockets. These constitute a considerable advance over the Soviet Army's previous artillery family. Some older weapons are still standard but probably will be replaced during the next five-year period. It is believed, however, that the over-all total number of weapons in the new family will be less than that in its predecessor. The new weapons are generally characterized by a comprehensive range of calibers, by simplicity of design, by comparatively light weight, better mobility, and by increased performance. All calibers 200 mm and greater could physically accept atomic warheads. (S)

b. There are still considerable gaps in our knowledge of the new Soviet Army artillery family, and these gaps are recorded in ACSI Intelligence Collection Memorandum 26-81K2-16. Department of the Army Pamphlet 30-4-1, as changed, gives a detailed treatment for most known Soviet artillery. (C)

2. Antiaircraft[16]

a. The Soviet Army World War II family of light and medium antiaircraft artillery guns lacked modern fire-control and remote-control equipment. No heavy Soviet antiaircraft artillery guns existed in World War II. Current designs in production are families of new and modern, light, medium, and heavy guns and associated electronic fire-control and remote-control equipment. A very simple, small-caliber family of light antiaircraft weapons, based on a 14.5-mm machine gun in single-, dual, and quadruple-mount versions, has been produced to round out the Soviet antiaircraft arsenal. (C)

b. The new weapons are designed to eliminate the deficiencies of the World War II family. Information on the progress of the Soviet Army in electronic antiaircraft artillery fire-control devices is found in Section E. (U)

c. 14.5-mm Antiaircraft Heavy Machine Gun Family -- A new family of heavy antiaircraft machine guns is currently supplementing the 12.7-mm Antiaircraft Heavy Machine Gun (DShK) in the Soviet Army. This weapon is based on a new 14.5-mm (caliber .57) machinegun and exists in single-, dual-, and quadruple-gun versions which bear the nomenclature

16. See characteristics table, page 27 .

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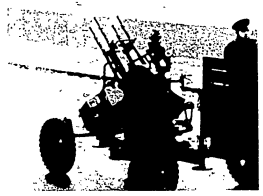

FIG 17. 14.5-mm AAHMG ZPU-4. (U)

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FIG 18. 57-mm Antiaircraft Gun Model S-60. (U)

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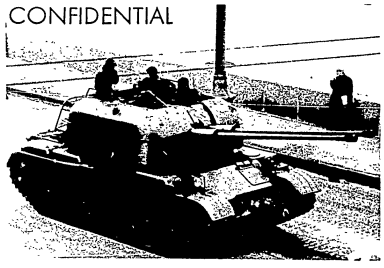

FIG 19. 57-mm Self-Propelled Antiaircraft Gun Model ZSU-57-2. (S)

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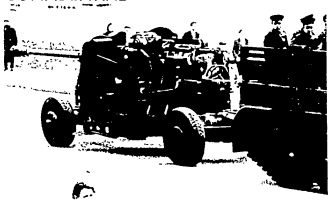

FIG 20. 100-mm Antiaircraft Gun Model KS-19. (S)

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FIG 21. 122-mm Antiaircraft Gun M1955. (U)

Figure 16. TABLE OF CHARACTERISTICS OF SOVIET ANTIAIRCRAFT ARTILLERY

Designation	Effective Ceiling (ft)	Weight (lbs) Travel	Weight (lbs) Action	Projectile Weight (lbs)	Practical Rate of Fire (rds per min)	Muzzle Velocity (fps)	Operationally Available*	Quantity Produced* As of 1 Jan 58	Annual Rate of Production*
14.5-mm AAHMG Family	3,000*	838 (ZPU-2) 2,100* (ZPU-4)	Unknown Unknown	0.12*	150 per barrel	3,300	1949	47,000	6,200
57-mm AA Gun-Model S-60	6,000* w/on carriage sights 16,000 w/off carriage fire control equipment	10,275	9,920	6.17	105 to 120	3,281	1950	9,200	1,000
Twin 57-mm SP AA Gun-Model ZSU-57-2 (S)	6,000* w/on carriage sights	62,000	62,000	6.17	105 to 120 per tube	3,281	1955	4,450	1,000
100-mm AA Gun-Model KS-19 (S)	39,000	20,600	20,600	35	15	2,953	1949	7,400	1,000
122-mm AA Gun M1955	40,000 to 45,000*	65,000*	55,000*	55*	10 to 12*	3,300*	1953	475	150

* Estimated

ZPU referring to the antiaircraft mount. These letters are followed by a figure 1, 2, or 4 which indicates the number of guns mounted on the carriage concerned. The ZPU-1 and ZPU-2 are mounted on towed, single-axle, two-wheeled carriages and the ZPU-4[17] on a towed, double-axle, four-wheeled carriage. Twin 14.5-mm machineguns, employing a special ring mount, have been observed mounted on the 4 x 4 BTR-40 and the 6 x 6 BTR-152 armored personnel carriers. These weapons are found in all line and antiaircraft divisions of the Soviet Army. The ZPU-1 has been identified only in the hands of North Korean troops, therefore, probably has not been adopted for service in the Soviet Army (C).

d. 57-mm Antiaircraft Gun Model S-60* -- This 57-mm antiaircraft gun[18], believed to have been accepted for standardization in 1950, is replacing the 37-mm antiaircraft gun M1939 in the Soviet Army. The overall design features of this gun indicate that it was developed from the German World War II experimental 55-mm Gerat 58 antiaircraft gun. Its carriage is the same Bofors type as that used for its predecessor, i.e., one with four wheels, outriggers, and jack pads for stability. It is clip fed through a horizontal feeding mechanism, has a remote-control system, on-carriage sighting devices, and off-carriage fire-control equipment, including a radar component, SON-9, nicknamed "FIRE CAN". These weapons are found in all Soviet antiaircraft divisions and antiaircraft regiments of line divisions. They are also found in mechanized regiments, medium tank regiments, heavy tank and assault gun regiments of mechanized and tank divisions. (C)

e. Twin 57-mm Self-propelled Antiaircraft Gun Model ZSU-57-2 -- This weapon was first seen in East Germany and shortly thereafter displayed in the Moscow parade held 7 November 1957. It is the first self-propelled antiaircraft gun to be introduced by the Soviets since the end of World War II. The weapon apparently is designed to fulfill roles comparable to those allotted to the United States self-propelled twin 40s. It consists of a modified T-54 tank chassis mounting twin 57-mm S-60 antiaircraft guns in an open turret[19]. The complete vehicle is estimated to possess mobility characteristics similar to those of the T-54 tank and the twin 57-mm guns to have performance capabilities equal to those of the towed weapon with its on-carriage optical sighting arrangements. To date no off-carriage fire-control equipment has been associated with the self-propelled version of the weapon. (S)

f. 85-mm Antiaircraft Gun KS-18/KS-18A -- The only current information on this weapon is its nomenclature and the fact that the cartridge case for its ammunition differs from that of other 85-mm rounds. Indications are that the cartridge case for this weapon is larger than that of the known 85-mm rounds, thus implying an improved performance for the KS-18. It may be a new weapon or a redesignation of the 85-mm antiaircraft gun M1944. (S)

* Formerly had the tentative model year designation, M1950.
17. See photograph, page 22.
18. See photograph, page 22.
19. See photograph, page 22.

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g. 100-mm Antiaircraft Gun Model KS-19 -- A 100-mm antiaircraft gun[20] is replacing the Soviet 85-mm antiaircraft guns M1939 in antiaircraft regiments of antiaircraft artillery divisions. This gun has similar ballistic characteristics to the 100-mm Field Gun M1944. The antiaircraft gun has a remote-control system, and its fire control consists of a radar component and a director. The gun itself has a power rammer, a single-round loading tray, and an on-carriage fuze setter. This gun formerly bore the tentative model year designation M1949. (C)

h. 122-mm Antiaircraft Gun M1955 -- A new 122-mm antiaircraft gun[21] was revealed for the first time in the Moscow May Day Parade of 1955 and therefore has provisionally been assigned the nomenclature, 122-mm Antiaircraft Gun M1955. The design features of this weapon show that it is a direct descendent of the United States 120-mm antiaircraft gun, a battery of which was furnished to the USSR in late World War II. The gun is equipped with a power-operated remote-control system, a power rammer and an automatic fuze setter. It is generally more complicated and sophisticated than earlier antiaircraft guns of Soviet design. This weapon is found in PVO (National Air Defense) AAA Divisions protecting strategic targets in the Soviet Union. (C)

3. Field[22]

a. The postwar family of Soviet field artillery consists of high-velocity guns and improved howitzers featuring greater range, less weight, and increased mobility than comparable pieces used during World War II. In the heavy artillery calibers the Soviets have revealed one new heavy gun-howitzer and two types of super-heavy self-propelled guns. The gun-howitzer is 203 mm in caliber and is standard equipment in the Soviet Army. The two super-heavy self-propelled weapons are estimated to be 305 to 380 mm in caliber. As far as can be judged at this time from a study of the available photography, both guns would appear to be low-pressure types and are probably intended to be the Soviet answer, from the point of view of prestige, to the United States 280-mm gun. With the introduction of tactical rockets and guided missiles into the Soviet Army, it is considered that these two weapons are not likely ever to be issued to troops, and that their inclusion in the latest Moscow parade was primarily for propaganda purposes, both as impressive pieces of equipment in themselves and as examples of Soviet technological ability. (C)

b. 85-mm Divisional Gun Model D-44 -- This weapon[23] has been issued throughout the Soviet Army. In its antitank role, its HVAP-T projectile penetrates 5.43 inches of armor at 0° at 500 yards. This gun is found in every echelon of the Soviet Army ground forces at and above regimental level. This weapon formerly bore the model year designation M1945. (C)

20. See photograph, page 23.
21. See photograph, page 23.
22. See characteristics table, page 27.
23. See photograph, page 29.

Figure 22. TABLE OF CHARACTERISTICS OF SOVIET FIELD ARTILLERY

Designation	Maximum Range (yds)	Weight Travel	Weight Firing	Armor Penetration (mm at 0° at 1,000 yds)	Projectile Weight (lbs)	Rate of Fire (rds per min)	Muzzle Velocity (fps)	Operationally Available*	Quantity Produced* as of 1 Jan 56	Annual Rate Production*
85-mm Div Gun D-44	17,100 w/HE 21,300 w/AP	3,800	3,800	111 at 20° w/APHE-T; 139 at 30° w/HVAP-T	HE and APHE-T -- 21 AP-T -- 11 HVAP-T -- 11	15	HE and APHE-T -- 2,600 AP-T -- 2,600 HVAP-T -- 3,380	1945	28,500	2,000
85-mm AUX-PAT Gun D-48 (S)	17,100 w/HE 21,300 w/AP	5,300	5,200	111 at 20° w/APHE-T; 139 at 30° w/HVAP-T	HE and APHE-T -- 21 AP-T -- 11 HVAP-T -- 11	15	HE and APHE-T -- 2,600 AP-T -- 2,600 HVAP-T -- 3,380	1953	4,100	2,000
100-mm Field Gun M1955	23,000* w/HE	6,600*	6,600*	155 at 20° w/APHE-T; 194 at 30° w/HVAP-T*	HE and APHE-T -- 35* HVAP-T -- Unknown	8*	HE and APHE-T -- 2,953*	1953	3,700	1,000
122-mm Field Gun D-74	24,700* w/HE	14,500*	14,500*	Unknown	HE - 48*; APHE-T and CP - 59*	6*	HE -- 2,690*	1958	2,000	400
130-mm Field Gun M46 (S)	30,000* w/HE	18,600	17,000	Unknown	HE and AP - 66*	5-6	HE and AP -- 3,051	1953	850	200
152-mm Howitzer D-20	15,000* w/HE	13,000*	13,000*	Unknown	HE and CP - 90*	4-5*	HE and CP -- 2,200*	1953	685	400
203-mm Gun-Howitzer M1955	28,000* w/HE	45,000*	45,000*	Unknown	HE - 225* CP - 230*	1 rds in 4 min*	HE -- 2,000*	1954	375	150
Super-Heavy SP Gun Type "A" (305 to 380 mm)*	No estimate	120,000*	120,000*	Not applicable	No estimate	No estimate	No estimate	Unknown	Unknown	Unknown
Super-Heavy SP Gun Type "B" (305 to 380 mm)*	No estimate	140,000*	140,000*	Not applicable	700	No estimate	2,000	Unknown	Unknown	Unknown

* Estimated

c. 85-mm Auxiliary-propelled Antitank Gun Model D-48 -- The Soviets recently have introduced this modified version of the 85-mm divisional gun[24]. This weapon is unique in that it has an engine mounted on the left trail leg which provides power by means of a drive shaft to the gun carriage wheels, enabling the piece to be moved short distances without its prime mover. The weapon is steered by a steering wheel which controls a single castor wheel positioned beneath the trail spades. There is a rectangular box on the right trail leg behind the gun shield which is believed to be a storage container for a few rounds of ready ammunition and also provides a seating platform for part of the gun crew. No doubt this weapon is designed to accompany and support with direct fire advancing ground troops. It is particularly significant in atomic warfare where it is essential that unprotected equipment be moved quickly to and from protective cover. It is found in Soviet rifle regiments and antitank battalions of rifle divisions. It is also found in mechanized regiments of mechanized and tank divisions. (C)

d. Other Auxiliary-propelled Antitank Guns -- Auxiliary-propelled versions of the 57-mm Antitank Gun M1943 and the 100-mm Field Gun M1955 are reported to exist. (S)

e. 100-mm Field Gun Model 1955 -- On 1 May 1955, the Soviets revealed a new 100-mm field gun[25] which currently is replacing the 100-mm Field (and Antitank) Gun M1944. The new weapon has been reported with line divisions, at Army level, and in the reserve artillery of the High Command (RVGK). It is considered to have a performance at least equal to its predecessor in both field artillery and antitank roles. The outstanding recognition feature of the new artillery piece is a recoil system which is positioned behind the gun shield and over the breech ring. This type of recoil system is suitable for mounting in armored combat vehicles. Its carriage is equipped with single wheels as opposed to the dual wheels used on the 1944 model, and it has one castor wheel on the trails near the spades which is lowered and used to gain rapid traverse when the gun is in action. (C)

f. 122-mm Field Gun Model D-74 -- This weapon[26] is lighter and shorter than the 130-mm M-46 discussed below. It has a jack-type firing pedestal on the carriage, and both trails are fitted with a castor wheel for facilitating all-round traverse; thus the weapon is well-suited to perform antiarmor missions. Unlike the 130-mm M-46, its tube remains in battery while the weapon is in the traveling position, and no limber is required for towing purposes. This gun, which is found at Army level and in the reserve artillery of the High Command (RVGK), probably is a replacement for the 122-mm Corps Gun M1931/37. (C)

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24. See photograph, page 29.
25. See photograph, page 29.
26. See photograph, page 30.

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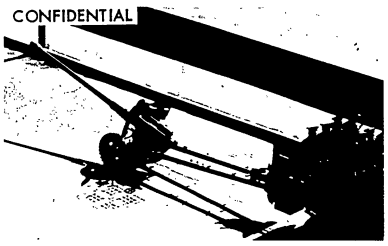

FIG 23. 85-mm Divisional Gun Model D-44. (U)

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FIG 24. 85-mm Auxiliary-Propelled Antitank Gun D-48. (S)

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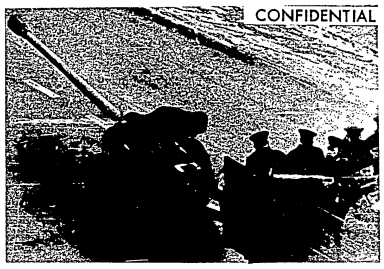

FIG 25. 100-mm Field Gun M1955. (U)

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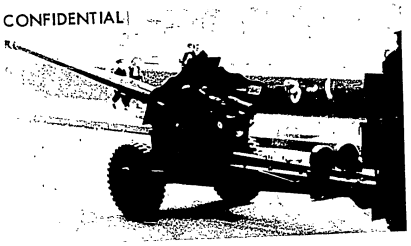

FIG 26. 122-mm Field Gun Model D-74. (U)

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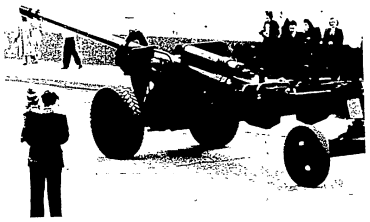

FIG 27. 130-mm Field Gun Model M-46. (S)

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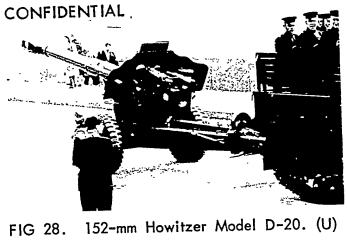

FIG 28. 152-mm Howitzer Model D-20. (U)

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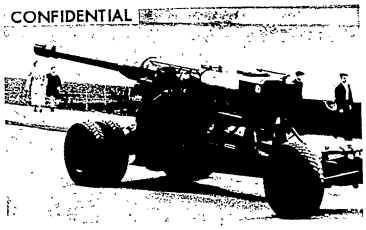

FIG 29. 203-mm Gun-Howitzer M1955. (U)

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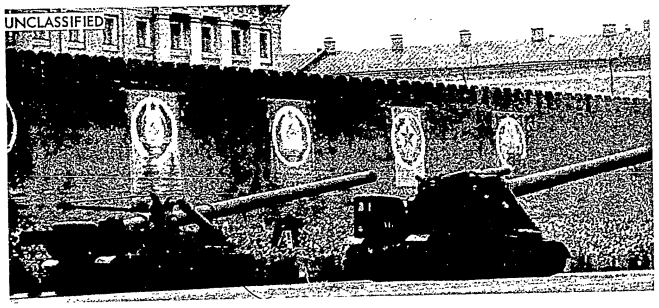

FIG 30. Super-Heavy Self-Propelled Guns. (U)

g. 130-mm Field Gun Model M-46 -- A new long-range field gun[27], 130 mm in caliber, appeared in Moscow in 1954. It is equipped with a muzzle brake and a sliding wedge breech mechanism. The weapon is mounted on a single-axle carriage, uses a single-axle limber for traveling purposes, and is moved out of battery for transit. Like the new 100-mm field gun, this weapon is found at Army level and in the reserve artillery of the High Command (RVGK). This piece of artillery formerly was carried as the 122-mm Field Gun M1954. It is known to have an antitank capability. (S)

h. 152-mm Howitzer Model D-20 -- In the next higher caliber, a new howitzer[28], estimated to be 152 mm in caliber, was revealed for the first time in the 1955 Moscow May Day Parade. It is mounted on a carriage identical to that of the 122-mm Field Gun D-74. Its tube appears to be somewhat longer than the tube of the 152-mm howitzers, M1938 and M1943; the weapons it probably is replacing. This weapon is found at Army level and in the reserve artillery of the High Command (RVGK). (C)

i. 203-mm Gun-howitzer Model 1955 -- This new heavy field artillery piece[29] was included in the Moscow May Day Parade of 1955. It has a tube length of approximately 27 feet, and is considered to be a gun-howitzer. Compared with older Soviet heavy field artillery weapons, which are equipped with cumbersome, low-speed tracked carriages or are broken down into multiple loads for displacement, the new weapon features vastly increased mobility and a considerable reduction in the time required to place the gun into and out of action. The appearance of the new gun-howitzer indicates that the Soviets are taking steps to correct one of the major weaknesses of their artillery system, the inadequate mobility of their heavy pieces. This new weapon is found only in the reserve artillery of the High Command (RVGK). (C)

j. Super-heavy Self-propelled Guns -- Two types of super-heavy self-propelled guns were displayed in the parade held in Moscow, 7 November 1957[30]. (When referring to the photograph included in this study, the weapon on the left will be called Type "A" and the one on the right Type "B".) Both guns are mounted on a lengthened heavy tank chassis, accenting the Soviet drive toward mobility even for super-heavy weapons. Both guns are estimated to be of 305 to 380 mm (12 to 15 inches) in caliber, although the tube wall thickness appears to be greater in Type "B". Both are low tube-pressure guns with an atomic capability. Type "A" has no visible jacket or recoil mechanism, and appears to be more of an experimental weapon than Type "B". It may fire a fin-stabilized shell or be a closed-breech rocket launcher. Type "B" is an orthodox gun which could fire a 700-pound shell at a muzzle velocity of 2,000 feet per second. Both guns probably are prototypes. (C)

27. See photograph, page 30.
28. See photograph, page 30.
29. See photograph, page 31.
30. See photograph, page 31.

k. Notes of Interest

(1) A light-weight 57-mm towed gun, ballistically identical to the M1943 model of the same caliber, is known to exist, perhaps for airborne use. (S)

(2) ACSI gives the Soviet artillery the physical capability of firing atomic rounds in all weapons of 200-mm caliber and larger. (C)

(3) In some cases model number designations are unknown therefore model year designations are used in this study. The year used is based on the first sighting of the weapon concerned by western observers. (U)

4. Artillery Mortars[31]

a. The 160-mm Mortar M1943, introduced near the close of World War II, is being replaced by a new 160-mm weapon of greater range. A new and larger mortar, 240-mm in caliber, has been added to the family. (C)

b. 160-mm Mortar Model M-160 -- This 160-mm smoothbore weapon[32] is much heavier, has a more substantial mount, and a much larger tube than its predecessor. A difference exists between it and the 160-mm M1943 mortar in that the new mortar is designed to fire along lower trajectories than is usual for a mortar. Maximum elevation is 50°. This weapon is found at and above divisional artillery level in the Soviet Army. (S)

c. 240-mm Mortar Model M-240 -- This mortar's configuration[33] is similar to mortars normally associated with infantry in that it uses a base plate and elevating and traversing mechanisms. Like both the 160-mm mortars, this weapon is breech loaded and is towed muzzle foremost by means of a muzzle clamp. This mortar has an extremely long tube, approximately 18 feet in length. An unusual feature is the provision of a firing platform which is anchored to the ground by pickets. This weapon can easily be distinguished from other Soviet heavy mortars by its greater bulk, long tube, and the two vertical cylinders which are prominently located on each side of the tube just even with the forward edge of the carriage wheels. Although mortars approaching the caliber of this new weapon have been developed in the past, they have not seen widespread use. Like the new 160-mm weapon, this mortar has a maximum elevation of 50°. The introduction of this heavy mortar appears to be an extension of the existing Soviet weapons system. It is found only in the Soviet reserve artillery of the High Command (RVGK). (S)

31. Characteristics table, page 34.
32. See photograph, page 35.
33. See photograph, page 35.

Figure 31. TABLE OF CHARACTERISTICS OF SOVIET MORTARS

Designation	Maximum Range (yds)	Projectile Weight (lbs)	Rate of Fire (rpm)	Weight (lbs) Travel	Weight (lbs) Firing	Operationally Available*	Quantity Produced* As of 1 Jan 58	Annual Rate of Production*
82-mm Mortars M1937, M1941, and M1943	3,320	HE - 7.3 SMK - 7.6	Up to 25	M1937 123 M1941 128 M1943 128	123 115 128	1938	260,140	1,000
120-mm Regimental Mortars M1938 and M1943	6,240	HE - 35.05 SMK - 36.38	Up to 15	1,102	606	1939	153,850	2,000
160-mm Mortar M1943	5,500	HE - 88	3	2,480	2,381	1943	33,900	Not in current production
160-mm Mortar M-160	8,800	HE - 88*	2 to 3	3,100	2,870	1949	4,300	1,000
240-mm Mortar M-240	10,600	HE - 220*	1	9,150	8,000	1951	1,800	500

* Estimated

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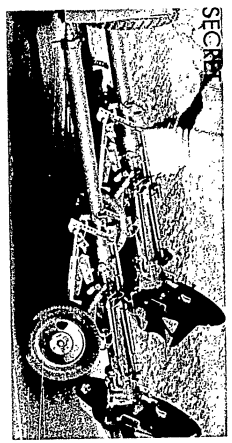

FIG 32. 160-mm Mortar Model M-160. (U)

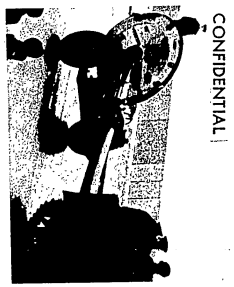

FIG 33. 240-mm Mortar Model M-240. (S)

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Figure 34. TABLE OF CHARACTERISTICS OF SOVIET FIELD ROCKET LAUNCHERS (FREE ROCKETS)

Designation	Maximum Range (yds)	Weight of Rocket* (lb)	Weight of Equipment Loaded* (lb)	Diameter of Warhead (in)	Length of Rocket* (ft)	Method of Stabilization	Operationally Available*	Quantity Produced* as of 1 Jan 58	Annual Rate of Production*
140-mm RL (16 rd) BM-14 on ZIS 151	11,000	HE - 98	18,000	5.5	3	spin	1952	3,600	1,000
200-mm RL (4 rd) on ZIS 151	22,000*	HE - 350	20,000	7.9*	10	fin (slow spin)	1952	600	100
240-mm RL (12 rd) BM-24 on ZIS 151	11,000*	HE - 240	19,800	9.45	4	spin	1951	2,700	700
240-mm RL (12 rd) on TP: M1954	11,000*	HE - 240	30,000	9.45*	4	spin	1955	500	200
250-mm* RL (6 rd) on YaAZ 214	22,000*	HE - 1,000 CHEM - 1,000	34,000	10*	17	fin (slow spin)	1954	10,000 (rockets)	Unknown
1 rd RL on amphibious chassis	30,000*	HE, CW, and nuclear 5,400	36,000	23	29.6	fin (slow spin)*	1954	5,000 (rockets)	Unknown
1 rd RL on JS-type chassis	70,000*	HE, CW and nuclear 7,000	73,000	33*	32	fin (slow spin)*	1954	4,000 (rockets)	Unknown

* Estimated

5. Field Rocket Launchers (Free Rockets)[34]

a. The Soviets continue to expand the variety of rocket launchers available to their field forces. In addition to three truck-mounted multiple rocket launchers which have appeared in recent years, they have now displayed an improved version mounted on a full-tracked prime mover. They have also maintained the emphasis on mobility in their two new long-range ballistic rockets. One of these is mounted on a full-tracked amphibious carrier, the other on the chassis of a heavy tank. Parallel with these developments they have continued to improve their orthodox launcHers by introducing a new six-round launcher mounted on a heavy truck. (U)

b. 140-mm Rocket Launcher (16 round) BM-14 -- The launching tubes of this rocket launcher[35] are arranged in two tiers of eight each from which it fires 140-mm spin-stabilized rockets. This launcher is probably a replacement for the 132-mm rocket launcher M-13 and is found in all Soviet mechanized divisions, army artillery level, and the reserve artillery of the High Command (RVGK). (C)

c. 200-mm Rocket Launcher (4 round) -- This launcher[36] was first seen in the Moscow May Day parade in 1954. It has four large launching frames mounted parallel in a single bank from which it fires fin-stabilized rockets. In addition, each launching frame is equipped with built-in guide rails which impart initial slow spin to the fired rockets to aid stability. The small number of rockets, their length, and their shape indicate that this rocket launcher is not designed for the area saturation role normally performed by Soviet field rocket launchers. It is believed to be intended for long-range interdiction. It is possible that the rockets have a specially designed warhead. This weapon is found only in the Soviet reserve artillery of the High Command (RVGK). (C)

d. 240-mm Rocket Launcher (12 round) BM-24 -- This launcher[37] has 12 circular open-crate launching frames mounted in 2 banks of 6 each from which it fires spin-stabilized rockets. This launcher is considered to be a normal development from the 300-mm rocket launcher M-31 and features a changeover from fin-stabilized to spin-stabilized rockets which are spun by means of anglod venturi in the base of the rockets. This weapon is found in Soviet tank divisions, army artillery level, and the reserve artillery of the High Command (RVGK). (C)

e. Each of the three rocket launchers described above are mounted on the ZIS-151 6 x 6 truck chassis. The trucks are equipped with metal shields which are normally carried on the roof of the cab but which are lowered over the windshield and cab windows for protection during firing. (C)

34. Characteristics table, page 36.
35. See photograph, page 38.
36. See photograph, page 38.
37. See photograph, page 38.

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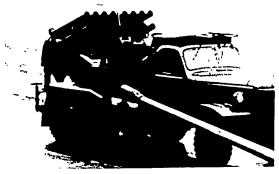

FIG 35. 140-mm Rocket Launcher (16 Rounds) BM-14. (U)

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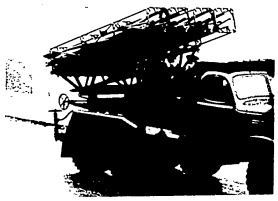

FIG 36. 200-mm Rocket Launcher (4 Rounds). (U)

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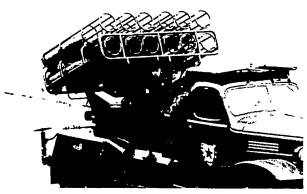

FIG 37. 240-mm Rocket Launcher (12 Rounds) BM-24. (U)

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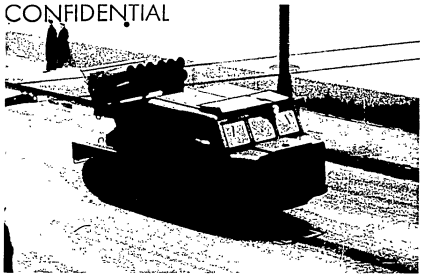

FIG 38. 240-mm Rocket Launcher (12 Rounds) On Tracked Prime Mover M1954. (U)

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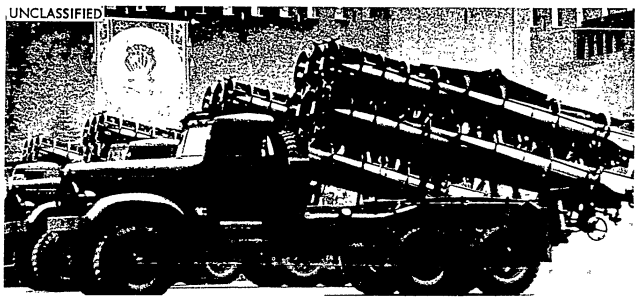

FIG 39. 250-mm (?) Rocket Launcher (6 Rounds). (C)

f. 240-mm Rocket Launcher (12 round) on Tracked Prime Mover M1954 -- Constant Soviet efforts to improve ground mobility are readily detectable in this item of equipment.[38] The mounting of this 12-tube launcher on the chassis of a medium artillery tractor provides a much greater cross-country capability than that of its predecessor, the 240-mm truck-mounted rocket launcher (12 round) BM-24. The ballistic performance of the new weapon is apparently very similar to that of the BM-24. Unlike the BM-24, however, the rockets are launched from short tubes instead of from open crate-types frames. (C)

g. 250-mm (?) Rocket Launcher (6 round) on YaAZ-214 -- First seen in the November 1957 Moscow parade, this is the largest and most effective weapon in the range of Soviet multilaunch rockets.[39] Mounted on the latest heavy (8 ton) truck chassis, the 6 x 6 YaAZ-214, the launcher is of typical Soviet design, imparting slow spin to the fin-stabilized rockets by means of helical guide rails. The rocket motor is of the single-venturi, solid propellant type, and the warheads used are probably high explosive and chemical. Elevation and a few degrees of traverse are achieved by handwheels at the rear, and the elevation can also be mechanically or hydraulically controlled from the driver's cab. Jack pads at the rear are lowered to improve the stability of the platform. (C)

h. 1-round Rocket Launcher on Amphibious Chassis -- This is the smallest of the Soviet missiles[40] first displayed in November 1957. It is unguided and corresponds tactically to the United States "Honest John", though its full-tracked amphibious chassis gives it a high degree of mobility. The unusual shaped warhead weighs about 1000 pounds indicating nuclear capability of about 20-25 kilotons. The rocket motor is a solid propellant type and is in two non-separating sections. The reason for this is not clear; it may be for range zone purposes, to simplify manufacture and transport or to give high initial boost from one section followed by sustained thrust from the other. To maintain accuracy from the short launching rail the rocket is probably spun by canted jet nozzles. (S)

i. 1-round Rocket Launcher on JS Type Chassis -- This rocket[41] is estimated to have a range of 35 nautical miles and, with a 1500-pound warhead, a nuclear capability of 300 to 500 kilotons yield. The unusual jacket-type launcher may incorporate a heating element to prevent cold-weather damage to the solid propellant of the motor. The main exhaust exits through seven venturi at the rear, but additional canted nozzles are probably provided to impart slow spin for accuracy. The armor thickness of the chassis is expected to be the minimum consistent with necessary rigidity. The maximum road speed is estimated at 21 m.p.h., and the cruising range at 90 miles. Elevation is by hydraulic means, and the launcher can probably be traversed only a few degrees relative to the chassis. (S)

38. See photograph, page 39 .
39. See photograph, page 39 .
40. See photograph, page 41 .
41. See photograph, page 41 .

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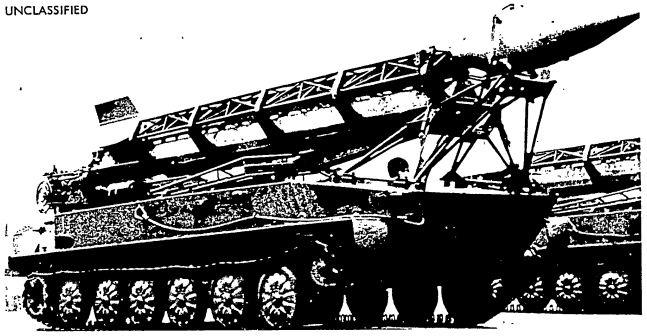

FIG 40. 1-Round Rocket Launcher On Amphibious Chassis. (U)

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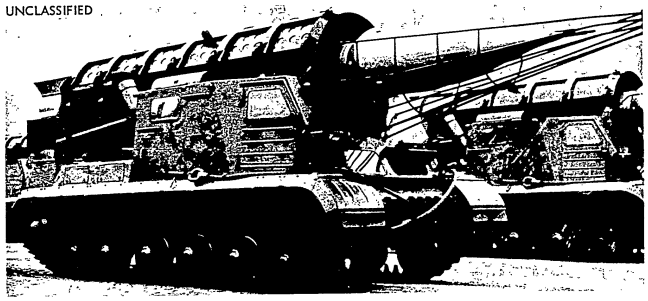

FIG 41. 1-Round Rocket Launcher On JS Type Chassis. (U)

j. Future Artillery Trends

(1) Antiaircraft Artillery -- In the antiaircraft field, it is likely that the 100-mm and 122-mm weapons will be replaced, during the next five years, by surface-to-air guided missiles for defense against high altitude attack. The 14.5-mm AAHMG and 57-mm (both towed and SP versions) will no doubt be retained in field armies during this period to carry out roles against low-level attack. Improvements in mobility may be made to the 14.5-mm and the towed 57-mm antiaircraft weapons. The Soviets will continue to make improvements to fire control equipment for all the existing antiaircraft pieces. It is unlikely that any new conventional antiaircraft guns will be introduced during the next five years. (C)

(2) Field and Antitank Artillery -- The Soviet Army now has a complete family of post-World War II field artillery weapons. All field guns up to 152-mm caliber can be used in the antitank role, however, during the period in question, such antiarmor missions now being performed by the dual-purpose 85-mm Divisional Gun D-44, the 85-mm auxiliary-propelled AT gun D-48, and the 100-mm Field Gun M1955 may be taken over by a suitable surface-to-surface guided antitank missile. The 100-mm Field Gun M1955 and the older 57-mm Antitank Gun M1943 may be modified in a similar manner as the 85-mm D-48 piece to incorporate an auxiliary means of self propulsion. Reports on hand indicate such modifications have already been made to the two weapons. To date, no information is available concerning modern gun-data computers for the Soviet field artillery. Such instruments may be expected to appear in the near future. (S)

(3) Heavy Mortars -- Soviet heavy mortars, with probable minor modifications, are expected to be retained to carry out missions with the Soviet field artillery. (C)

(4) Rocket Launchers -- Like the new 240-mm Rocket Launcher (12 round) on Tracked Prime Mover M1954, the 140-mm (16 round) and the 200-mm (4 round) weapons may well appear mounted on full tracked carriages in the near future. (C)

(5) Self-propelled Field Artillery -- Since the Soviets have continued to place such emphasis on mobility for all their artillery weapons, it is likely that the new 122-mm and 130-mm guns, the 152-mm howitzer, and the 203-mm gun-howitzer will appear in self-propelled versions during the next five years. (S)

(6) Free Rockets -- More varieties of surface-to-surface 1-round artillery rockets will no doubt be revealed during this period. (C)

(7) Ammunition

(a) In the field of ammunition, although virtually no improvements over World War II designs have been reported, there is little doubt that great progress has been and will continue to be made. The Soviets exploited the German technicians at a time when such problems were of first importance, it then being considered that it was only through radical improvements in ammunition that artillery fire power could be increased. (C)

(b) The Soviets have long had both a high-capacity HE shell for blast effect and a thick-walled shell for fragmentation. It is estimated that improvements will be made, if this has not happened already, in the design of optimum fragmentation shells on the lines of internally serrated shell bodies and fillings, improved booster designs or brittle shell with low-brisant fillings. The use of combined HE/Chemical fillings may be expected in fragmentation shells. Increased ranges for the larger guns may be achieved by the use of travelling charges, ramjet or rocket-assisted shells. There is room for considerable reduction in the types, variants and weight zones of ammunition available for each gun, to ease the present logistic problems. Proximity and mechanical time fuzes, which are now in use for anti-aircraft guns, will be made available for field artillery of like calibers. (S)

(c) Antitank ammunition now consists largely of AP, AP-HE, shaped charge (HEAT) and arrowhead (HVAP) projectiles. Improved performance may be expected by the introduction of high-velocity discarding sabot and HEP shell; but there is no information that the Soviets are considering the use of any techniques to defeat armor which are not already in use in the West. (C)

SECTION C

INFANTRY WEAPONS

1. General

a. Since World War II the Soviets have introduced a new range of infantry weapons[42], which is now in full use in the Soviet Army. The Satellite Armies are beginning to receive these newest small caliber weapons. The main features of this new small arms program are:

(1) The standardization of shorter and less powerful rounds of ammunition, the 7.62-mm M1943 series, which are common to the new submachine gun, rifle and light machine gun. In bullet weight, velocity and effective range the ball round falls midway between the United States caliber .30 rifle and carbine rounds; its use reduces the infantryman's combat load and materially eases the supply problem.

(2) The introduction of a complete series of recoilless antitank weapons, which are very mobile and provide effective close-in protection for infantry.

(3) A marked improvement in the quality of production and the finish of the new weapons. For example, the submachine gun and the machine gun both have chrome plated bores, and the rough metal stampings, which were a feature of the older weapons, have been eliminated. At the same time, simplicity of design has been maintained. (U)

b. World War II Weapons in Current Service -- Several infantry weapons used by the Soviets in World War II are still in current service. These weapons are:

(1) 82-mm Mortar Models 1937, 1941 and 1943
(2) 120-mm Mortar Models M1938 and M1943
(3) 7.62-mm Goryunov Heavy Machine Gun M1943
(4) 12.7-mm DShK Heavy Machine Gun M1938 and M1938/46

These weapons fulfill a specific requirement. Modifications and improvements to these weapons and their ammunition are to be expected, but no replacements in the form of newly designed equipment have been seen. Characteristics of the mortars are given with those of the artillery mortars in Figure 31, page 34. The 12.7-mm machine guns are now seen primarily as secondary armament on tanks, on ground tripod antiaircraft mounts and on armored carriers. Personnel carriers are also seen mounting the 7.62-mm Goryunov and also, though infrequently, a twin 14.5-mm mount using the same basic gun as the ZPU-2 and ZPU-4.[43] (U)

42. See Characteristics Table, page 51.
43. For description of ZPU guns see Artillery section, page 21.

c. Postwar Infantry Weapons -- In addition to the weapons described below, two new 9-mm pistols and two new grenades have been introduced. Discussion of these is omitted from this study as they are not considered to be significant developments. Detailed treatment of all Soviet infantry weapons is available in DA Pamphlet 30-7-1. (U)

2. Description and Employment

a. 7.62-mm Kalashnikov Submachine Gun (AK) -- This is the new submachine gun[44] of the Soviet Army which has replaced the World War II model in the rifle squad, and is the personal arm of troops of all arms. There are two versions of the same weight, one with a wooden stock and the other with a folding metal stock. The latter is generally seen with specialist troops such as airborne troops and tank crews, but is also in use by the infantry. The weapon fires the same round as the SKS carbine and the RPD light machine gun, is gas operated and can be used either for full or semiautomatic fire. With a long range for this type of weapon, 440 yards at semiautomatic, it would be considered as a selective fire rifle by United States standards. A detachable bayonet is provided with the weapon. (U)

b. 7.62-mm Simonov Semiautomatic Carbine (SKS) -- This is the standard weapon[45] of the Soviet rifle squad, but is found with all arms. Gas operated, it is the second of the new weapons firing the short M1943 round and replaces the bolt-action rifles and carbines of World War II. Because of its size and employment it would be considered a rifle by United States standards. It has the unusual feature of a permanently attached folding bayonet, which may be either knife or needle type; using the latter, the weight is reduced by about 5 ounces. (U)

c. 7.62-mm Degtyarev Light Machine Gun (RPD) -- The RPD[46] is the third weapon in the series firing the short M1943 round, and is the base of fire of the Soviet rifle squad. Its higher rate of fire, resulting from the adoption of belt feed, and its lighter weight make this a much more handy and effective weapon than its predecessors. The barrel has a chrome-plated bore but is not of the quick-change type, and the metallic link belt is carried in the drum attached below the receiver. Although it has a high cyclic rate of fire of about 650 rounds a minute, it develops an effective rate of only 150 r.p.m. (U)

d. 7.62-mm Company Machine Gun M1946 (RP-46) -- This was the first of the postwar infantry weapons,[47] and is designed to give a high rate of sustained fire. Although it first came into service in 1947, it immediately disappeared until 1954, when it took its place as the company support machine gun along side the new family of small arms. Like the Goryunov heavy machine gun, it fires the old M1908 rimmed long rifle round, and it uses the same metallic link belt, five lengths being

44. See photograph, page 47.
45. See photograph, page 47.
46. See photograph, page 47.
47. See photograph, page 48.

FIG 44. 7.62-mm Kalashnikov Submachine Gun (AK). (U)

FIG 45. 7.62-mm Semiautomatic Carbine (SKS). (U)

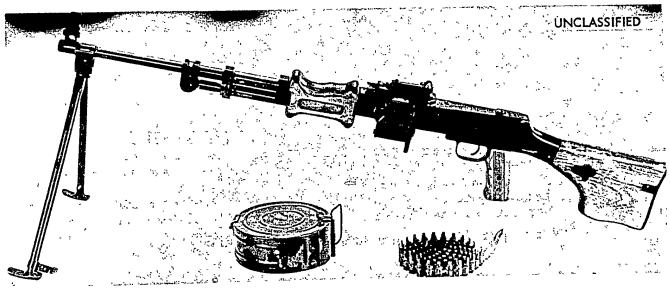

FIG 46. 7.62-mm Light Machine Gun (RPD). (U)

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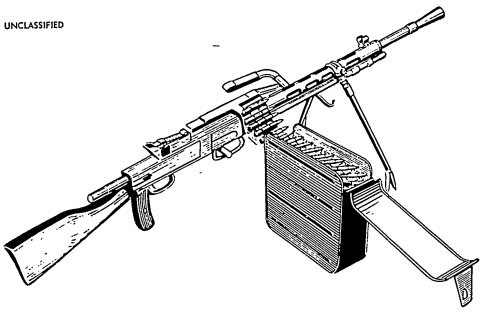

FIG 47. 7.62-mm Company Machine Gun M1946 (RP-46). (U)

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FIG 48. Infantry Antitank Launcher RPG-2. (U)

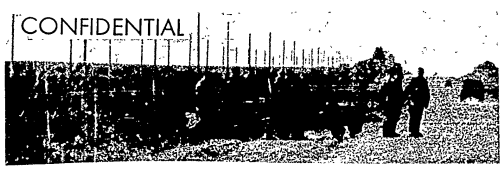

FIG 49. 82-mm Infantry Antitank Launcher SPG-82. (U)

joined to make a 250-round belt. It fires fully automatic only and has a quick-change barrel. (U)

e. Infantry Antitank Launcher RPG-2 -- The RPG-2[48] is the Soviet squad antitank weapon, and is an improved version of the German World War II recoilless antitank grenade launcher. It is muzzle loaded, has a caliber of 40-mm, while the warhead of the fin-stabilized shaped-charge projectile is 82-mm in caliber. The propellant is threaded on to the tail shaft of the projectile, which is percussion fired. The greater part of the launcher tube to the rear of the trigger assembly is insulated to protect the firer. (U)

f. 82-mm Infantry Antitank Launcher SPG-82 -- This battalion antitank weapon[49] was first seen in 1947, but, like the company machine gun, did not come into service until 1954. Its present status is not known, but it is possible that it is being replaced by the 82-mm gun below. It is a breech-loaded, recoilless, smooth-bore rocket launcher and fires fin-stabilized, shaped-charge and HE projectiles. It is mounted on a light, two-wheeled carriage and has a light shield for blast protection. The launcher can be removed from its mount and fired from the shoulder. Having no elevating or traversing gears, aiming is by shoulder control in both cases. (C)

g. 82-mm Recoilless Antitank Gun B-10 -- This is also a battalion antitank weapon now standard in the Soviet and in some Satellite Armies. It fires a fin-stabilized, shaped-charge round with an armor penetration similar to that of the SPG-82, but it has a greater effective range and an improved rate of fire. Also, it can fire an antipersonnel HE round, and has an elevating mechanism. For these reasons it is considered that this weapon[50] may be a replacement for the less-refined SPG-82 as the recoilless battalion AT gun. It is hand towed by the muzzle grips, and may be fired off either the wheels or the tripod mount. Its maximum HE range is about 4500 yards. (S)

h. 107-mm Recoilless Antitank Gun B-11 -- This is principally a regimental antitank weapon,[51] but it is also found with the motorized rifle battalion of mechanized regiments. The gun is similar in design to, but larger than, the 82-mm B-10, probably also firing fin-stabilized HEAT and HE rounds from either the tripod mount or its wheels. It is normally vehicle towed, using the conspicuous lunette on the muzzle. The mount has both elevating and traversing gears, and is equipped with open and telescopic sights. Its maximum HE range has been reported to be about 7000 yards. (S)

3. Future Trends

a. This study of the current Soviet infantry weapons shows that they continue to emphasize the importance of the role of infantry in any future conflict. The rate of re-equipment and the quality of the weapons indicate that the Soviet production capability has been greatly increased since World War II. (C)

48. See photograph, page 48.
49. See photograph, page 48.
50. See photograph, page 50.
51. See photograph, page 50.

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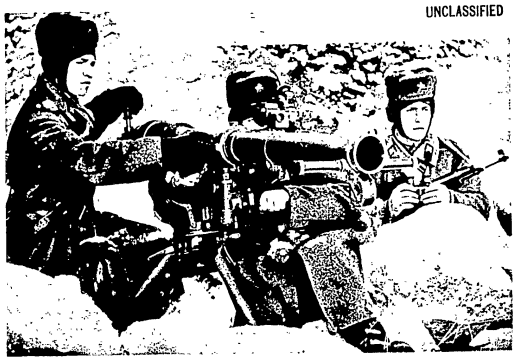

FIG 50. 82-mm Recoilless Antitank Gun B-10. (S)

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FIG 51. 107-mm Recoilless Antitank Gun B-11. (C)

Figure 42. TABLE OF CHARACTERISTICS OF SOVIET INFANTRY WEAPONS

Designation	Weight (lb) (empty)	Length (in)	Effective Range (yds)	System of Operation	Effective Rate of Fire (r.p.m.)	Feed Device	Operationally Available*	Quantity Produced* As of 1 Jan 58	Annual Rate of Production*
7.62-mm Submachine Gun, AK	9.5	34.3	440-Semi-automatic 330-Auto	Gas Selective	40-Semiauto 90-Auto	30-rd Box Mag.	1949	2,275,000	300,000
7.62-mm Carbine, SKS	8.5	40.2	440	Gas-SA	40	10-rd Box Mag.	1947	6,705,000	750,000
7.62-mm Light MG, RPD	14.5	40.8	880	Gas-Auto	150	100-rd Belt in drum	1949	304,000	40,000
7.62-mm Company MG, RP-46	28.7	50*	880	Gas-Auto	250	250-rd Belt	1946	47,500	6,000
7.62-mm Heavy MG, Goryunov M1943	87.1	45.3 Gun only	1,100	Gas-Auto	350	250-rd Belt	1943	123,000	5,000
12.7-mm Heavy MG, DShK, M1938/46	269	62.7	1,640	Gas-Auto	80	50-rd Belt	1946	590,000	10,000

Antitank Weapons	Weight (lb) (empty)	Length (in)	Effective Range (yds) vs. Armor	HEAT Proj Weight (lb)	Effective Rate of Fire (r.p.m.)	Penetration* mm/0	Operationally Available*	Quantity Produced* As of 1 Jan 58	Annual Rate of Production*
AT Launcher RPG-2	6.1	37.4	100-150	3.3	4-6	180	1949	238,000	25,000
82-mm AT Launcher SPG-82	66*	59*	300*	n a	2	180-229	1948	30,000	4,000
82-mm Recoilless AT Gun, B-10 (S)	187	66	650*	8*	8	180-229	1948		
107-mm Recoilless AT Gun, B-11 (C)	675	131	1000*	20*	6*	330	1951	14,500	2,500

* Estimated

b. In view of the high quality and large numbers of the personal and antitank weapons now available, it is considered that there will be no introduction of new weapons of these types in the next few years. One possible change may be the withdrawal of the SKS carbine from the family of small arms, its role being taken by the AK submachine gun; with the same performance, the AK has the advantages of a larger magazine and the possibility of both semi- and full-automatic fire. Among the antitank weapons, the existence of two battalion weapons, the SPG-82 and the 82-mm B-10, may well lead to another change, namely the suppression of one of them. This situation is complicated by the existence of a new Czechoslovak weapon which, though of apparently higher quality, is so similar to the SPG-82 that they may both have been designed to meet the same military requirement. The Czech gun, the 82-mm "Tarasnice", is a recoilless gun but much lighter than the SPG-82, and is in service in all the European satellite armies, as well as in Egypt and Syria. (C)

c. In the machine gun family the program of modernization and ammunition standardization has apparently lagged far behind that in other fields. The Company and Goryunov 7.62-mm and the 12.7-mm DShK are used variously as infantry, carrier and tank mounted weapons in both the ground and antiaircraft roles. The 14.5-mm twin and quad guns are used as towed and carrier-mounted antiaircraft weapons, and a single ground version, the PKP, has been reported. This multiplicity of weapons, mostly of older design and firing rounds which could be considerably improved and standardized, appears to run counter to Soviet weapon policy. It is therefore expected that the next few years will see the appearance of a new family of machine guns to eliminate these faults. (C)

SECTION D

AIRCRAFT AND AIRBORNE EQUIPMENT

1. General

a. Since the end of World War II the U.S.S.R. has made impressive gains in the development of combat and transport aircraft of all types. Soviet development of helicopters and cargo aircraft suitable for airborne operations, being of particular interest and concern to the Department of the Army, are discussed in the following paragraphs. Details pertaining to Soviet combat aircraft may be found in "Characteristics and Performance Handbook, USSR Aircraft" published by the Department of the Air Force. For the purposes of this study it suffices to say that the Air Force of the Soviet Army is currently equipped with all types of modern combat aircraft including supersonic and all-weather jet interceptors, light, medium and heavy jet bombers and effective ground support aircraft. As regards performance, these aircraft are generally comparable to equivalent aircraft currently in service with the U.S. Air Force. (C)

b. No major improvements in special airborne equipment or airborne supply equipment have been detected in recent years. The only item of interest to make its appearance recently was a tracked SP gun carriage mounting a 57-mm gun. It is believed that this vehicle was designed primarily for airborne use. A full discussion of the vehicle is found in Section A, para 3a(3). In view of the lack of new or significant changes in Soviet airborne equipment the subject is not treated in detail in this study. For detailed information reference is made to ACSI Intelligence Research Projects No. 9845 "Soviet Airborne and Aerial Supply Operations", dated 1 October 1956 and No. 8908, "Airborne Equipment and Airborne Defenses of the Soviet Union", dated 13 July 1955. (C)

2. Helicopters [52]

a. Although the Soviets had experimented with helicopters prior to World War II, relatively little attention was devoted to this aspect of aeronautics during the period 1941-1949. This was probably the result of the heavy emphasis and priority placed on development of

52. See table, page 60 .

SPECIAL HANDLING REQUIRED
NOT RELEASABLE TO FOREIGN
NATIONALS EXCEPT UK and Canada
BY AUTHORITY OF [illegible] DATE 5 March 58
[illegible] CE
(All portions of Section D require Special Handling as indicated above.)

combat aircraft, at first required to prosecute the war and later to catch up with the United States. However, around 1949 a definite change in policy took place in the U.S.S.R. and from this time we see the Soviets actively and successfully developing a series of helicopter models ranging from the ultra-light to what is probably the largest helicopter in the world today. The helicopter is now a standard item of equipment in the Soviet Army. Aircraft of this type are used for liaison, reconnaissance, supply missions, medical evacuation and assault operations. Recently, the Soviets started arming their helicopters, and it is expected that soon most of their military helicopters will be equipped with rapid firing guns (23-mm caliber or larger), machine guns, and/or rockets. (C)

b. The HAT

(1) The smallest helicopter currently available for operational use is known by the name HAT.[53] Soviet designations K-10, K-17, and K-19 have been associated with this aircraft. All the differences among these models have not yet been determined, but it is believed that at least the power plant is different in each model. In addition to the three models of the HAT mentioned above which are open and look alike, it is believed that a fourth model exists which is covered by a plastic or aluminum fuselage for protection of the pilot and instruments during adverse weather conditions. The HAT can lift only one person, namely, the pilot, and consequently is suitable only for limited reconnaissance and liaison duties. As the photograph shows, the HAT is equipped with floats and can land safely on ground or water. Recent information indicates that the K-10 version of the HAT is in production. The HAT obtains lift from two sets of counter-rotating, three-bladed rotors mounted coaxially on a single rotor shaft. The counter-rotating principle eliminates the need for a counter-torque tail rotor. (C)

(2) The HAT has been under development since 1949. It is, therefore, unlikely that this aircraft will undergo any further major modifications in the future. Instead, it is likely that the Soviets will initiate an entirely new design for an ultra-light helicopter to replace the HAT should there be a continuing requirement for such an aircraft. (C)

c. The HARE

(1) There are two versions of the utility helicopter known by the code name HARE.[54] These carry Soviet designations MI-1 and MI-3.[55] The MI-1 is the more common version of the HARE and has been in service with the Soviet Army since 1951. (C)

(2) The MI-3 represents a major modification of the original MI-1. The entire power system has been changed. The AI-26V (575 h.p.) engine has been replaced by the ASH-21 rated at 740 h.p.

53. See photograph, page 55.
54. See photograph, page 55.
55. See photograph, page 55.

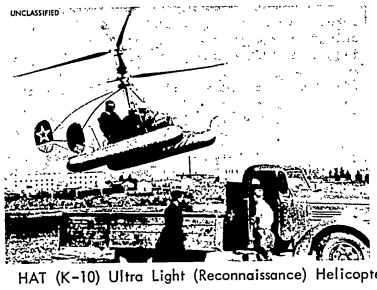

FIG 53. HAT (K-10) Ultra Light (Reconnaissance) Helicopter. (U)

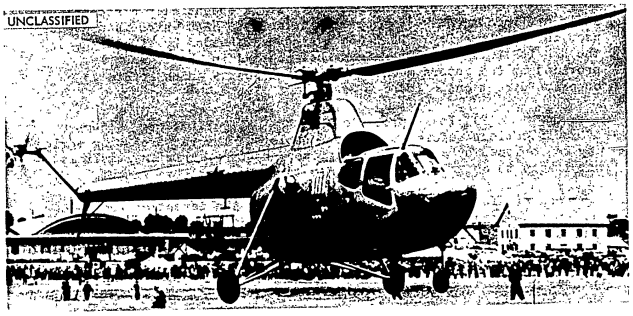

FIG 54. HARE (MI-1) Utility Helicopter. (U)

FIG 55. HARE (MI-3) Utility Helicopter. (U)

The rotor has been changed by adding a fourth blade. It is probable that other changes have been made including a new transmission and improved communication equipment. The prototype of the MI-3 was successfully tested in 1956 and may now be in series production. (C)

(3) There is recent information that some of the HARE helicopters used by the Soviet Army have been armed with 23-mm guns. It is expected that this trend will continue and that eventually most Soviet helicopters used by the military services will be armed with guns and/or rockets. Other than for minor improvements it is not expected that the HARE will be further modified to any appreciable extent. The MI-1 version of the HARE is probably approaching obsolescence and is likely to be replaced by new aircraft such as the HEN and HOG disoussed below. (C)

d. The HEN

(1) The K-15 or HEN[56] is one of the latest helicopters to go into production in the U.S.S.R. It is essentially a reconnaissance/liaison aircraft and will probably replace the HARE which is presently used in this capacity. Designed by the team headed by Nikolai Kamov, the HEN is similar to other Kamov helicopters in that thrust is provided by two rotors mounted on coaxial shafts which rotate in opposite directions. (C)

(2) It is probable that the HEN will undergo a number of modifications before it becomes obsolete. The reciprocating engine may be replaced by a small gas turbine. However, this in itself is not likely to change the performance to any appreciable extent. (C)

e. The HOG -- The K-18 or HOG[57] is the latest of the Kamov-designed helicopters. Like the HAT and HEN it is equipped with the counter-rotating rotor system. The HOG is a utility size helicopter and if accepted for service with the Soviet Army will combine with the HEN to replace the HARE. However, as of the date of this study the HOG has not been produced in significant numbers and may still be in the evaluation/testing stage. (C)

f. The HOUND -- This aircraft, known to the Soviets as the MI-4,[58] is the first modern cargo helicopter developed in the U.S.S.R. It was first seen in 1953 and since that time has been produced in quantity for use in the Soviet Army. The MI-4 is equipped with clam-shell doors in the rear of the fuselage. When the doors open, a ramp can be lowered from the aircraft, permitting rapid loading and unloading of heavy equipment. The HOUND can lift 16 lightly equipped troops or heavy equipment such as jeeps or field artillery pieces. (In the photograph, Figure 58, the 76-mm divisional gun is shown being unlonded.) (C)

56. See photograph, page 57.
57. See photograph, page 57.
58. See photograph, page 57.

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FIG 56. HEN (K-15) Reconnaissance Helicopter. (U)

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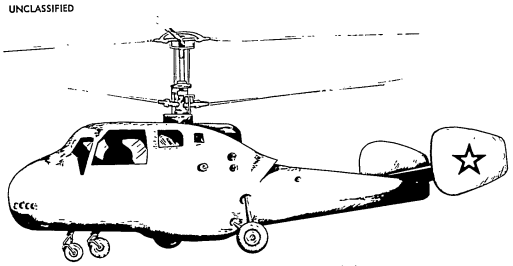

FIG 57. HOG (K-18) Utility Helicopter. (U)

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FIG 58. The HOUND (MI-4) Light Cargo Helicopter seen Here Loading The 76-mm Divisional Gun M1942. (U)

g. The HORSE

(1) The heavy cargo helicopter HORSE[59] or YAK-24 was seen for the first time in 1955, when it was still in prototype stage. The following year several of these aircraft participated in river-crossing maneuvers in East Germany. The YAK-24 is a tandem-rotor helicopter, powered by 2 ASH-82T, 14-cylinder radial reciprocating engines connected by a synchronizing shaft. Outwardly the HORSE resembles the United States YH-16, although structurally there are considerable differences between the two aircraft. The fuselage length of the HORSE is 72 feet, whereas its cargo hold measures some 36 feet in length. It can lift 8,800 pounds of cargo or 40 troops. With this load it has a range of approximately 200 nautical miles. The HORSE is equipped with a hydraulic-operated ramp door located on the rear underside of the fuselage. Heavy items of equipment can be rapidly loaded and unloaded from this aircraft. (S)

(2) The HORSE helicopter underwent several minor modifications since its first appearance in 1955. Most significant of these was a redesigned tail section. The V-shaped stabilizer was replaced by horizontal and vertical stabilizers. It is expected that other modifications of the HORSE will be made before the aircraft reaches obsolescence. Replacement of the reciprocating engines by gas turbines is a likely development. This may well result in some improvement of performance. For one, the payload could be raised to about 10-12,000 pounds. (S)

h. The HOOK -- The latest helicopter to appear in the U.S.S.R. is the MI-6 or HOOK.[60] This is probably the largest helicopter in the world today. It is estimated that this helicopter has a payload capacity of about 22,000 pounds or 80 troops. The radius of operation is estimated at 100 nautical miles. The HOOK is powered by two gas turbine engines, each estimated to deliver about 4,000 equivalent shaft horsepower. Thrust is provided by a five bladed overhead main rotor estimated to have a diameter of about 110 feet. The HOOK is currently undergoing service tests. If accepted without major modifications, series production could be initiated before the end of 1958. It is unlikely that significant numbers of the HOOK could become available for use in the Soviet Army before the second half of 1959. (C)

3. VTOL Aircraft

a. The Soviets have recently initiated active experimentation with VTOL aircraft. The first experimental aircraft[61] of this type, observed near Moscow in June 1957, was of the "flying bedstead" variety. It consists of a main platform of rectangular shape about 6 x 8 feet in the horizontal plane, with gear booms projecting in four directions from the centers of the platform sides. An enclosed

59. See photograph, page 59.
60. See photograph, page 61.
61. See photograph, page 61.

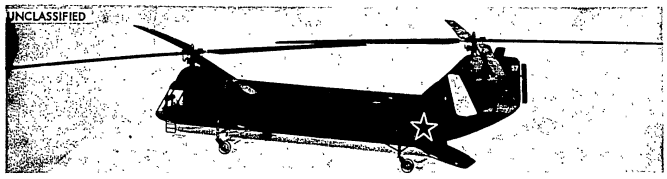

FIG 59a. HORSE (YAK-24) Heavy Cargo Helicopter. (U)

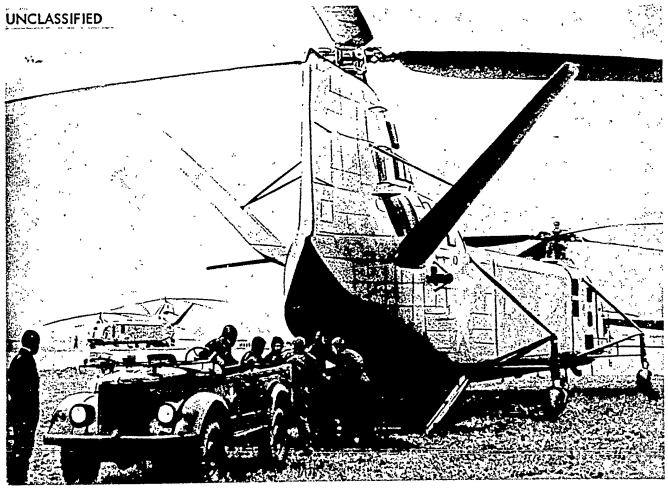

FIG 59b. HORSE (YAK-24) Heavy Cargo Helicopter Seen Unloading GAZ-69 Personnel Carrier With Trailer. (U)

Figure 52. ESTIMATED CHARACTERISTICS AND PERFORMANCE OF SOVIET HELICOPTERS

Designation	HAT (K-10)	HARE (MI-1)	HARE (MI-3)	HEN (K-15)	HOG (K-18)	HOUND (MI-4)	HORSE (YAK-24)	HOOK (MI-6)
Payload in Pounds/ or Troops	None	350/2	400/3	200/1	750/4	3,500/16	8,800/40	22,000/80
Radius/Range (n.m.)	35/75	90/190	75/160	85/180	95/200	95/200	100/220	100/220
Maximum Speed (knots)	65	108	108	85	115	110	120	n a
Cruising Speed (knots)	60	76	81	64	80	100	100	n a
Rate of Climb at SL, ft/min	n a	1,280	n a	n a	n a	1,700	n a	n a
Hover Ceiling (ft)	1,000	10,810	6,561	2,230	n a	5,500	n a	n a
Maximum Ceiling (ft)	8,210	14,760	14,763	10,000	n a	n a	n a	n a
Power Plant No./ and Type	1/AI-4G Reciprocating	1/AI-26V Recipro- cating	1/ASH-21 Recipro- cating	1/AI-14R Reciprocating	1/Recip or Gas Turbine	1/ASH-82FN Recipro- cating	2/ASH-82T Recipro- cating	2/Gas Turb
Power Rating (h.p.)	50	575	740	260	260	1,825	2,000	4,000
Empty Weight (lb)	570	3,940	3,968	1,825	2,000	9,500	20,000	n a
Gross Weight (lb)	827	4,960	5,180	2,500	3,100	16,000	34,000	n a
Fuel Capacity (lb)	40	617	650	300	350	1,900	3,210	n a
Operationally Available	1949	1951	1957	1957	1958*	1953	1955	1959*
Quantity Produced As of 1 Jan 58	n a	500	n a	n a	n a	438	77	1
Annual Rate of Production	n a	100	n a	n a	n a	120	30	0

* Estimated

FIG 60. HOOK (MI-6) Heavy Cargo Helicopter. (U)

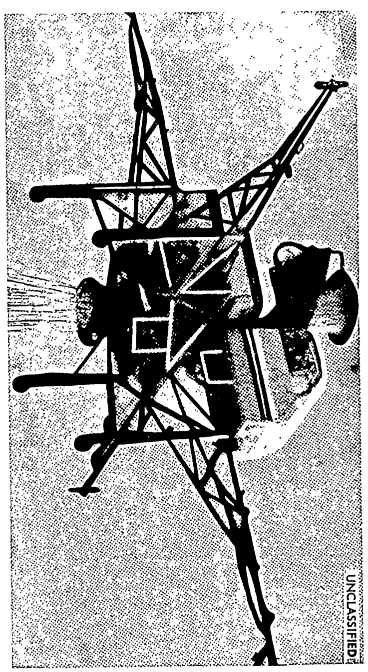

FIG 61. VTOL Platform. (U)

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pilot compartment is set in front of the upward projecting engine and air intake. The over-all height of the aircraft is estimated at 13 feet, the bottom of the platform being about 5 feet from the ground. It is believed that this aircraft is powered by an axial flow gas turbine engine capable of producing a jet thrust of 6-7,000 pounds. The engine may include an after burner since the noise level was quite high and a reddish glow could be seen under the exhaust. The total weight of this VTOL aircraft is estimated at about 6,000 pounds. (S)

b. Although the aircraft described above is of little practical value in its present configuration it is likely that the Soviets will continue to experiment with and develop new VTOL aircraft which may eventually have useful military application. At the present rate of progress it is unlikely that the Soviets will have in service significant numbers of VTOL jet aircraft for Army use during the period of this estimate (1958-1963). (S)

4. Light Fixed-Wing Aircraft

a. Relatively little activity has occurred in the field of light aircraft during the past few years. At present only one of the several light aircraft types in service with the Soviet Army is considered satisfactory from a performance standpoint. This aircraft is known as the CREEK[62] or YAK-12. Actually there appear to be at least four varieties of this model each designed for a slightly different purpose. The CREEK compares favorably with similar aircraft in the West such as the L-19. In fact, the CREEK can land or take-off in a shorter distance than the L-19. Furthermore, one of the recent modifications of the CREEK has a payload capacity of 660 pounds or 3 passengers. To date the Soviets have produced a total of 2,843 CREEK's and production is continuing at the rate of 360 aircraft per year. (C)

b. Recently the Soviets announced that they have completed design work on a new twin engine, utility class, high wing monoplane. According to Soviet estimates this aircraft will operate in the speed range between 27 and 124 knots. The payload will probably amount to about 1,000 pounds with rear door loading probable. The wing loading and ground pressure are expected to be relatively low, allowing for short take-off and landing from relatively unimproved terrain. By the end of 1957 no evidence had been received that the Soviets had built a flying prototype of this aircraft. Only a mock-up is known to have been constructed to date (see photograph)[63]. Production of this aircraft could be initiated sometime in 1959 if flight tests initiated during 1958 prove successful. (C)

c. It is believed that the Soviets already have or will shortly initiate the development of a light jet or turbo-prop aircraft suitable for liaison, reconnaissance and other Army functions. It is expected that design and prototype testing of such an aircraft will be completed during the period of this estimate. (S)

62. See photograph, page 63.
63. See photograph, page 63.

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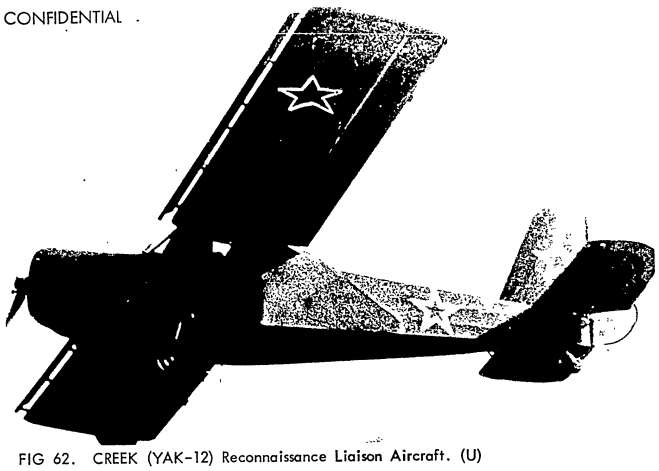

FIG 62. CREEK (YAK-12) Reconnaissance Liaison Aircraft. (U)

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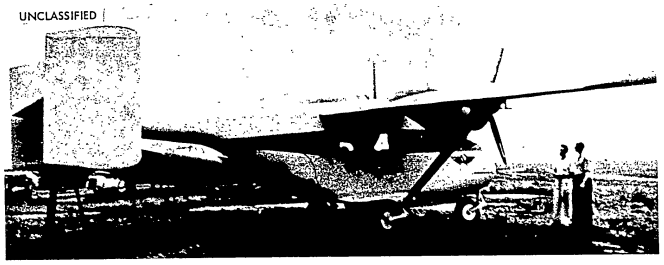

FIG 63. The Newly Designed Soviet Utility Aircraft. (U)

5. Transport Aircraft

a. General -- The development of transport aircraft received relatively little attention during the period from 1941 to 1953. However, since a reversal in trend was first detected in 1954, the progress made by the Soviets was spectacular. This was to a large extent made possible by prior research and development of bomber aircraft. During the period 1956-1957 alone the Soviets displayed a total of six new medium and heavy transport aircraft prototypes, each powered by gas turbine engines. This rapid progress has not been without its pitfalls. There are indications that many of the new aircraft displayed serious weaknesses during flight tests. Most of these were associated with aerodynamic stability and control. Soviet engineers are considered entirely capable of eliminating most if not all of these deficiencies. However, this will take time and consequently production of the newly designed aircraft may be delayed. (S)

b. Light Transports[64] -- Despite the recent development of new medium and heavy transports, routine military and civilian air transportation in the U.S.S.R. is almost entirely dependent on light cargo aircraft. The bulk of the Soviet cargo aircraft fleet is composed of three models. These are the CAB (LI-2) very similar in appearance and performance to the U.S. C-47 (DC-3); COACH (IL-12) the Russian version of our CONVAIR 240; and CRATE (IL-14) a modified version of the COACH. (C)

c. Medium Transports[65] -- Currently it is believed that the Soviets do not have in service an appreciable number of medium transports. Only one medium transport model had been developed in the U.S.S.R. during the period 1940-1956. As far as is known only a few prototypes of this aircraft were ever produced. However, during the past two years the Soviets have completed design of three new medium transports. Prototypes of these aircraft are currently being tested and series production of one or more of these aircraft could be initiated during 1958. The new transports are known by the names of CAMP (AN-4),[66] CAT (AN-10)[67] and COOT (IL-18)[68]. (C)

d. Heavy Transports[69] -- The first modern heavy transport to be developed in the U.S.S.R. was the well-known CAMEL (TU-104).[70] This aircraft is believed to have become available for limited service in 1955. This does not mean to imply that the Soviets were entirely without heavy transports prior to that time. A limited number of B-29-type bombers had been converted into transport aircraft. This bomber is known as the BULL (TU-4), its design being almost identical to that of the U.S. B-29. Recently the Soviets have modified the TU-104 and the new model is designated CAMEL A. Further the Soviets have developed

64. See characteristics table, page 66.
65. See characteristics table, page 66.
66. See photograph, page 65.
67. See photograph, page 65.
68. See photograph, page 65.
69. See characteristics table, page 67.
70. See photograph, page 68.

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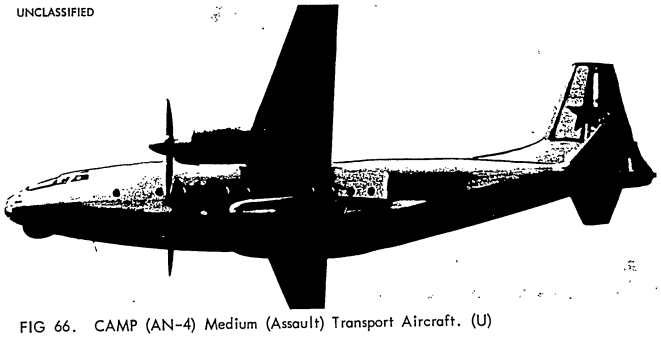

FIG 66. CAMP (AN-4) Medium (Assault) Transport Aircraft. (U)

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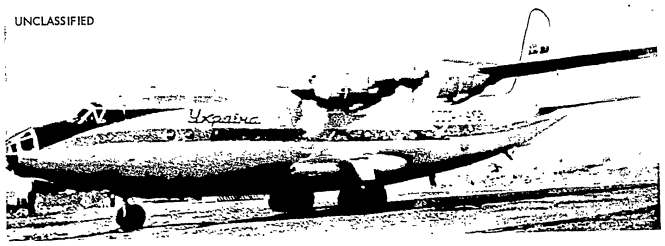

FIG 67. CAT (AN-10) Medium Transport. (U)

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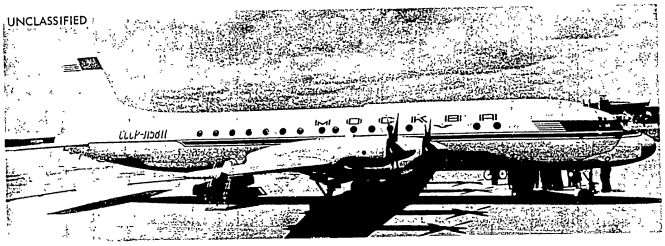

FIG 68. COOT (IL-18) Medium Transport Aircraft. (U)

Figure 64. BASIC MISSION, PERFORMANCE AND PHYSICAL CHARACTERISTICS TABLE OF SOVIET LIGHT TRANSPORT AIRCRAFT

Designation	Gross Take-Off Weight (lb)	Fuel Capacity (lb)	No. of Engines/ Type	Rated Power each	Payload in Pounds/ or Troops	Radius/ Range (n.m.)	Maximum Speed/ Alt	Cruising Speed (knots)	Take-Off Distance GR (ft)	Operationally Available	Quantity Produced As of 1 Jan 58	Annual Rate of Production
CAB (LI-2)	26,400	3,200	2/ASH-62IR	985 h.p.	6,600/ 20	465/ 920	164 knots/ 5,400 ft	115	2,420	1944	2,643	0
COACH (IL-12)	38,000	3,200	2/ASH-82FN	1,825 h.p.	10,000/ 25	635/ 1,290	235 knots/ 1,500 ft	165	1,750	1946	585	0
CRATE (IL-14)	40,000	4,750	2/ASH-82T	2,000 h.p.	7,200/ 30	610/ 1,290	250 knots/ 10,000 ft	160	1,700	1954	1,043	420

Figure 65. BASIC MISSION, PERFORMANCE, AND PHYSICAL CHARACTERISTICS TABLE OF SOVIET MEDIUM TRANSPORT AIRCRAFT

Designation	Gross Take-Off Weight (lb)	Fuel Capacity (lb)	No. of Engines/ Type	Rated Power	Payload in Pounds/ or Troops	Radius/ Range (n.m.)	Maximum Speed/ Alt	Cruising Spood (knots)	Take-Off Distance GR (ft)	Operationally Available	Quantity Produced As of 1 Jan 58	Annual Rate of Production
CAMP (AN-4)	88,000	16,000	2/Turbo-prop	4,000 ESHP	20,000/ 60	705/ 1,235	330 knots/ 1,000 ft	230	2,355	1958*	9	n a
CAT (AN-10)	110,000	20,500	4/Turbo-prop	4,000 ESHP	27,700/ 100	665/ 1,250	n a	335	n a	1958*	10	n a
COOT (IL-18)	128,000	39,600	4/Turbo-prop	n a	24,400/ 100	1,500/ 2,800	n a	340	2,900	1959*	1	n a

*Estimated

Figure 69. BASIC MISSION, PERFORMANCE, AND PHYSICAL CHARACTERISTICS TABLE OF SOVIET HEAVY TRANSPORT AIRCRAFT

Designation	Gross Take-Off Weight (lb)	Fuel Capacity (lb)	No. of Engines/ Type	Rated Power	Payload in Pounds/ or Troops	Radius/ Range (n.m.)	Cruising Speed (knots)	Take-Off Distance GR (ft)	Operationally Available	Quantity Produced As of 1 Jan 58	Annual Rate of Production
CAMEL (TU-104 A)	152,500	59,000	2/AM-3 jet	19,000 lbs LST	23,200/ 90	1,130/ 2,400	460	3,400	1955	53	48
CAMEL "A" (TU-104 A)	157,000	59,000	2/AM-3 jet	19,000 lbs LST	27,500/ 90	1,100/ 2,400	460	3,700	1958*	n a	n a
BULL (TU-4) transport version	137,000	40,200	4/ASH-90 Recip	2,200 h.p.	25,700/ 90	1,670/ 3,150	205	5,500	1954	150	0
CLEAT (TU-114)	250,000	100,000	4/Turbo-prop	10,000 h.p.	55,000/ 230	n a/ 5,200	400	6,000	1958*	3	n a
COOKER (TU-110)	183,000	65,500	4/Jet	n a	38,000/ 150	n a	n a	n a	1959*	1	n a

* Estimated

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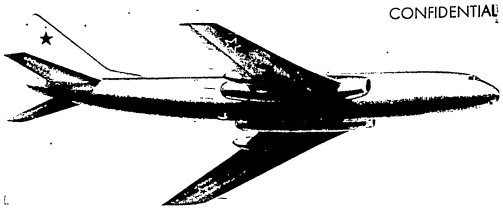

FIG 70a. CAMEL (TU-104) Heavy Transport Aircraft. (C)

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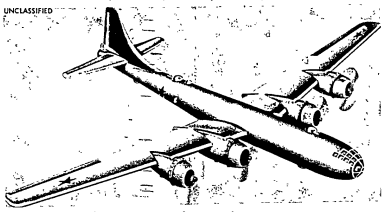

FIG 70b. BULL (TU-4) Bomber Frequently Used As A Heavy Transport Aircraft. (U)

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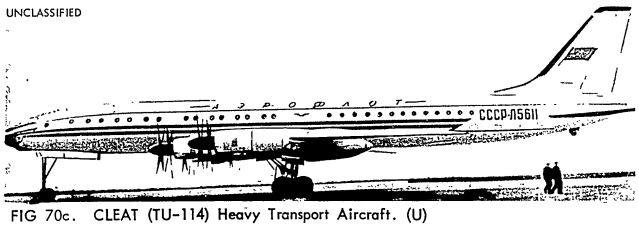

FIG 70c. CLEAT (TU-114) Heavy Transport Aircraft. (U)

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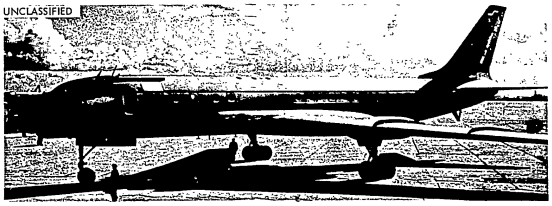

FIG 70d. COOKER (TU-110) Heavy Transport Aircraft. (U)

two new heavy transports, the CLEAT (TU-114)[70] and the COOKER (TU-110).[70] As far as is known both of these aircraft are still in the testing stage. (C)

6. Simulators

a. There is no evidence available on Soviet simulator devices that could be incorporated in or used with acquisition, tracking or gun-control radar to simulate a real target for training purposes. (C)

b. There is no evidence of Soviet simulators used in pilot training. (C)

c. There is no evidence of Soviet simulators employed as decoys to protect bombers or other aircraft. (C)

d. There is reliable evidence that simulators or mock ups of helicopter cargo compartments are used in training troops in loading and unloading procedures. (C)

7. Reconnaissance Drone

No information. (S)

70. See photograph, page 68.

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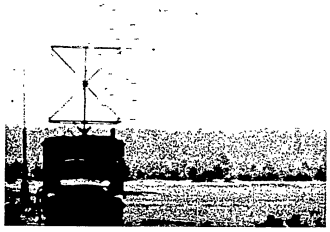

FIG 72. CROSS FORK Target Acquisition Radar. (U)

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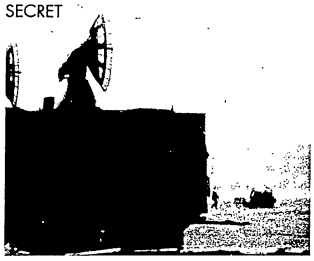

FIG 73. Two WHIFF Radars. (U)

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FIG 74. FIRE CAN Or SON-9 Fire Control Radar In Operating Position. (C)

SECTION E

COMMUNICATION AND ELECTRONICS

1. General

Since World War II the Soviet has moved from a position of insignificance in the fields of communications and electronics to a respected position among the four leading nations. (U)

2. Fire Control Radars [71]

a. The CROSS FORK [72], a Soviet radar similar in design capabilities and emission characteristics to the United States SCR 602 and the British AA Nr 4, MK 3, apparently is being used by the Soviets for target acquisition. The United States and British models were designed for medium-range early warning and ground control interception. The CROSS FORK is mounted on a GAZ-63 closed van 4x4 truck. CROSS FORK's have been sighted operating at WHIFF fire-control sites. (S)

b. The first Soviet-developed fire control radar to be observed was nicknamed WHIFF [73]. This radar is the Soviet version of the United States SCR 584. The WHIFF is an antiaircraft fire-control radar capable of searching for and detecting aircraft targets out to 70,000 yards range and automatically tracking individual targets in range, elevation and azimuth out to 32,000 yards. The accuracy of the WHIFF is approximately plus or minus 25 yards in range and plus or minus 0.6 mil in elevation and azimuth. An electronic computer is believed to be an integral part of this radar. The WHIFF is used with 100mm and 85mm antiaircraft guns. (S)

c. The three newest known Soviet fire control radars are nicknamed FIRE CAN, LONG TROUGH and TRACK DISH. (U)

(1) The FIRE CAN[74] for which the Soviet's designation is SON-9, is a land-based, mobile, fire control radar for which no recognizable intercept data and little collateral data are available. The FIRE CAN probably operates in the S-band (1.55-5.20 KMc/s) but the technical characteristics are unknown. The antenna of the FIRE CAN is a 4½ foot parabolic reflector mounted on a van, 7½ feet high by 12 feet long by 6½ feet wide. Since first sighted in 1955, this equipment has been seen at a number of Soviet installations in Eastern Europe. It is always associated with gun emplacements and is believed to be used with the 100mm and 85mm guns. The FIRE CAN

71 See table page 74.
72 See photograph page 70.
73 See photograph page 70.
74 See photograph page 70.

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FIG 75. LONG TROUGH Acquisition Radar In Operating Position. (C)

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FIG 76. Unidentified Radar Resembling LONG TROUGH But Having a Shorter Reflector. (C)

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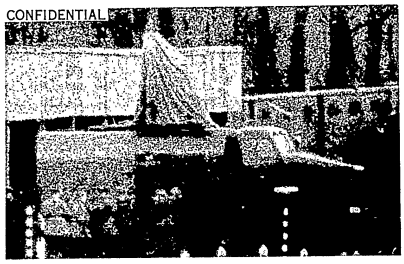

FIG 77. Antiaircraft Fire Control Radar TRACK DISH. (C)

is capable of measuring range, azimuth and elevation with a possible search range of 60,000 yards and a maximum tracking range of 24,000 yards. (S)

(2) LONG TROUGH[75] has a long trough-like antenna array, having its long axis horizontal, similar to the fiber-glass protective radome of the United States M-33 acquisition antenna. LONG TROUGH is mounted on a box-bodied truck. A few other radars[76], having similar but shorter antenna configurations, have been noted mounted on tracked vehicles. The functions of these are as yet not determined.(S)

(3) TRACK DISH[77] has a dish-type antenna reflector similar to the WHIFF or FIRE CAN tracking radars. The TRACK DISH antenna is mounted on a fully tracked prime mover with a box-like body. (S)

3. Counter-battery radar and counter-mortar radar

A single report of low credibility indicates that the Soviets have an X-band mortar, and artillery shell detection radar called ARSOM-1. The ARSOM-1 is reportedly mounted on a GAZ-63 truck under normal conditions but could be dismounted and placed on a tripod. The antenna is reported to be of the same general configuration as LONG TROUGH, which is reliably reported to be used with antiaircraft artillery. (S)

4. Passive radar-field type[78]

a. BOX BRICK is a piece of Soviet passive detection equipment reported in the Soviet Zone of Germany and the Soviet Zone of Austria prior to withdrawal of Soviet Forces. Soviet passive detection sites are believed to be located along the western edge of the Soviet bloc. BOX BRICK[79] was reportedly designed to collect electronic intelligence (ELINT) and is believed capable of ascertaining frequency, pulse width, pulse recurrence frequency, other types of modulation, polarization and scan rate of a radar or other electronic equipment by intercepting its signal. It can not detect an aircraft which is not emitting radar signals. BOX BRICK can probably determine the direction of aircraft at a greater range than collocated early warning radars, and could thus be used to orient or alert early warning radars. The box body of the BOX BRICK rotates through 360 degrees at various speeds. The cube on the roof of the van has been reported to rotate independently; however, this is unlikely. For transit the cube is either detached or retracts into the body of the vehicle. (S)

b. BRICK ROUND[79] and BRICK SQUARE[79] are small paraboloids believed to be antennas supplementing BOX BRICK by providing additional

75 See photograph page 72.
76 See photograph page 72.
77 See photograph page 72.
78 See table page 74.
79 See photograph page 75.

Figure 71. SOVIET FIRE CONTROL RADAR DATA TABLE

Designation	Technical Characteristics: Radio Frequency	Technical Characteristics: Ranges in miles	Technical Characteristics: Modulation	Technical Characteristics: Miscellaneous	Operationally Available	Quantity Produced As of 1 Jan 58	Annual Rate of Production	Estimated Changes in Next 5 years
CROSS FORK	212 Mc/s	Unknown	PRF is 400 pps	Pulse duration about 2 micro-seconds	Available	Unknown	Unknown	None. May be replaced by LONG TROUGH
WHIFF	S-Band	See text	Pulse	Soviet version of U.S. SCR 584	Available	Unknown	Unknown	None. May be replaced by FIRE CAN and TRACK DISH
FIRE CAN	S-Band	See text	Pulse	Characteristics probably similar to SCR-584	1955	Unknown	Unknown	Greater range
LONG TROUGH	Possibly S-Band	Unknown	Unknown	Probably standard acquisition type radar	1956	Unknown	Unknown	Greater range
TRACK DISH	Possibly S or X Band	Unknown	Unknown	Probably similar to FIRE CAN	1956	Unknown	Unknown	Greater range

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Figure 78. DATA TABLE ON FIELD TYPE PASSIVE RADAR DEVICES

Designation	Technical Characteristics: Radio Frequency	Technical Characteristics: Range in miles	Technical Characteristics: Modulation	Technical Characteristics: Miscellaneous	Operationally Available	Quantity Produced	Annual Rate of Production	Estimated Changes in next 5 years
BOX BRICK	S-Band and lower through VHF	100-500	--	ELINT receiver	1954	30	10	None.
BRICK ROUND	S or X Band	100-500	--	--	1955	30	10	None.
BRICK SQUARE	S or X Band	100-500	--	--	1955	30	10	None.

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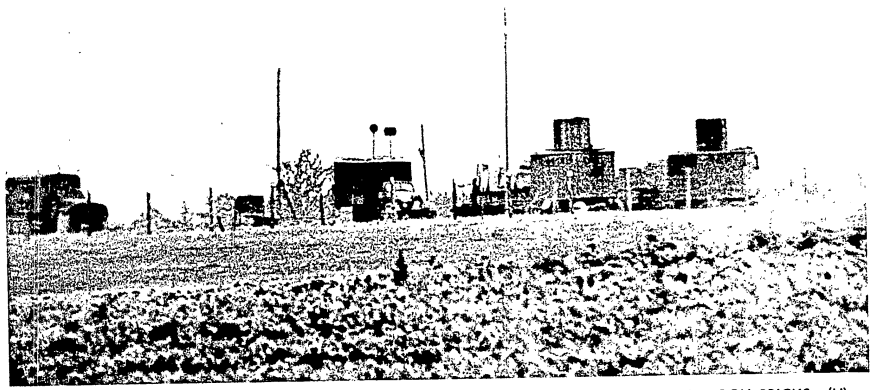

FIG 79. From Left To Right - One BRICK ROUND Antenna; One BRICK SQUARE Antenna; Two BOX BRICKS. (U)

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frequency coverage. (S)

c. No information has been received indicating Soviet development of passive radars for use in detecting personnel, vehicles or artillery. (C)

5. Variable-time fuzes

Although a large quantity of U.S. made VT fuzes for field artillery use was captured by Communist forces in Korea and research on AAA VT fuzes has been conducted in the Soviet bloc, particularly in Hungary, no firm indications have been received to indicate that the Soviet armed forces have VT fuzes for operational use. It is considered that they could have VT fuzes for operational guided missiles if they felt the need for such devices. A Soviet general has stated to Western officials that the Soviet Union has proximity fuzes for antiaircraft artillery but not for field artillery. (S)

6. Night observation device

Numerous reports indicate that certain Soviet tanks, especially the T-54, are equipped with infrared night observation devices. Different ranges for the devices are reported, probably experienced under different atmospheric conditions. Minimum range is evidently about 15 yards and maximum range about 150 yards. Reportedly this is a cylindrical device with a metal housing which is fitted just above the driver's vision slit. One report states that the normal headlight driving device on the T-54 tank is converted for use as an infrared source by installing three glass disks (one black, one light green, one transparent) in front of the headlight, giving the headlight a slightly greenish shade. (S)

7. Automatic data-processing equipment[80]

a. ANALOG COMPUTERS

Analog computers are used extensively in the U.S.S.R. and the equipment is comparable to that in the West. One of the largest is type MN-8, which is a universal machine having capability of solution of 32nd order differential equations used for solving problems connected with earth satellite flight and aircraft trajectories using auto-pilots, hydraulic problems, and wave motion in wave-guides. Smaller computers, the ATR-1 and ATR-2, have been built especially for the solution of railway problems and for the control of railway systems. (S)

b. DIGITAL COMPUTERS

(1) The Soviets regard the development of digital computers

80 See table page 77.

Figure 80. Data Table on the More Important Soviet Electronic Computers Having Military Applications

Designation	Capability	Use	Quantity Produced	Annual Rate of Production	Estimated Changes in Next 5 years
MN-8 analog computer	Can solve 32nd order differential equations	Solving problems re earth satellite flight, aircraft trajectories and wave motion in wave guides	Unknown	Unknown	Increased speed and capacity.
ATR-1 analog computer	Unknown	Solving railway problems; control of railway systems	do	do	do
ATR-2 analog computer	do	do	do	do	do
BESM digital computer	7,000-8,000 operations per second	Solving many problems, including language translation and weather forecasting	do	do	do
M2 digital computer	3,000 operations per second with 10 decimal digits	Engineering, aeronautical and nuclear physics problems	do	do	do
KIEV digital computer	5,000 to 7,000 operations per second	Unknown	do	do	do
FOOCOM digital computer	Unknown	Weather forecasting	do	do	do
KRISTAL digital computer	do	Crystal analysis	do	do	do
URANIT digital computer	do	Geological exploration	do	do	do
STRELA-1 digital computer	3,000 operations per second	Language translation	do	do	do
PUSKO 6-32a computer/predictor	Unknown	Aircraft course predictor	do	do	do

as a matter of considerable national importance on which they are prepared to invest much money and scientific manpower. A. N. Nesmayanov, President of the Academy of Sciences, U.S.S.R. has stated that a technological break-through can be expected in this field. (S)

(2) The BESM[81] is a medium high-speed digital computer (by modern standards of operating speed) and is the largest known Soviet machine. It has been seen by several independent Western engineers, all of whom described it as a competent native-Soviet piece of equipment of an advanced type, taking into consideration that it has been in operation since 1952, at which time it was equivalent to the best U.S. computer. It has an average operating speed of 7,000-8,000 operations per second, the machine being three-address, parallel operation with floating decimal point. Of particular interest is the high utilization factor of the machine. Out of each day's 24 hours operation 72% is useful time, 20% is marginal testing time and 8% is lost time for locating and correcting faults. (S)

(3) A smaller computer, the M2 has been used for a wide range of engineering, aeronautical, metallurgical and nuclear physics problems. The M2 makes 3,000 operations per second with 10 decimal digits (33 binary places), using three- address code with fixed or floating decimal point. A new computer, the KIEV, which performs 5,000 to 7,000 operations per second and occupies a space of 30-40 cubic meters, has been developed by the Academy of Sciences of the Ukraine SSR. The Ukraine Academy also claims to have developed computers for use in medical diagnosis, particularly of cardiac conditions. (S)

(4) Considerable interest has been shown in the U.S.S.R. in the development of other special purpose computers. Of these, the POGODA is used for weather forecasting; the KRISTAL for crystal analysis; and the GRANIT for geological exploration. The BESM has also been used for weather forecasting. (S)

(5) Soviet scientists have intensively developed methods of using digital computers for automatic language translation. Experiments, conducted largely with the BESM[81] and STRELA-1 computers, have clearly established the principles of machine translation of English, German, French, Chinese and Japanese into Russian. A special purpose computer designed specifically for translation is under development. The Soviet is considered to have or to be close to having an operational capability for machine translation of English in some vocabulary fields notably physics. This is based on a recent demonstration before the Academy of Sciences. (S)

81 See photograph page 79.

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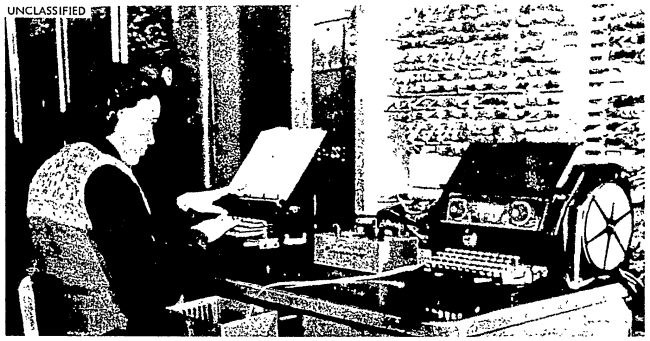

FIG 81. Operator Is Perforating Tape To Feed English Text Into BESM Computer For Automatic Translation To Russian. (U)

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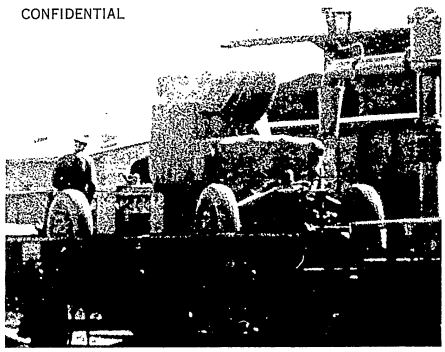

FIG 82. Antiaircraft Artillery Computer-Predictor PUAZO 6-12a In Traveling Position. (U)

(6) In connection with the mechanization of information handling, an article by a Soviet scientist in October 1956 indicated trends in Soviet research and outlined his thoughts for future application of data processing techniques to information machines. His article is evidence of a full understanding of the problems involved. (S)

(7) In 1955 the President of the Academy of Sciences, U.S.S.R., referred to the building of a computer having a speed of 25,000 operations per second, which is more than adequate for solving problems, in "real-time". ("Real-time operation means that incoming data must be computed in time for the result to be used to control the further course of the process from which the data was derived. For example, in the case of fire control for high speed aircraft, weapon control signals must be derived from input target data in sufficiently short time to be effective.) No definite intelligence is available about this computer, but it is significant that a prominent Soviet scientist in August 1957 said that the Soviet would be using a computer for controlling their rocket firings and earth satellite tracking. If he meant that the satellite data is to be passed from tracking-station to tracking-station in synchronism with the flight of the satellite in its orbit, then the data must be computed in "real-time" by a machine similar to United States IBM 704 computer. (S)

c. AUTOMATIC DATA PROCESSING EQUIPMENT - FIELD TYPE

(1) The PUAZO series of antiaircraft artillery computers/predictors has long been used by Soviet AAA units. Some of these AAA units now in the field have the PUAZO 6-12a[82], an electro-mechanical type of aircraft course predictor, which incorporates a visual height and range finder. (S)

(2) Although a good deal of publicity has been given to Soviet electronic computers as applied to machine translation, none of these is believed to be available for field use (i.e., Corps and lower echelons). (C)

(3) There is no information available on other types of automatic data processing equipment for field use. (S)

8. Air traffic control system[83]

a. In the U.S.S.R. and at Soviet military installations in the European Satellite countries, high frequency direction-finding stations provide, in conjunction with medium frequency beacons and airborne automatic radio compasses, the main navigation aids available to aircrews. There are four main types of high frequency direction finding equipment: four-masted Adcock installations, six masted Adcock installations, eight masted Adcock stations and wide-aperture multiple arrays. The PKV-45 type is the most representative of the Soviet four-masted installations. (S)

82 See photograph page 79.
83 See table page 81.

Figure 83. DATA TABLE ON SOVIET AIR TRAFFIC CONTROL DEVICES

Designation	Technical Characteristics: Radio Frequency	Technical Characteristics: Range in miles	Technical Characteristics: Modulation	Technical Characteristics: Miscellaneous	Operationally Available	Quantity Produced As of 1 Jan 58	Annual Rate of Production	Estimated Changes in next 5 years
MOON	120 Kc/s	1500-1800 nm	Pulse	Loran or Gee mode. Now on later.	Avail	1	0	Possible phase comparison to increase accuracy.
SHORT WAVE	220-270 Mc/s 290-330 Mc/s	Short-range accurate Nav-aid	Pulse	Similar to U.S. Shoran	Avail	Unknown	Unknown	None.
ROOF RUN	330-240 Mc/s	Final landing approach	AM	Glide path transmitter	1953	Unknown	Unknown	None.
ROOF TALK	X-Band	U	Pulse	Probably similar to U.S. AN/M FN-1	1956	Unknown	Unknown	None.
LONG EYE	9250-9580 Mc/s	3.2 and 10.8 nm	Pulse	Antenna rotation rate	1956	Unknown	Unknown	None.

b. Six and eight masted installations have been reported since 1954 at a number of airfields in the U.S.S.R. and at Soviet military bases in East Germany. Wide-aperture high frequency direction-finding stations such as KRUG are reportedly in use at several locations in the U.S.S.R. A large number of very high frequency direction-finding stations have been installed at Soviet airfields since 1954. This equipment is of modern design, self-contained and fully mobile. (S)

c. MOON is the nickname given to a Soviet long range, low frequency, pulse navigation system. MOON is a hyperbolic system which depends on the transmission of synchronized signals from three widely separated ground stations; a master station and two slave stations. The master station is located at a point 86 km from Orel at 5308N-3451E. The north slave station is located near Petrozavodsk, at approximately 6140N-3402E and the south slave station southwest of Simferopol at approximately 4456N-3348E. (S)

d. SHORE WALK is the nickname given the Soviet equivalent of the U.S. SHORAN. SHORE WALK is a navigation and blind bombing system utilizing two or more ground beacons which are alternately interrogated by the airborne equipment to provide extremely accurate range measurements. Where the exact location of the beacons are known, the two range circles thus obtained produce an accurate fix. (S)

e. HOME RUN is the glide path transmitter portion of the Soviet instrument landing system (ILS) which is installed at a number of Soviet civil airfields. The installation was mobile when first observed in 1953, but more recent reports indicate that it has been transferred to small permanent buildings. The equipment has many points in common with its Western counterpart and is known to operate on the ICAO frequency assigned to this type of navigation aid. (S)

f. HOME TALK is the precision approach radar installation which is part of the Soviet ground controlled approach system observed during 1956 at a number of Soviet civil and military airfields. The electronics installation, which is fitted in a prime-mover vehicle, consists of two radar antenna and display systems, associated radar circuitry and communications equipment. One radar system provides precise data on aircraft elevation during letdown, while the second antenna gives accurate azimuth and range information on the approaching aircraft. HOME TALK is generally collocated with LONG EYE, the Soviet airfield surveillance radar which is used to control aircraft entering the approach-to-landing pattern of the airfield. (S)

g. LONG EYE, a surveillance radar, has back-to-back reflectors. It has been sighted in East Germany and U.S.S.R. It is considered to be the relatively short range azimuth search radar associated with the precision radar used in the Soviet ground control approach-to-landing aid. LONG EYE's antenna consists of two truncated parabolic reflectors measuring about 10 feet by 6 feet, mounted back-to-back on a trailer vehicle. (S)

9. Airborne thermal reconnaissance device

In January 1958 a Soviet aircraft reportedly was observed in Yugoslavia with a device consisting of 4 identical searchlight-like objects about 10 inches in diameter, 2 above the other 2, mounted under 1 wingtip. According to the report, which is of low credibility, the device is an infrared acquisition device. The report did not state on what type of aircraft the device was observed. It is conceivable that the device is a thermal (infrared) navigational or reconnaissance device rather than a target acquisition device. This, if true, is the first information on any Soviet Airborne infrared device. (S)

10. Nuclear locator devices

a. Soviet development of ion chamber dosimeters, geiger counter and ion chamber area survey meters appears to be about parallel with development of these devices in the U.S. (S)

b. The Soviet Union has the capability to design devices for receiving electromagnetic radiation from atomic detonations in order to determine the location and yield of bursts. However, no information on such devices has been obtained. (S)

11. Mobile Very High Frequency and Ultra High Frequency radio communications equipment

a. The R-400 is reportedly a Soviet-designed and manufactured microwave set having a capacity of six speech channels, operating in the frequency range 2500 to 2750 Mc/s, having a power output of 8 to 10 watts and using pulse-position modulation. The antenna consists of a 5 to 6½ foot paraboloid mounted on a 100 foot telescopic mast. The antenna beam width is 8 degrees. The R-400 equipment other than the antenna is carried in a box-shaped vehicle with a 3-axle ZIS-151 chassis or equivalent. The antenna is carried in a special vehicle. Photographs of microwave sets which are probably of the R-400 type have been taken in East Germany[84] and at Soviet installations in Hungary[85 & 86]. Another microwave set, nicknamed BUG EARS, has been photographed at Soviet installations in Hungary in mobile and fixed applications[87]. (S)

b. Little is known about Soviet, very high frequency radio relay communications equipment but two Yagi antenna arrays have been photographed: one at Krampnitz, East Germany[88] in November 1956, and one in Budapest, Hungary[88] in December 1956 or January 1957. (S)

12. Field Radio Equipment[89]

a. Soviet field radio equipment is characterized by ruggedness and simplicity. (U)

84 See photograph page 84.
85 See photograph page 84.
86 See photograph page 84.
87 See photograph page 85.
88 See photograph page 85.
89 See table page 86.

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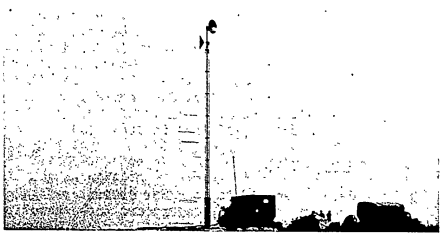

FIG 84. Readily Transportable Microwave Radio Relay Set. (U)

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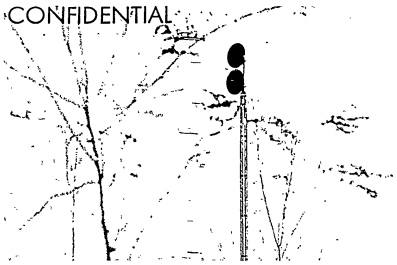

FIG 85. Antenna And Upper Part Of Mast Of Microwave Radio Relay Set. (U)

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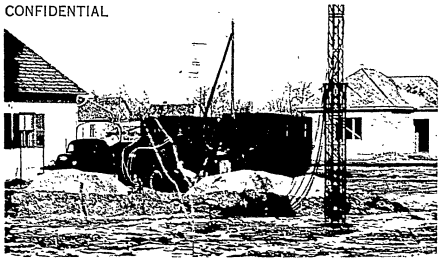

FIG 86. Base Of Antenna Mast Of Microwave Radio Relay Set And Communication Vans. (U)

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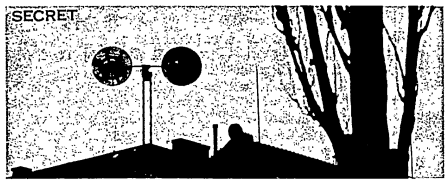

FIG 87. BUG EARS Microwave Radio Relay Antennas In A Fixed Installation. (U)

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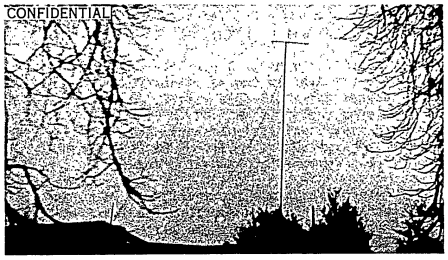

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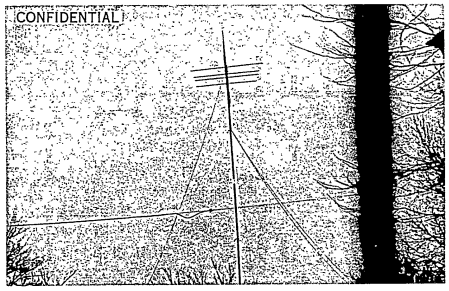

FIG 88. TOP: Unidentified Very-High-Frequency Antenna Array Seen In East Germany. (C)
BOTTOM: Unidentified Very-High-Frequency Antenna Array Seen In Hungary. (C)

Figure 89. DATA TABLE OF SOVIET FIELD RADIO EQUIPMENT

Designation	Technical Characteristics: Radio Frequency	Range in miles	Modulation	Miscellaneous	Operationally Available	Quantity Produced	Annual Rate of Production	Estimated Changes in next 5 years
RSB-F	2-12 Mc/s	Voice: 50	AM		Avail	Unknown	Unknown	Possibly new sets having the same functions but miniaturized.
RBM-1	1.5-5 Mc/s	See text	AM	Two-man pack	do	do	do	do
A-7-A	26.9-32.1 Mc/s	Voice: 6	FM	One-man pack	do	do	do	do
A-7-B	23.9-28.1 Mc/s	do	do	do	do	do	do	do
9RS	3.7-6.0 Mc/s	Voice: 4 - 13	AM	Vehicular	do	do	do	do
10-RK	1.5-6.0 Mc/s	Voice: 9	Unknown	do	do	do	do	do
10-R	Below 6 Mc/s	Unknown	Unknown	do	do	do	do	do
10-RT	Above 6 Mc/s	do	do	do	do	do	do	do
10-RTM	Unknown	do	do	do	do	do	do	do
10-RT-12	do	do	do	do	do	do	do	do
10-RK-26	do	do	do	do	do	do	do	do
12-RTM	do	do	do	do	do	do	do	do
R-105	VHF			One-man pack	do	do	do	do
R-106	VHF			do	do	do	do	do
R-108	Possibly VHF	Voice: 2.5		do	1956	do	do	do
R-109	do	Voice: 1.5	do	do	1956	do	do	do

b. RSB-F[90] is an amplitude modulated radio set used by corps and division headquarters as a mobile or fixed station. It is a low-powered (50 watt) set operating in the medium and high frequency ranges at 2 to 12 Mc/s. The RSB-F may be installed in a vehicle. It employs one transmitter and two receivers. The voice of this set is about 50 miles. By using a power amplifier such as the 500-K-9 with the transmitter, the range of this set could be increased to 600 miles for voice and 1,250 miles for telegraphy. (C)

c. RBM-1[91] is an amplitude modulated, two-man-pack radio set used in forward echelons of infantry and artillery units. Normally, it is operated while stationary at a command post or observation post but may be operated while on the march or in a vehicle. The RBM-1 has low power and operates at frequencies from 1.5 Mc/s to 5 Mc/s. Its voice range is four miles with a vertical antenna and eight miles with a doublet antenna; distances for telegraphy are approximately twice those for voice. (C)

d. A-7-A and A-7-B[92] are frequency modulated one-man-pack radio sets employed by forward echelons of infantry and artillery units. They operate in the high and very high frequency ranges (A-7-A at 26.9 to 32.1 Mc/s; A-7-B at 23.9 to 28.1 Mc/s). They have very low output power of 1.5 and 2.0 watts respectively. These sets have a voice range of six to seven miles and no provision for telegraphy. They are easy to operate but are somewhat bulky and cumbersome. (C)

e. 9RS is a vehicular-type, amplitude modulated radio set used in the older light and medium tanks and with assault guns. It has low power (5 watts) and operates from 3.7 to 6.0 Mc/s, in the high frequency range. The voice range of the 9RS is 4 to 10 miles between moving vehicles and 11 to 13 miles between stationary vehicles. It transmits only voice signals but can receive both voice and telegraphic signals. It can communicate by voice with many other Soviet ground and airborne radio sets. In command vehicles it is apparently being replaced by the 10-RK, which has more power (10 watts) and operates at about 1.5 to 6.0 Mc/s with a voice range of about 9 miles. (C)

f. The radio set used in heavy tanks and medium and heavy assault guns has been the 10-R[93], a pre-1950 set operating at a frequency below 6 Mc/s. The 10-RT installed in PT-76, T-54, and T-10 tanks, is a later model and probably operates about 6 Mc/s. The 10-RTM, installed in assault gun vehicles, may operate in the very high frequency band. Other radio sets reported to be installed in tanks and other armored vehicles are the 10-RT-12[94], and the 10-RK-26 and the 12-RTM. The 10-RT-12 is installed in armored personnel carriers BTR 40 and BTR 152. The 10-RK-26 is installed in JSU-152 assault gun vehicles. (C)

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90 See photograph page 88.
91 See photograph page 88.
92 See photograph page 88.
93 See photograph page 89.
94 See photograph page 89.

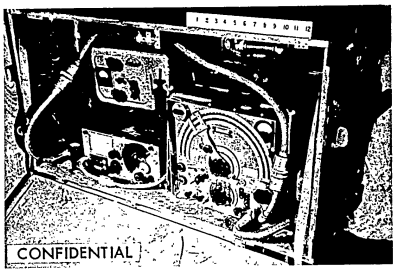

FIG 90. RSB-F. (U)

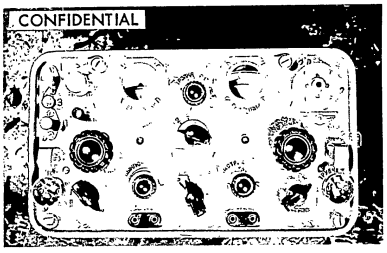

FIG 91. RBM-1. (U)

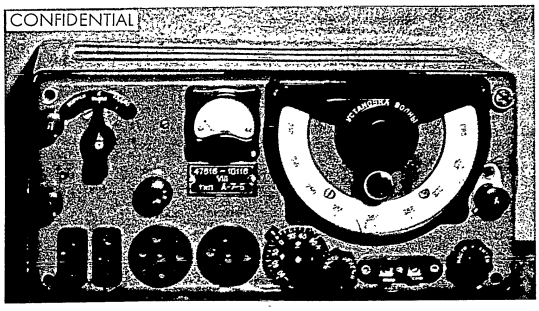

FIG 92. A-7-B. (U)

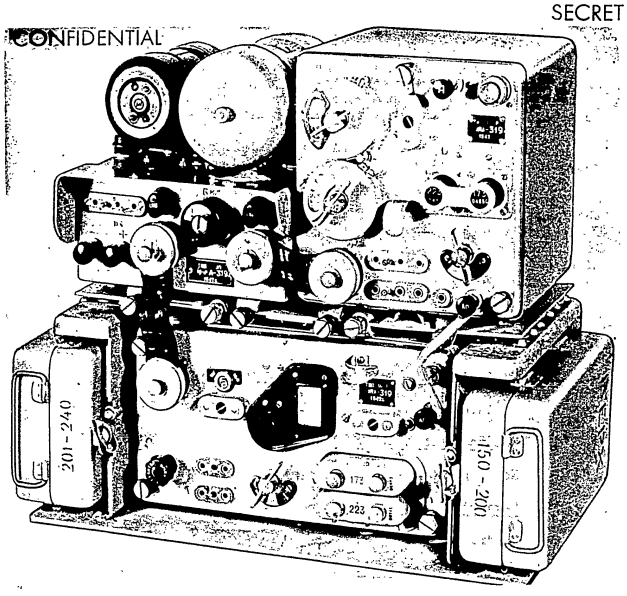

FIG 93. Tank Radio Set 10-R. (U)

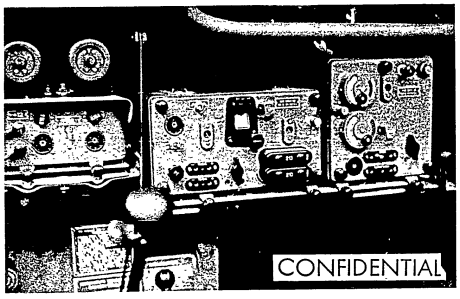

FIG 94. Vehicular Set 10-RT-12. (U)

g. R-105[95] and R-106[96] are two new Soviet man-pack radio sets employed by infantry and artillery units down to company and battery headquarters in some cases. They are voice radios and are believed to operate in the very high frequency range. (C)

h. The two newest known Soviet field radio sets are the R-108 and R-109. All data shown on these two sets are tentative.(C)

(1) The R-108[97] is used at platoon level. Reportedly the range is approximately 2.5 miles and the weight about 40 pounds. Two wet cell batteries provide a 2.4 volt power source. The antenna is flexible and about 60 inches long. The set is provided with a microphone, earphones and carrying straps. (C)

(2) Reportedly the R-109[98] weighs about 55 pounds, has a range of approximately 1.5 miles, has a 60 inch antenna, a microphone, earphones and a carrying strap. Reported dimensions are shown in Figure 98. (C)

13. Anti-missile electronic countermeasures

No information. (S)

14. Reconnaissance drone

No information. (S)

15. Variable-time fuze jammer

No information. (S)

16. On-line cipher device

No information. (S)

17. Teletype, high speed

No information. (S)

18. Infrared detector

No information other than that given under the heading: Airborne Thermal Reconnaissance Device par 9 above. (S)

95 See sketch page 91.
96 See sketch page 91.
97 See photograph page 92.
98 See sketch page 92.

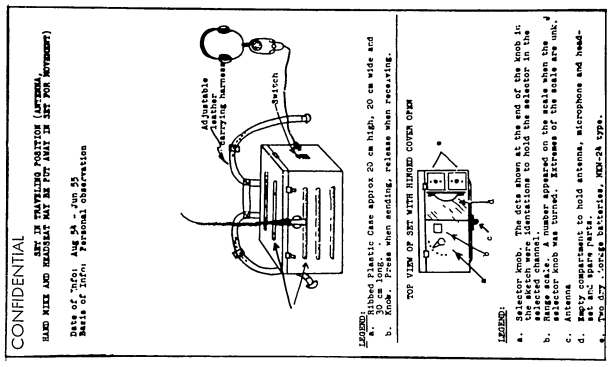

FIG 96. Memory Sketch Of Man-Pack Radio Set R-106. (U)

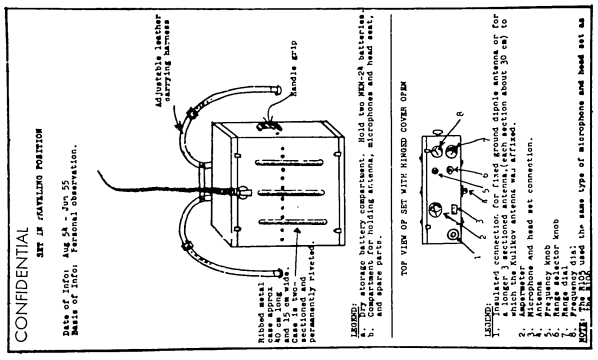

FIG 95. Memory Sketch Of Man-Pack Radio Set R-105. (U)

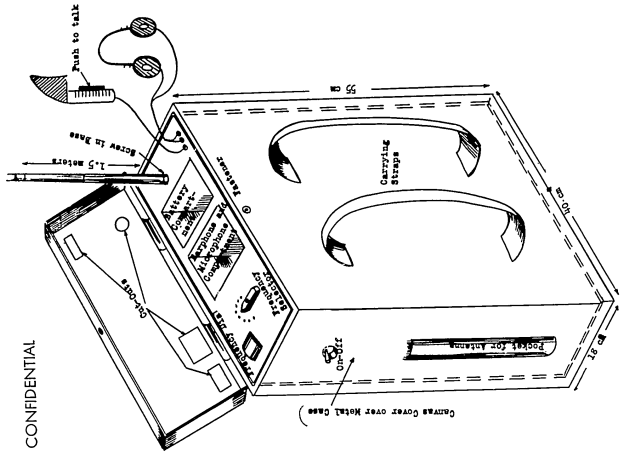

FIG 98. Sketch Of Portable Radio R-109. (C)

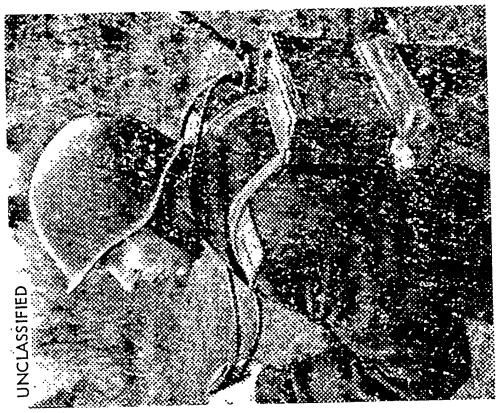

FIG 97. Platoon Leader Using Portable Radio R-108. (U)

CONFIDENTIAL

CONFIDENTIAL

19. Portable electronic jammers

No information. (S)

20. Night photographic device

No information.(S)

21. Long-range target location

No information. (S)

22. Aircraft simulators

No information. (S)

23. Gun data computers for Field Artillery

No information. (S)

SECTION F

GUIDED MISSILES

1. General

The development of a family of guided and ballistic missiles probably has received more emphasis than any other Soviet weapons development program. As a result of the native Soviet effort and the exploitation of captured German missile data, equipment, facilities, and impressed German scientists and missile component technicians, it is believed the Soviets now have developed, or have operational sophisticated missile systems in all major categories. The technical characteristics and performance data of the Soviet missiles discussed herein are shown in Characteristics Table, Figures 99 and 99a. (C)

2. Air-to-Surface Missile (ASM's)

In the air-to-surface missile field, the Soviets are believed to have developed a type, initially conceived by the Germans, known as the Komet system. See Figure 100. (C)

a. This missile is intended for use against naval or ground targets. It is estimated to be 34 feet long and 4 feet in diameter with normal taper wings 8 feet long and 5 feet wide at the root. The propulsion system is probably turbo jet, the payload approximately 3,000 pounds with either a nuclear or HE warhead with proximity fusing. The missile is estimated to have a maximum speed of 485 knots and a range of 50 nautical miles. (S)

b. The guidance system is beam rider with semi-active homing in the terminal phase of trajectory. The missile is launched from a carrier aircraft, which also may be the control aircraft, or control may emanate from a separate airplane that also has fighter-interceptor capability when not engaged in missile guidance. (S)

3. Surface-to-Surface Missiles (SSM's)

a. Ballistic Missile SS-1

(1) This missile is carried on the same heavy tank chassis that is used to transport the 35 nautical mile artillery rocket. It probably is fired vertically from a launching stand mounted on the chassis. The missile configuration consists of a cone and cylinder with 4 control surfaces located at the aft end. It is believed the missile employs a solid propellant although the possibility of a sealed liquid propellant system cannot be overlooked. Control of the missile probably is accomplished by air vanes and jet vanes. The jet vanes cannot be seen but are indicated by the overhang of the air vanes shown in Figure 101. (S)

(2) The self-propelled launcher depicted in the

FIG. 99
SOVIET GUIDED MISSILE OPERATIONAL AND PRODUCTION PROGRAM

Air-to-Surface Missile Systems

Weapons	Maximum Range n.m.	Accuracy (CEP)	Cruise Speed Mach No.	Approximate Gross Weight lbs.	Guidance System	Year Available	Total* Number Produced As of 1 Jan 58	Remarks
AS-2	55	150 ft.	0.9	8,000 10,000	Beam-riding with semi-active terminal homing.	1956-57	1,000	The U.S.S.R. could have a 100 n.m. supersonic version of the AS-2 in 1961.

Surface-to-Surface Missile Systems

Weapons	Maximum Range n.m.	Accuracy (CEP)	Thrust of Motors Metric ton	Approximate Gross Weight lbs.	Guidance Systems	Year Available	Total* Number Produced As of 1 Jan 58	Remarks
SS-1	30-100	1,200 ft.	10	10,000	Inertial	1954	4,700	SS-4
SS-2	50-200	2,000 ft.	25	30,000	Radar-Radio	1954	1,600	May be modified by 1958 to achieve 1,000 n.m. range
SS-3	150-350	3,000 ft.	35	53,000	Comm/inertial same	1954	700	
SS-4	250-700	1-2 n.m.	100	110,000	same	1956	150	
SS-5	3800-4500	5 n.m.	100/35	200,000	same	1958-59	10	

Guided Anti-Tank Missile - there is no information on Soviet development of anti-tank missile system.

* Cumulative stockpile at the end of 1957.

FIG. 99a.

Surface-to-Air Missile System

Weapons	Maximum Altitude	Maximum Horizontal Ranges	Accuracy (CEP)	Maximum Speed Mach. No.	Guidance System	Year Available	Total* Number Produced As of 1 Jan 58	Remarks
SA-1	60,000 ft	20-25 n.m.	50 or 190 ft.	2.0-2.5	Command	1955	23,000	U.S.S.R. could have a 90,000/100 n.m. missile operational in 1961. Missiles would have a speed of Mach 2.5 and a CEP of 100 feet with terminal homing or 500 ft with command guidance.
Boosted SAM**	60,000	30		1.8(design)	Command			

Anti-Ballistic Missile - there is no information on Soviet development of an anti-ballistic missile system.

Air-to-Air Missile System

Weapons	Maximum Range n.m.	Accuracy (CEP) ft.	Maximum Speed Mach No.	Approximate Gross Weight lbs.	Guidance System	Year Available	Total* Number Produced As of 1 Jan 58	Remarks
SAM	4.8	20	2	335	Beam Rider	1956	44,000	U.S.S.R. could have operational a semi-active homing and/or infra-red homing all weather air-to-air missile, with a 15 to 20 n.m. range in 1961.

Soviet Earth Satellite Vehicle

Designations	Dimensions	Weight lbs.	Radio Trans freq. (MCS)	Initial Orbital Alt. (miles)	Orbital Cycle (min)	Date Launched	Remarks
Sputnik I	23" sphere	185	20 & 40	540	95	4 Oct 57	Power source-silver zinc batteries with mercury-oxide elements were used in both vehicles.
Sputnik II	30' X 5' diam.	1,120	20 & 40	1,060	102	3 Nov 57	
Sputnik III***	30' X 5' est.	2,000	20 & 40	800	99	1958	120 metric ton 1st stage; combinations of basic or improved thrust units will provide boosters for significant increases in payload of satellite or space flight.

* Cumulative stockpile at the end of 1957.
** Surface-to-air missile displayed in Moscow parade.
*** Estimated characteristics.

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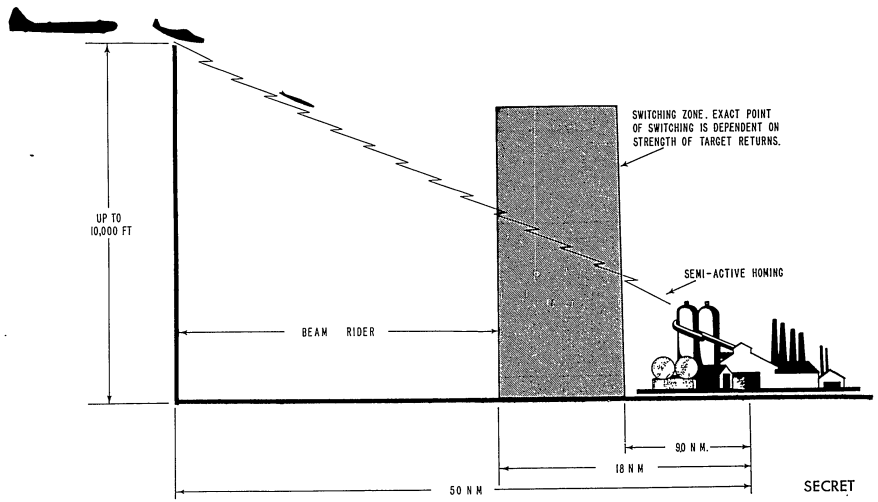

FIG 100. Tactical Use Of The KOMET Guidance System. (U)

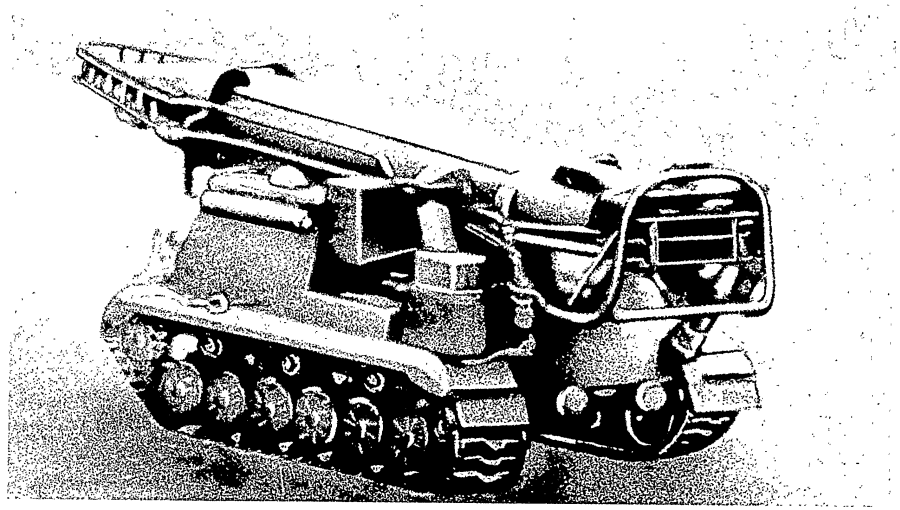

FIG 101. Rear View Of SS-1. (U)

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photograph apparently is capable of hydraulically erecting the missile to a vertical firing position. What appears to be sighting equipment is mounted on the front of the tracked vehicle. The sighting arrangement indicates the entire vehicle may have to be oriented to provide initial aim to the missile. Final aiming may be accomplished either before or after erection of the missile. Possibly a vernier control within the launcher is utilized after erection. (C)

(3) The launcher is equipped with a ladder-like superstructure which may serve as both a brush guard and a servicer. See Figure 102. (C)

(4) The frame work mounted aft of the missile appears to be a means of blast deflection for protection of the tracks. (S)

(5) It is believed a missile can be erected, fired, and the launcher moved to another location within ten minutes. (C)

(6) Reloading of the launcher probably is accomplished by a crane. (S)

b. Ballistic Missile SS-2

The Soviets reconditioned and test-launched German A-4 (V-2) missiles in October-November 1947 at the Kapustin Yar firing range. The information obtained from these firing tests probably gave the Soviets the data necessary to develop an improved version of the V-2 missile system. Although no missile of this type was displayed in the Moscow parade, the Soviets could have available a surface-to-surface missile system with the configuration shown in Figure 103. (S)

c. Ballistic Missile SS-3

(1) This is a single-stage surface-to-surface missile. Two of these missiles, mounted on trailers and pulled by M 1950 tracked prime movers, were displayed in the Moscow parade. The missile is tapered from its nose to about one fifth of its length. The remainder of the missile is uniform in diameter. The exhaust orifice is 3 feet 4 inches in diameter. This is larger than the exhaust orifice of the United States Redstone missile and indicates a thrust on the order of 80,000 pounds. There are four carbon vanes that protrude into the exhaust stream. See Figures 104 and 105. Possible fuel ports six inches in diameter and painted red are located near the forward seam. (S)

(2) The missile has small stabilizing fins, smaller than those on the U.S. Redstone missile, indicating that this missile has a high degree of inherent stability. The small fin size suggests that the missile carries a heavy nuclear warhead. (S)

(3) The extremely pointed nose cone was not designed for a high-speed re-entry into the atmosphere, which would indicate a medium range missile. (C)

(4) The trailer which is used to transport the missile is not believed to be a tactical vehicle. The high center of gravity,

FIG 102. Front View Of SS-1.

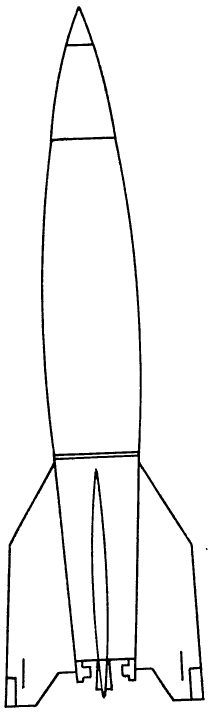

FIG 103. Estimated Soviet Short Range Ballistic Missile.

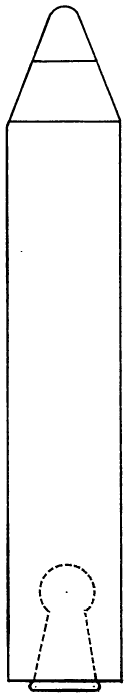

FIG 106. Possible Soviet Medium Range Ballistic Missile.

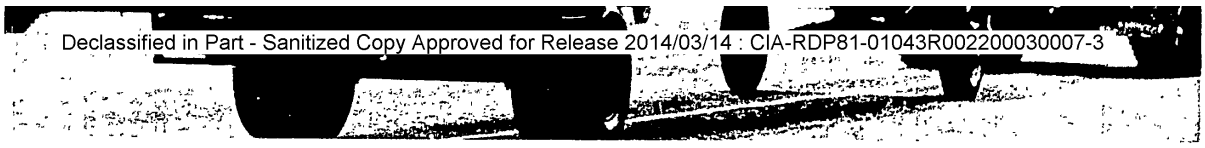

FIG 104. Rear View Of SS-3. (U)

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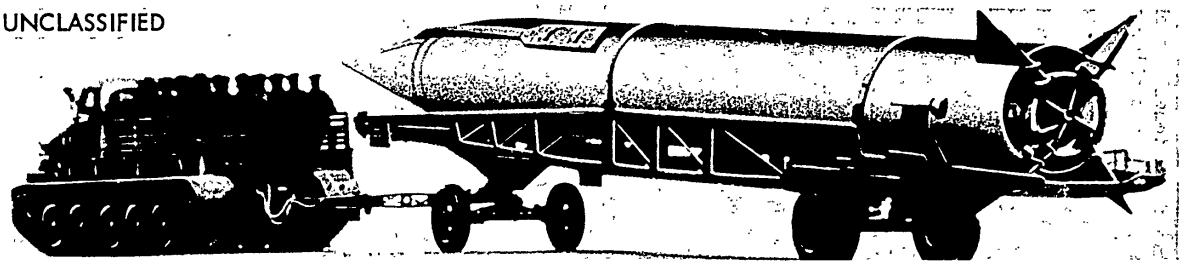

FIG 105. Side View Of SS-3. (U)

lack of adequate suspension at the front end, and generally weak construction of the transport vehicle indicate it probably was not designed for extensive mobile operation. In addition it seems most unlikely that the trailer could be used as an erecting mechanism. (S)

d. Ballistic Missile SS-4

German scientists who have returned from the Soviet Union have reported development work on rocket engines done in the U.S.S.R. from 1946 to 1950. They also reported the development of a missile that was to have a gross weight on the order of 110,000 pounds. Reliable intelligence indicates Soviet operational test firing of a missile to a range of approximately 700 nautical miles. There have been at least 48 test firings of this missile over a period of 26 months. Detailed specifications of this missile are not available but it is believed that it has a heavy nuclear warhead and could be the missile for which the 100 metric ton thrust engine was designed in 1950. See Figure 106 for an estimated configuration of SS-4. (S)

e. Guided Anti-Tank Missile

There is no information on Soviet development of an anti-tank surface-to-surface missile system. (C)

4. Surface-to-Air Missiles (SAM's)

a. The development and deployment of a Surface-to-Air missile system continues as a major priority of the Soviets. (C)

b. The layout of a SAM (B-200) site typical of those located around critical target areas is shown in Figure 107. Forty such sites have been observed around the Moscow Complex and nine around Leningrad. The sites include a cantonment area, launch area, and a guidance area. The launch area is about $\frac{1}{2}$ by 1 mile in size and contains three longitudinal roads and eleven traverse roads. The launch pads are arranged in groups of three at the ends of the traverse roads with an underground bunker between each adjacent set of pads. The area contains 60 launch racks and missile-like objects approximately 25 feet long, and 3 feet in diameter have been observed on the launch racks. The missile probably carries a warhead of approximately 1,000 pounds to an altitude of 60,000 feet and a range of 20 to 25 nautical miles. (S)

c. The guidance area is about a half mile square and is located a mile from the launch area. It contains a large underground bunker which probably houses radar and computer components and separate power and maintenance facilities. The radar antennas protrude from the end of the central bunker facing the launch site. Based on current information relative to the SAM design and development program of the Soviets, it is estimated that the B-200 has a growth potential and that the radar (YO-YO) had the following characteristics when first employed at operational sites. (S)

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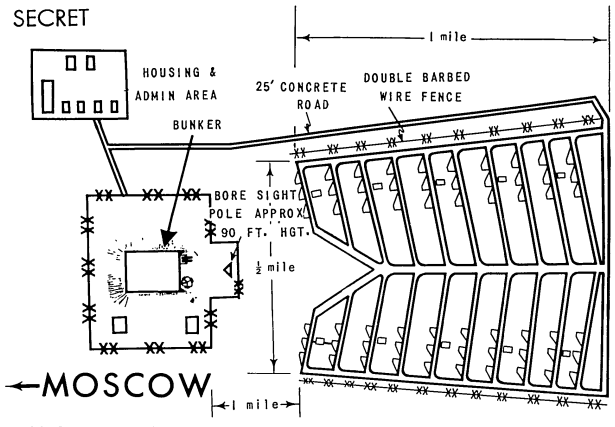

FIG 107. Typical Missile Site. (U)

d. The radar is a track-while-scan device that incorporates two antenna systems, one for azimuth and one for elevation. The system has the capability of handling 20 targets and 20 missiles simultaneously. The antennas produce fan-shaped beams with an effective beam width of approximately 54° by 1½° at half power points. The crystal controlled pulse repetition frequency is 2,500 cycles per second; this provides an unambiguous range of 32.4 nautical miles. The radar display range, as limited by scope presentation, is 27 nautical miles. The YO-YO transmitter has been reported to have a peak power of 2 megawatts and to operate in S-band. Operating frequencies in the range of 3,100 to 3,800 megacycles have been indicated. The antenna rotates at 50 revolutions per minute and thus each of the 6 beams scans the sector 5 times per second. The system will provide automatic tracking in azimuth and elevation to accuracies of 1/20th of a degree. (S)

e. Figure 108 shows what is probably a second generation surface-to-air missile and was displayed in the Moscow parade on 7 November 1957. This missile is a boosted type similar to the Nike family of missiles. The overall length of the missile-booster combination is 34 feet, the missile is 28 feet long, and approximately 18 inches in diameter. The booster probably is solid propellant type and the missile sustainer motor probably employs liquid propellant. Analysis of available photographs indicates that the missile is probably not launchable from the trailer. (S)

f. Based on analysis, the design velocity of the missile is probably Mach 1.8. The missile is probably command guided. It will carry a 350-450 pound warhead, which could be either nuclear or HE to a range of 30 nautical miles at an altitude of 40,000 feet with full control effectiveness. The missile has a ceiling of 60,000 feet at this range but with reduced control effectiveness; conversely, for full effectiveness at 60,000 feet altitude, the range of the missile is reduced. (S)

g. Analysis also indicates that this missile is compatible with the B-200 (YO-YO) guidance system. However, there is no evidence which indicates that this missile is now operationally deployed in the SAM defenses around Moscow. A missile of this type would be suitable for use in air defense systems employed in the defense of cities and prime targets within the U.S.S.R. and in the air defense of Soviet field army zones of operation. (S)

5. Anti-ballistic Missile

There is no information on Soviet development of an anti-ballistic missile system. (C)

6. Air-to-Air Missile (AAM's)

Preliminary information obtained from German missile technicians, recently repatriated by the U.S.S.R. indicates that the U.S.S.R. has developed an air-to-air beam-riding missile called "ShM". See Figure 109. It is believed the first production item

FIG 108. Boosted Surface-To-Air Missile. (U)

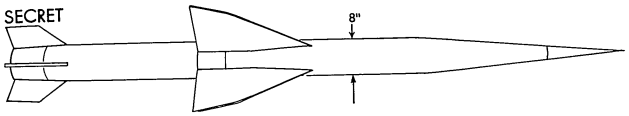

FIG 109. Soviet AAM ShM Estimated Configuration. (S)

was available in mid-1955 and that the missile can be used with the Soviet all weather interceptor Flashlight. Intelligence data indicates that the missile has a diameter of 8 inches, beam-riding guidance located in the aft end, and maximum range of about 5 nautical miles. The missile is estimated to be between 9 and 12 feet long and has a wing span of about 30 inches. There is a marked similarity between the Sparrow I and what is known of the Soviet "ShM". The Sparrow I weighs 335 pounds, has a 4.8 nautical mile range at 50,000 feet with Mach 2 plus aircraft launch speed and has a 42 pound HE frag warhead. (S)

7. Soviet Artificial Earth Satellites

The basic rocket system used in launching the Soviet Satellites on 4 October and 3 November 1957 probably comprised a stock 100-metric ton first stage and a stock 35 metric ton second stage. The same system probably could deliver a suitable thermonuclear warhead to a range of 4,000 nautical miles. A third stage probably was added in the 3 November launching and reportedly was the instrumented satellite itself. A third stage may have been added in the 4 October launching. In any case, the last stage of the launching system accompanied the first satellite in orbit. Illustrations of the two satellites and a schematic diagram of the instrumented section of the second satellite, published by the Soviet press, are shown in Figures 110, 111, 112. (S)

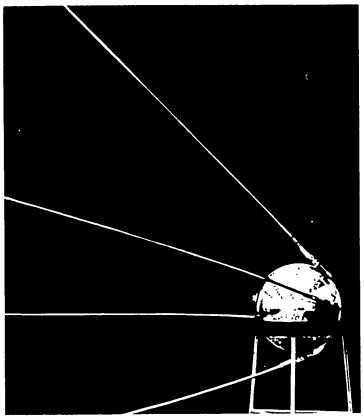

FIG 110. SPUTNIK I.

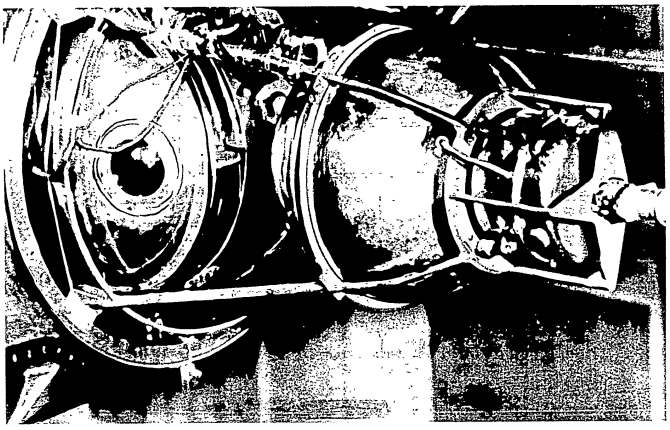

FIG 111. SPUTNIK II.

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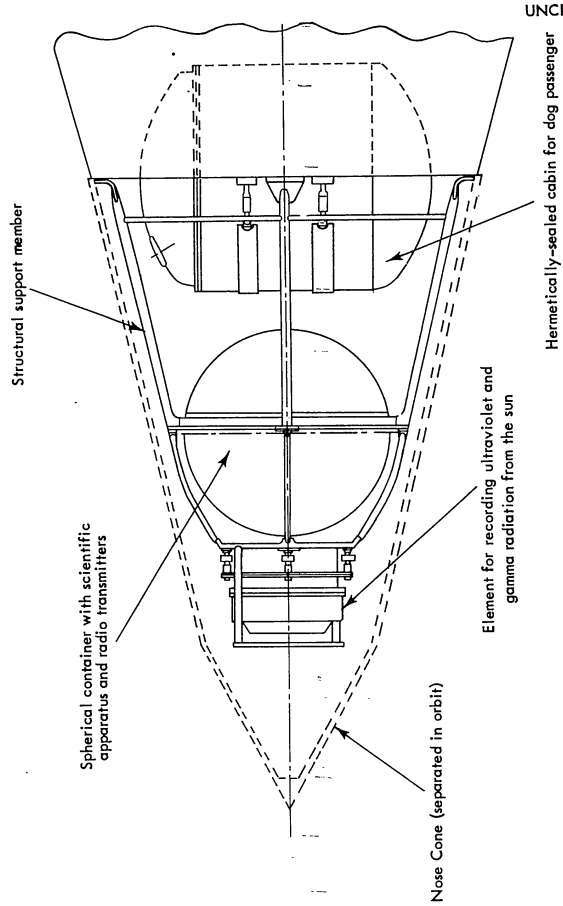

FIG 112. Instrumented Section Of Second Satellite. (Schematic Drawing)

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SECTION G

NUCLEAR WEAPONS

1. General

All information concerning Soviet nuclear weapon technology and the characteristics of weapons which could be in Soviet stockpiles has been derived from the analysis of Soviet nuclear tests. In 1958, Soviet weapons could yield between 2 kilotons and 20 megatons and could be delivered by a variety of means including aircraft, guided missiles, and rockets. The yield of any given weapon or warhead would depend on the dimensional limitations of the delivery system. Future developments will probably be directed toward more efficient use of critical nuclear materials and reduction of weapon dimensions to improve flexibility of delivery. In general, the U.S.S.R. will be capable of producing nuclear weapons of the range of yields and characteristics required for support of major military requirements. (S)

2. Nuclear Propulsion for Aircraft

There is no conclusive evidence of a Soviet program for nuclear aircraft propulsion; however, the Soviets have made increasingly frequent references to the feasibility of such propulsion during the past few years. These have ranged from popular discussions in newspapers and magazines to statements by some of the highest officials in the U.S.S.R. Some of the research known to have been conducted by the U.S.S.R. could apply appropriately to nuclear propulsion of aircraft. Assuming a program exists, it is probable that the Soviets are now engaged in the development and testing of reactor components and sub-systems, and could have a reactor system suitable for nuclear propulsion of sub-sonic aircraft available in 1962. However, it is possible that the U.S.S.R. could, for propaganda purposes, fly an experimental aircraft powered in part by nuclear power at an earlier date. (S)

3. Nuclear Propulsion for Surface Vehicles

Soviet publications have indicated interest in nuclear powered locomotives and tractors. A reactor system suitable for nuclear propulsion of large, heavy land vehicles could probably be available to the U.S.S.R. in 1962. (S)

4. Atomic Demolition Munitions

Specific Soviet nuclear demolition munitions have not been identified. However, present Soviet fission weapons yielding between 1 and 100 kilotons could be easily adapted for this purpose. (S)

Special Handling Required
Not Releasable to foreign
Nationals Except UK and Canada
By authority of Coleman W. Thacher Date 24 Feb 58
COLEMAN W. THACHER, Lt Col, GS

Unable to determine downgrading data

SECRET All portions of this section require special handling as indicated above.

SECTION H

CHEMICAL, BIOLOGICAL, RADIOLOGICAL (CBR) WARFARE

1. General

a. The Soviet Union is believed to have a significant overall capacity to initiate and sustain CBR warfare. During World War II, the Soviets reportedly had sufficient stocks of CW munitions on hand to conduct chemical warfare. Since World War II the U.S.S.R. has been able to augment its chemical and biological warfare capabilities. Reports on Soviet nuclear energy research and development programs do not indicate the existence of radiological weapons or prototypes now or in the near future. CBR warfare research and development programs are believed to be in effect and adequate in scope. The U.S.S.R. has the raw materials, manpower, and the plant facilities for large scale production of CBR materiel, except RW agents. Soviet CBR equipment and munitions are simple, sturdy, and multi-purpose. (S)

b. Very little factual information is available regarding operational availability and rate of production of Soviet CBR weapons. Gaps in our knowledge of CBR material are recorded in ACSI Intelligence Collection Memorandum 239-81K-3. Department of the Army pamphlets of the 30-12 series provide detailed information on known Soviet CBR materiel. (C)

2. Chemical Warfare

a. Toxic Agents

It is estimated that the Soviets can produce approximately 60,000 short tons of toxic chemical agents annually. Approximately 22 percent of this production is believed to be nerve agents and the proportion of nerve agents to other agents will increase in the future. The following are believed to be Soviet standard agents used to fill munitions and aerial dissemination devices.

NERVE AGENTS	BLISTER AGENTS*	OTHER
Sarin (GB)	Mustard (H)	Hydrogen cyanide (AC)
Tabun (GA)	Lewisite (L)	Phosgene (CG)
V-Agent	Nitrogen mustard (HN)	Diphosgene (DP)
	Phosgene Oxime (CX)	Chloropicrin (PS)
		Cyanogen chloride (CK)
		Arsine (SA)

* Not necessarily lethal (killing) agents.

(1) Means of dissemination

(a) Developments in Soviet offensive doctrine together with the appearance of several new large caliber artillery pieces, mortars, and rocket launchers support the assumption that toxic chemical rounds exist for most of these weapons. In addition, the Soviets are prepared to use mines,[113] bombs, ampoules, and spray tanks to disseminate toxic chemical agents. (S)

(b) It is believed that the Soviets could have standardized missiles with toxic chemical agent warheads, however, no specific information is available.[114] (S)

(c) Ground spray devices include portable and vehicular types.[115] Aerosol research indicates improvements may be in progress although no specific information is available. (S)

(d) The Soviets, who had an advanced technology for aircraft delivery devices at the end of World War II, have aircraft which could be utilized for the dissemination of any specific agent. (S)

(e) Table II[116] lists bombs which are believed to be available in quantity for delivery of mustard, phosgene and the nerve agents. No new information has been received on the specific characteristics of Soviet chemical warfare bombs. Soviet spray equipment has reportedly been adapted for use on Soviet jet aircraft. Other known airplane spray apparatus on which data are available are also included in Table II. (S)

(f) The World War II aircraft spherical bomblet release gear[117] is believed to be an effective means of obtaining wide area coverage with CW agents, including the nerve agents. The bomblets disseminated by this device include the glass incendiary bomblet.[118] (S)

b. Smoke and Flame Warfare Materiel

(1) Adamsite and diphenyl-chloroarsine are believed to be standard in the U.S.S.R. for filling toxic ground munitions and aerial bombs. The anthracene formulations (mixtures of anthracene, potassium chlorate, and ammonium chloride) are Soviet screening smoke compositions of munitions exploited by the United States. The Russians are aware of other smoke compositions, including sulfur-trioxide-chlorosulfonic acid solution, titanium tetrachloride, while phosphorus, and more recently, HC mixture (hexa-choroethane Aluminum-zinc oxide). (S)

113. See photograph, page 116.
114. See table, Figure 99, page 96.
115. See table, page 115.
116. See table, page 115.
117. See photograph, page 116.
118. See photograph, page 116.

TABLE I

Nomenclature	Capacity gallons	Weight of Unit-lbs
Portable - Manpack		
Contaminating Apparatus, Portable, NPZ-3	4	-
Contaminating Apparatus, Portable, NPZ-2	3.7	-
Manpack Decontamination Apparatus, RDP-3	3.2	-
Manpack Decontamination Apparatus, RDP-4	-	-
Vehicular		
Motorized Filling Plant, ARS-5K	423	-
Combat Chemical Vehicle, BKhM-1 (BKhM-1a)	196	-
Combat Chemical Vehicle, BKhM-3	95	-

Fig. 115 Ground Spray Devices

TABLE II

Nomenclature	Weight of Filling - lbs	Weight of Round or Device - lbs
Bombs		
Bomb, Aerial, KhAB-25	31	61
Bomb, Aerial, KhAB-100	110	—
Bomb, Aerial KhAB-200	117-202	346-387
Bomb, Aerial, KhAB-500	374-405	660-690
Bomb, Aerial, KhAB-1,000 *	600 *	—
Spray Devices		
Nomenclature	Capacity — Gallons	
Spray Apparatus, Airplane, VAP-500, VAP-1,000	83 177	
Spray Apparatus, Airplane, UKhAP-250 (multi-purpose sprayer)	264	
Spray Apparatus, Airplane, UKhAP-500 (multi-purpose sprayer)	50-53	

* Estimated not confirmed.

Fig. 116 Aerial Munitions and Equipment for the Dissemination of Toxic Agents (U)

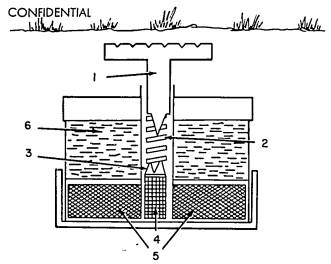

FIG 113. Soviet Mustard Gas Land Mine. (U)

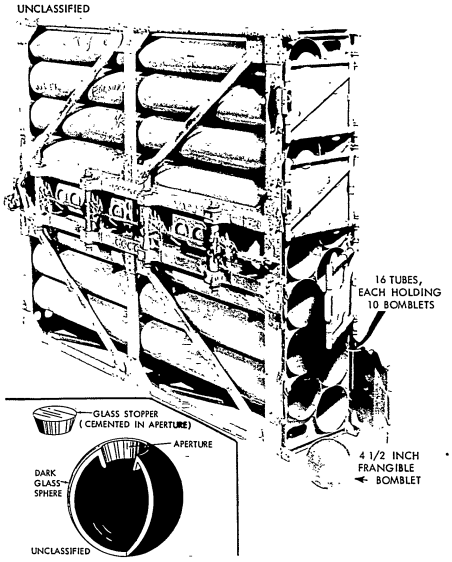

FIG 117. (TOP) Bomblet Release Gear. (U)
FIG 118. (BOTTOM) Glass Incendiary Bomblet That May Be Disseminated In-Bomblet Release Gear Above. (U)

TABLE III

GROUND MUNITIONS

Nomenclature	Weight of Filling - lbs	Weight of Round or Device - lbs
Artillery		
Shell, Smoke, 122-mm Howitzer or Corps Gun	8.3	54.1
Shell, Smoke, 76-mm (Howitzer)*	1.5	--
Mortars		
Shell, Smoke, 82-mm Mortar	--	18.0
Shell, Smoke, (WP), 107-mm Mortar	4.5	15.4
Shell, Smoke, 120-mm Mortar	4.3	36.4
Ampoule, (Smoke) 127-mm Mortar	2	3.25
	Weight of Filling - lbs	**Weight of Round or Device - lbs**
Grenades		
Grenades, Hand, Smoke, RDG-1, RDG-2Kh, "S" type	0.9 - 1.0	1.5 - 1.25
Thermogenerators		
Screening Smokes		
Candles, Smoke	0.5 - 4.2	0.9 - 5.2
Pots, Smoke, DM-11, BDSh-5	1.7 - 4.0	2.2 - 88.5
Barrel, Smoke, DB-11	81.5	97.1
Drum, Smoke, DSh-100	220	287
Toxic Smokes		
Candles, Smoke, Pot, YaD-11, YaD-21, YaD-31	3.7 to	4.8

GROUND DISSEMINATION VEHICLES

Nomenclature	Capacity Gallons	Weight of Units - lbs
Vehicle, Motorized Filling Plant ARS-5K	291	--
Vehicle, Gas Transport ARS-D	304-357	--
Vehicle, Gas Transport ARS-6	530	--

* Estimated (not confirmed).

Fig. 119. Ground Munitions and Equipment for the Dissemination of Smoke (U)

(2) Ground toxic and screening smoke munitions and equipment are listed in Table III,[119] and aerial toxic and screening smoke munitions and equipment are listed in Table IV.[120] (U)

(3) Flame materiel and disseminating devices are listed in Table V.[121] Continued performance improvement has been reported, including fuel thickeners with satisfactory characteristics. OP-2 powder has been reported as a Soviet flame fuel thickener, but no specific information is available. (S)

(4) Known portable,[122] cart-mounted, mechanized flame throwers, including suspected flame and incendiary weapons, are summarized in Table V. (S)

(5) One new portable type flame thrower reportedly has a new fuel tank and gun group arrangement and uses a bipod with the gun group. The range of this weapon is indicated to exceed 40-yards, but specific data are unconfirmed. (S)

(6) Available data for aerial flame munitions are presented in Table VI.[123] (S)

(7) It is estimated that approximately 10 percent of Soviet production of all types of ground and aerial munitions could be devoted to smoke and flame type munitions. (S)

c. Defensive Materiel

Soviet chemical warfare defensive equipment is effective. Quantities are considered adequate to meet requirements of the Soviet Armed Forces including most of the Satellites. (S)

(1) Detection and Identification

(a) Kits and laboratories are available for detection and identification of all standard United States chemical agents. The nerve agent, GB, is a possible exception, however, reports since 1955 indicate that detection equipment may be developed to detect GB as well as GA. The latest model described is the Simplified Detection Kit, IPI.[124] The following chemical warfare agents can be detected by the Soviets kits:

Tabun	Hydrogen cyanide
Mustard	Cyanogen chloride
Nitrogen Mustard	Chloropicrin
Lewisite	Arsine
Phosgene	Chloroacetophenone
Diphosgene	Acid Smoke Agents (S)

119. See table, page 117.
120. See table, page 119.
121. See table, page 119.
122. See photograph, page 121.
123. See table, page 120.
124. See figure, page 121 .

TABLE IV

Nomenclature	Number of Bombs	Weight of Filling - lbs	Weight of Round or Device - lbs
Bombs			
Bomb, Aerial, AOKh-8, AOKh-10, AOKh-12, AOKh-25	--	1.2 - 8.25	17.5 - 52
Bomb, Aerial, KhAB-500		374 - 407	660 - 691
Bomb, Aerial, KhAB-25 YuD	--	16.4	76
Bomb, Rotational Scatter Airplane - RKAB-1 (container for smoke bombs listed above)			2,635
Bomb, Rotational Scattering Airplane - RKAB-2 (container for smoke bombs listed above)			1,430
Bomb, Rotational Scattering Airplane - RKAB-3 (container for smoke bombs listed above)			990
Spray Apparatus, Airplane, UKhAP-250 (multi-purpose sprayer)			26.4
Spray Apparatus, Airplane, UKhAP-500 (multi-purpose sprayer)			50 - 53

Fig. 120. Aerial Munitions and Equipment for the Dissemination of Smokes (U)

TABLE V

Nomenclature	Rate of Fire of Weapon	Weight of Filling - lbs	Weight of Round or Device - lbs
Mortars			
Shell, Incendiary, 120-mm Mortar	15 rpm w/o re-laying; 6 rpm with re-laying.	2.9	37.9
Spherical Glass Incendiary Bomblets	--	2	3.25
Ampoule, 127-mm	--	2	3.25
Grenade			
Grenade, Frangible	--	--	1.5 pints
Projectors			
Nomenclature	Capacity (Gallon)		Weight of Unit - lbs
Flame Thrower, Fixed or "PGT"	6.6		114-121
Flame Thrower, Portable, RONS-3	2		50
Flame Thrower, Portable, (New Model)	--		--
Flame Thrower, Mechanized, AT-O-M2	44		--
Flame Thrower, Mobile (Cart-Mounted)	(1 cylinder)		--
Flame Thrower, Mobile (Cart-Mounted)	(3 cylinder)		--

Fig. 121. Ground Flame and Incendiary Weapons and Equipment (U)

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TABLE VI

Nomenclature	Weight of Filling - lbs	Total Weight of Round or Device - lbs
Bombs		
Bomb, Aerial, Incendiary ZAB Series	1.3 - 508.6	3.3 - 660
Bomb, Rotational, Scattering Airplane - RRAB 1 (container for incendiary bomb)		2,635
Bomb, Rotational Scattering Airplane, RRAB 2 (container for incendiary bomb)		1,430
Bomb, Rotational Scattering Airplane, RRAB 3 (container for incendiary bomb)		990
Spray Devices		
Nomenclature	**Capacity (Gallons)**	**Weight of Filling - lbs**
Spray, Apparatus, Airplane ZAP-500 (Incendiary-granular phosphorus)		32 - 264
Spray, Apparatus, Airplane (multi-purpose sprayer)	26.4	242 - 417 (Approximate)
Spray, Apparatus, Airplane UKhAP-500 (multi-purpose sprayer)	50 - 53	814 - 924 (Approximate)

Fig. 123. Aerial Munitions and Equipment for the Dissemination of Incendiary and Flame (U)

TABLE VII

Agent	Concentration (Mg./l)	Flow Rate (lpm)	CML Breakpoint* (Min)
Cyanogen Chloride (CK)	4	32	5
Hydrogen Cyanide (AC)	10	32	35
Phosgene (CG)	11	30	90
G-Agent (GE)	2.4	50	270

* Note: Under the same test conditions as above, the penetration times of CK were determined to be 30 minutes for ICt_{50} (median incapacitating dosage) and 37 minutes for LCt_{50} (median lethal dosage).

Fig. 126. Performance Characteristics of MO-2 Canister (U)

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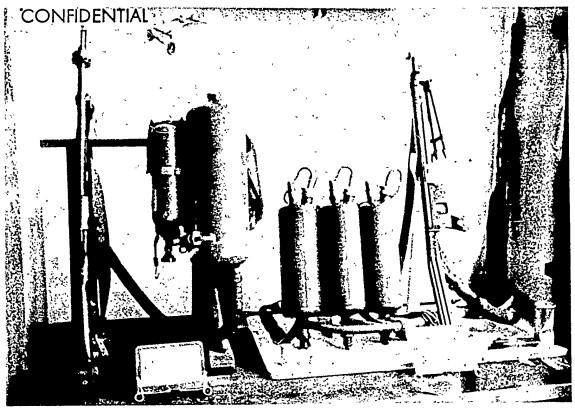

FIG 122. Soviet Flame Throwers. (U)

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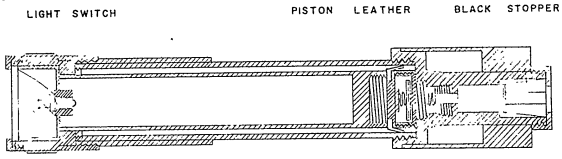

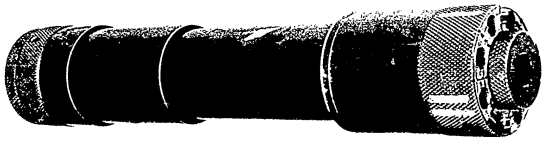

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FIG 124. Soviet Sampling Pump. (U)

(b) Little is known of the characteristics of present Soviet field laboratories. World War II models consisted of laboratories mounted on 3/4 ton and 2½ ton trucks and railroad cars. These laboratories are capable of identifying samples of all known chemical agents. No evidence has been obtained indicating major changes in these laboratories; recent developments probably are concerned with details of laboratory procedures and equipment as required by development of new chemical agents. (S)

(2) Protection

(a) The entire Soviet Army, a large proportion of the Satellite troops, and some Chinese Communist troops are now equipped with the Shlem Maska-1 (SHLEM-1) protective mask.[125] Limited use of the Shlem-1 mask is also made in civilian training exercises. Quantities are sufficient for general war. Occasional references have been made to a new gas mask, however, only the Shlem-1 has been issued in quantity. A 1957 Soviet manual describes and shows the Shlem-type mask with a double outlet valve which tests have shown is very effective. The contoured fit of the Shlem-1 provides over-all face and head protection, but is uncomfortable to wear in warm weather. The contour fit, double outlet valve and MO-2 canister provide protection against all known chemical agents. (See Table VII[126]) (S)

(b) A complete line of clothing[127,128] which will provide protection in any gas situation is available to the Soviet Soldier. Sufficient protective clothing and adequate impregnating facilities are probably available for large scale use. (S)

(c) The Soviets have two models of hooded protective coveralls[127] for special uses such as decontamination or toxic-agent-handling operations. (S)

(d) Articles of protective clothing issued to Soviet Armed Forces are summarized in Table VIII.[129] (S)

(3) Decontamination

(a) Chloramine-B or T in powder form or in a water-alcohol solution is issued for first echelon decontamination of skin, clothing, and equipment such as small arms. It is effective against mustard and lewisite, but ineffective against nerve agents. An alkaline solution in small bottles specifically designed for individual nerve agent decontamination has been reported in production but is not yet on issue. (S)

125. See photograph, page 123.
126. See table, page 120.
127. See photograph, page 125.
128. See photograph, page 125.
129. See table, page 124.

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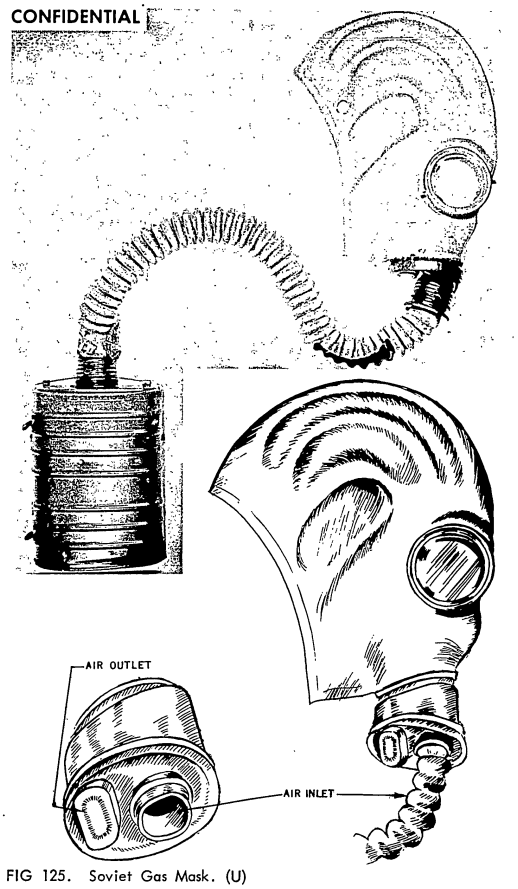

FIG 125. Soviet Gas Mask. (U)

TABLE VIII

Item of Clothing	Penetration Time by Liquid Agents	
	H	GB
Oilskin coverall	1-3 hours	½ to 6 hours
Rubberized fabric coverall	40-50 min	24 hours
Jackot	1½ hours	1 hour
Light protective suit	1 hour	1 hour
Rubber gloves (5-finger)	1 hour	*
Rubber gloves (3-finger)	2½ hours	5 hours
Rubber boot	3 hours	*
Oilskin apron	40 min	50 min
Oilskin buskins (sole)	2-8 hours	½-2 hours
(calf)	5-15 min	5-10 min
Rubberized fabric buskins (sole)	1 hour	1 hour
(calf)	40 min	1 hour
Paper cape	15-60 min	5-15 min
Cape-groundsheet	2 min	Less than 1 min

* Unknown

Fig. 129. Protection Afforded Against Liquid Agents by Soviet Protective Clothing (U)

TABLE IX

Disease	Days Incubation Period (ave)	Vaccine	Lethality (Approx)
Anthrax, Pulmonary	7	Yes	99%
Brucellosis	14	Yes	3%
Tularemia, Pulmonary	4	Yes	62.5%
Plague, Pulmonary	5	Yes	100%
Encephalititides*	10	Some	10 to 65%
Yellow Fever	11	Yes	5%
Parrot Fever	11	No	35%
Q Fever	10	Yes	2%

* Lethality varies with type.

Fig. 131. Possible Soviet BW Agents (U)

A. SOVIET RUBBERIZED FABRIC COVERALL (U)
B. LIGHT PROTECTIVE SUIT (U)

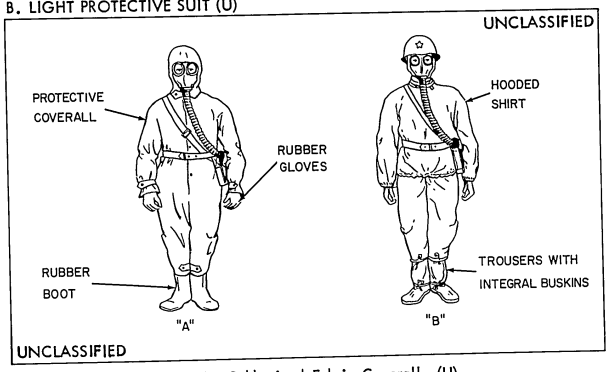

FIG 127 & 128. "A"-Soviet Rubberized Fabric Coverall. (U)
"B"-Light Protective Suit. (U)

(b) Limited information is available on Soviet antigas ointments. However, there are indications that chloramine-B, BAL, and anti-phosphorus ointments may be available. (S)

(c) A large variety of decontaminating equipment is available to the Soviet soldier to enable rapid recovery from chemical attack with persistent agents. Special kits in use are the PM-DK[130] for machine guns and mortars and the A-DK[130] for artillery pieces. Vehicular decontamination apparatus (ADM-750 and the ARS series) are used for tanks, trucks, personnel carriers, and miscellaneous equipment. Motorized units (AGV-2 and BU-2) are employed for clothing decontamination, and a new type dual-purpose clothing and personnel decontamination unit has been reported. All this equipment is utilized frequently in unit training and on maneuvers. (S)

3. Biological Warfare

a. Agents

Available information does not indicate that the U.S.S.R. has standardized any BW agents for either covert or overt BW operations. For possible BW agents, see Table IX.[131] (S)

(1) Means of Dissemination -- The most detailed information of Soviet BW munitions and dissemination devices has been obtained from German World War II intelligence. Some of these munitions and devices, believed to be the basis of some new developments, are: (a) the airplane spray tank model BR-1[132] (25 liters) for spraying a bacterial emulsion, (b) a larger version of the BR-2 (50 liters) for dust spraying dried BW agents, (c) an artillery projectile[133] containing ampoules filled with dry agents, (d) a variety of crude, but promising, apparatuses suitable for sabotage operations (See "SP-1" bomb type apparatus[134]), and (e) the water contaminating cylinder "TSV",[135] containing ampoules. In addition, the Soviet air munitions "VAP 1000", "VAP 500" and the "AK-2" ampoule dissemination apparatus are considered adaptable for the dissemination of BW materials. (S)

b. Defensive Materiel

(1) Detection -- 1956-1957 Soviet training literature indicates the Soviets have no devices for the immediate detection of disease-producing microbes and toxins. However, there are indications that considerable effort is being expended to develop a rapid means for the detection, isolation, and identification of possible BW agents. (C)

130. See photograph, page 127.
131. See table, page 124.
132. See photograph, page 129.
133. See photograph, page 129.
134. See photograph, page 129.
135. See photograph, page 129.

USSR - A MACHINEGUN - MORTAR DECONTAMINATION SET, PR - DK

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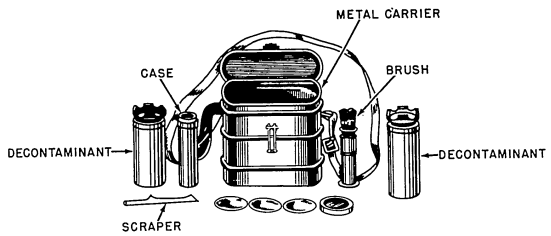

FIG 130. A Machinegun-Mortar Decontamination Set, PR-DK. (C)

(2) Protection

(a) The military gas mask, Shlem-1, will furnish adequate protection against all known possible BW agents, with the possible exception of tularemia. Organisms of tularemia type are small in diameter and an extremely low number are required to achieve casualties, leakage along the facepiece and/or outlet valve, although extremely small, may result in some infections. (S)

(b) Soviet standard CW protective clothing would be effective against BW agents. For protection against disease bearing vectors, anti-parasite chemicals for under clothing impregnation are available. (S)

(c) Many large Soviet buildings have recently been provided with air filtration systems equipped with electrostatic precipitators. Such systems increase the Soviet BW defense capability against aerosol attack. (S)

(3) Decontamination -- Removal of radiological, chemical or biological agents from the skin, eyes, nose, and throat is referred to as sanitary treatment. The same equipment, decontaminants and procedures as used for CW decontamination are used for BW decontamination. (C)

(4) Immunization -- Soviet troops are normally immunized against smallpox, typhoid, paratyphoid A and B, cholera, and tetanus. They now have vaccines available as indicated for those possible BW agents listed in Table IX. (S)

4. Radiological Warfare

a. Offensive Materiel -- Reports on Soviet nuclear research, development, and testing programs do not indicate the existence of radiological weapons or prototypes. Such weapons are not expected in the future. (S)

b. Defensive Materiel

(1) Protection -- The standard individual CW protective equipment consisting of the Shlem-1 gas mask assembly, and protective clothing is used for personal protection against radiological warfare. The gas mask will prevent the inhalation of radioactive particulates. The other protective items will reduce the decontamination problem and keep short range radiation emitters from directly contacting the skin. Closed structures for firing and observation may be provided with CW collective protectors for removal of radioactive particulates. (S)

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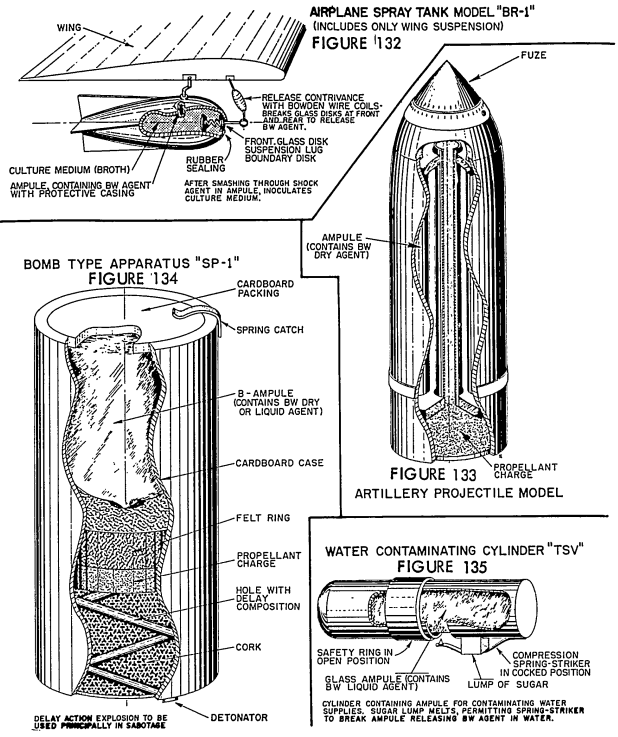

FIG 132, 133, 134, & 135. Soviet Devices Reported Primarily For BW Agent Dissemination. (U)

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(2) Detection

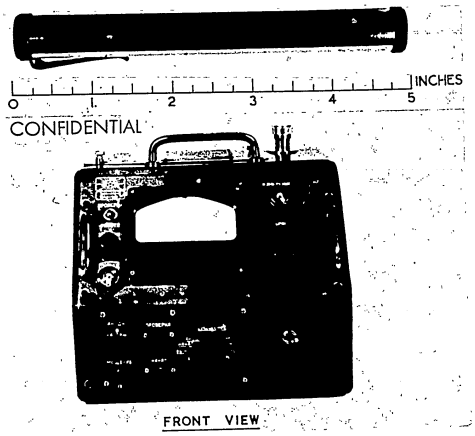
(a) The individual dosimeter, integral dosimeter, Type DP 21A,[137] is a pen-type dosimeter which is to be issued in lots of 200, with a charger-reader for each lot. The dosimeter is a non-self reading type ionization chamber with a range of 0-50 roentgens, and is in production in East Germany; there are no indications that it has been issued. The charger-reader is effective, although large and heavy, clumsy to use, and time consuming. (S)

(b) The area survey meter - Type DP 1A,[138] also reported to be in production in East Germany, is designed to measure dose-rate of beta and gamma radiations. The total range extends from 0.04 to 400 roentgens per hour in four subranges. It is accurate and rugged, but its size, weight, and power requirements limit its use in the field. (S)

(c) The "Contamination meter" - Radiometer DP 11-A consists of the probe, impulse amplifier, transformer, micro-ammeter, and earphones. It may be used to detect both beta and gamma radiation and will detect low intensities of gamma radiation (up to 0.3 roentgens per hour). (S)

(3) Decontamination -- The radiological decontamination equipment is exactly the same (except for clothing) as that used for chemical agent decontamination. However, if water is available, it will be used for radiological decontamination; special permission is probably required to use chemical decontaminants. (C)

137. See photograph, page 131.
138. See photograph, page 131.



FRONT VIEW

FIG 137. Soviet RADIAC Instruments. (U)

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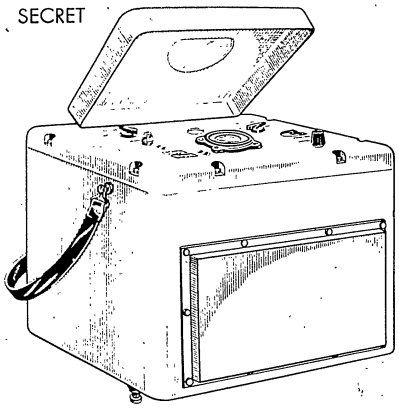

FIG 138. Soviet Survey Meter. (U)

SECTION I

RELATED EQUIPMENT

1. General

a. The Soviet Army has made most impressive gains in developing and manufacturing materiel referred to herein as related equipment. Brief treatment is given in this section to general and special purpose vehicles, bridging, mine warfare equipment, camouflage equipment, entrenching and excavating equipment, body and flexible armor, and medical equipment. A list of special items on which no information is known is also provided. (C)

b. The equipment covered in this section is by no means all of the related equipment available to the Soviet Army. Future revisions of this study will treat other categories of equipment provided users indicate a need therefor. (U)

2. General and Special Purpose Vehicles

a. Trucks[145]

(1) General -- Starting about 1946, the Soviet's began to introduce a series of Soviet manufactured trucks as replacements for their prewar vehicles and the United States equipment obtained under Lend-Lease. At least 10 different models of postwar trucks, ranging in payload capacity from $\frac{1}{2}$ to 13 tons, are currently in use in the Soviet Army. In addition, the basic chassis of most of these trucks are used for specialized vehicles such as gasoline or diesel fuel tankers, shop or radio vans, dump trucks, or semitrailer tractors. Soviet military trucks are powered by gasoline or diesel engines; however, there are engines available which run on substitute fuels. Diesel engines are normally installed in trucks above the 4 to 5-ton class. The power output of the older engines and the general design of older Soviet trucks are not up to United States standards but apparently have met Soviet interim requirements. Since the same Soviet trucks that are used by the military forces are also used in the civilian economy, it is almost impossible to estimate the quantity of each specific type vehicle that is used by the Soviet Army alone. Production figures for a specific model truck include those produced for all the Soviet's requirements (military, civilian, and for export to Bloc and non-Bloc countries). (U)

(2) New Family of Trucks -- Since 1956, the Soviet's have been gradually introducing a second postwar generation of transport and cargo vehicles. The announced objective of the Sixth Five-Year-Plan was to introduce a new series of vehicles generally consisting of

145. See Table, page 138.

more refined and better engineered versions of the older models which they will replace. However, in several instances the Soviets are introducing some completely new models in weight classes not recently provided or are including all-wheel-drive in models which previously had dead front axles. It is not anticipated that a third generation of transport vehicles will appear within the next five years. (U)

(3) GAZ-69 and GAZ-69A[146] -- The GAZ-69 series of light vehicles was introduced in 1954 and has generally replaced the older GAZ-67 B (jeep) ¼-ton truck. Often mistakenly referred to as a ¼-ton vehicle, the GAZ-69 is actually a ½-ton pickup truck capable of carrying 8 men or of carrying 2 men and a ½-ton load. It is air-transportable in the Soviet's HOUND helicopter. The GAZ-69A is a 5 passenger command and reconnaissance body version mounted on the basic GAZ-69 chassis. There is also a carryall body version called the GAZ-19. In addition, the basic GAZ-69 chassis is used in the small amphibious vehicle called the GAZ-46. The Soviets are exporting the GAZ-69 to several non-Bloc countries as well as providing it to most of the Bloc countries. (C)

(4) GAZ-62[147] -- The GAZ-62 is a totally new truck which resembles in appearance a United States 3/4-ton type truck. This vehicle features a folding windshield, canvas top and side-curtains for the drivers cab, and a low and wide cargo body. It is assumed that this vehicle is air-transportable. Constructed from the chassis and engine of the new GAZ-56 truck, modified to provide all-wheel-drive, this vehicle was designed to provide good cross-country operation. Production is reported to have started in the later part of 1957. (U)

(5) GAZ-56 -- This vehicle is a modernized replacement for the antiquated 1.5-ton GAZ-AA and GAZ-MM trucks, produced from 1932 to 1938 and 1938 to 1948 respectively, and which are still in use in some Army units and throughout the Soviet civilian economy. The GAZ-56 features an all-metal cab with heater and blower and, though primarily scheduled for use by the agricultural economy, it may well find its way into military administrative uses. Production is reported to have started in late 1957. (U)

(6) GAZ-63 and GAZ-66 -- Introduced shortly after World War II, the GAZ-63 was the first Soviet-made cargo truck to feature all-wheel-drive. The GAZ-63 is still widely used throughout the Soviet Army, both as a cargo vehicle and as a primemover for light field artillery and other weapons. It is also used as the basic chassis for the 4 x 4 wheeled APC, the BTR-40. A dump truck version is called the GAZ-93, and a tractor version for hauling a 5.5-ton semitrailer is known as the GAZ-63D. The GAZ-63 series of vehicles has been distributed to most of the Bloc countries. A new truck, the GAZ-66, was reported to be scheduled as a replacement for the GAZ-63 during the Sixth Five-Year-Plan. (U)

146. See photograph, page 135 .
147. See photograph, page 135 .

FIG 146. GAZ-69 (Left) And GAZ-69A (Right). (U)

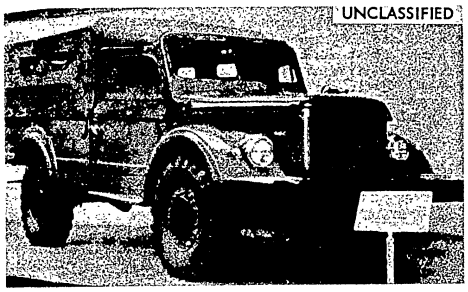

FIG 147. GAZ-62. (U)

(7) GAZ-51 and GAZ-52 -- The GAZ-51 is the economy counterpart of the GAZ-63 in that it does not have all-wheel-drive. Most of the Soviet Army's early radio van bodies, gasoline tankers, ambulances, etc., were assembled on the GAZ-51 chassis. Significant quantities of this vehicle have been provided to both Bloc and non-Bloc countries. A tractor version for hauling a 7-ton capacity semitrailer is known as the GAZ-51P. It is reported that a new truck, the GAZ-52, started to replace the GAZ-51 in production in late 1957. (U)

(8) ZIS/ZIL-150 and ZIL-164 -- Like the GAZ-51 above, the ZIS/ZIL-150 does not have all-wheel-drive and serves as an administrative type vehicle for hauling of general cargo, supplies, and personnel. (The designation ZIS/ZIL signifies the dropping of Stalin's name from the factory's name and the adoption of the name, Likhachev). A dump truck version is called the ZIS/ZIL-585. It is reported that a new truck, the ZIL-164, started to replace the ZIL-150 in production in late 1957. (U)

(9) ZIS/ZIL-151 and ZIL-157[148] -- The ZIS/ZIL-151 is standard throughout the Soviet Army. A 6 x 6 all-wheel-drive vehicle, its capable performance in mud or snow render it one of the most serviceable of Soviet transport vehicles. It is primarily used as a cargo truck, prime mover, and personnel carrier; however, it has also been used as the basic chassis for multibank rocket launchers, engineer-crane trucks, radio and maintenance vans, the 6x6 wheeled APC (BTR-152) and as the chassis for the "BAV" 6x6 amphibious truck. A new truck, the ZIL-157, is reported to have replaced the ZIL-151 in production in late 1956. The ZIL-157 closely resembles the ZIL-151 in most respects, but it can be readily identified by the use of single large flotation-type tires on the rear axles instead of dual tires and by the tire inflation devices attached to each wheel hub. (U)

(10) MAZ-200 -- This vehicle, as well as the almost identical YaAZ-200, was developed to provide a heavy capacity cargo truck. In a dump truck version it is known as the MAZ-205 and in a tractor version for hauling an 18.5-ton capacity semitrailer it is called the MAZ-200B. Its primary military use is in logistical support for the Army. (U)

(11) YaAZ-214[149] -- This new truck was introduced in 1956 and is possibly a replacement for the YaAZ-200 series of trucks referred to above. Unlike the YaAZ-200, which is a 4x2 vehicle, the YaAZ-214 is a three axle vehicle with an all-wheel-drive. It is equipped with large single flotation-type tires instead of dual tires on the rear axles. Primarily designed to provide a heavy load carrier with improved cross-country performance, the YaAZ-214 has been observed in use as the prime mover for a tank-transporter trailer and recently the chassis of the YaAZ-214 has been observed as the carrier for the Soviet's new 6-round, 250-mm Rocket Launcher. (U)

148. See photograph, page 137.
149. See photograph, page 137.

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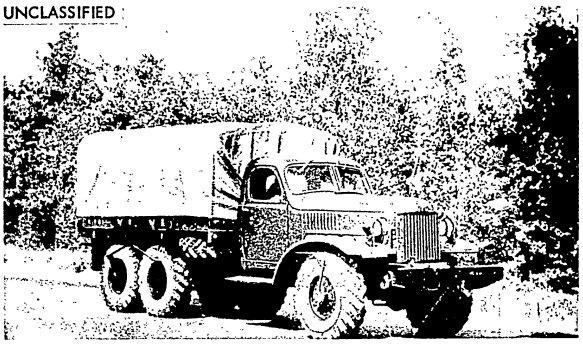

FIG 148. ZIL-157. (U)

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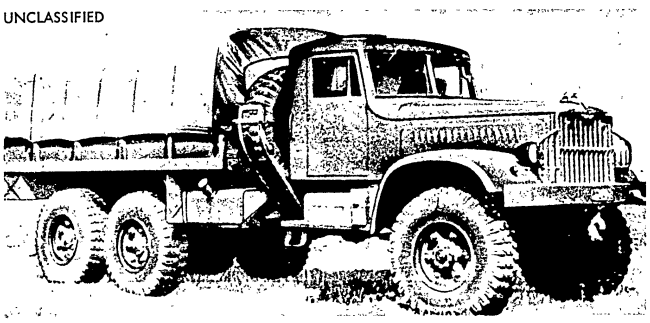

FIG 149. YaAZ-214. (U)

Figure 145. TABLE OF CHARACTERISTICS OF CARGO TRUCKS USED BY SOVIET ARMY

Designation	Vehicle Weight Empty	Cargo Capacity	Max Towed Load	Engine Type	Max Speed	Cruising Range w/o Refueling	Operationally Available	Quantity Produced Note 1 As of 1 Jan 58	Annual Rate of Production
GAZ-69, 4x4	1.75-Tons	1/2-Ton	1-Ton	55 HP, gasoline	55 mph	420 miles	1953	67,500*	30,000*
GAZ-62, 4x4	Unknown	1-Ton	Unknown	70 HP, gasoline	50 mph	Unknown	1957	Unknown	Unknown
GAZ-56, 4x2	Unknown	1.5-Tons	Unknown	70 HP, gasoline	50 mph	Unknown	1957	Unknown	Unknown
GAZ-63, 4x4	3.5-Tons	2-Tons	4-Tons	70 HP, gasoline	40 mph	485 miles	1949	150,000*	25,000* Note 2
GAZ-51, 4x2	3-Tons	2.5-Tons	4-Tons	70 HP, gasoline	45 mph	260 miles	1946	883,150*	120,000* Note 2
ZIL-150, 4x2	4.25-Tons	4.5-Tons	5-Tons	90 HP, gasoline	40 mph	310 miles	1949	875,000*	85,000* Note 2
ZIL-151, 6x6	6-Tons	5-Tons	4-Tons	90 HP, gasoline	40 mph	435 miles	1951	177,500*	30,000* Note 2
MAZ-200, 4x2	8-Tons	7.5-Tons	10-Tons	110 HP, diesel	35 mph	400 miles	1949	29,410*	5,000*
YaAZ-214, 6x6	13.5-Tons	8-Tons	11-Tons	205 HP, diesel	35 mph	450 miles	1957	250*	200*
YaAZ-210, 6x4	16.5-Tons	13-Tons	16.5-Tons	168 HP, diesel	35 mph	470 miles	1951	7,800*	1,500*

* Estimated

Note 1. Total Produced - only about 1/4 are probably in use by the Soviet Army.
Note 2. New models were being introduced in 1957 but insufficient information is available to indicate effect on production.

(12) YaAZ-210 -- This vehicle is the heaviest cargo truck in service in the Soviet Army. The YaAZ-210 serves as a cargo carrier and heavy prime mover. It is often used to tow a "train" of cargo trailers. The dump truck version is known as the YaAZ-210E, a tractor version for hauling a 25-ton capacity semitrailer is called the YaAZ-210D, and in a heavy duty prime mover version (for towing loads up to 50-tons such as tank-transporter trailers) it is called the YaAZ-210G. A new truck, the YaAZ-219, with a more powerful engine, is reported as scheduled to replace the YaAZ-210 series in production in late 1958. (U)

a. Amphibious Vehicles[150]

(1) General -- Fairly large numbers of United States amphibious jeeps and trucks (DUKW) were furnished to the Soviet Union under Lend-Lease. Some of these vehicles are still in use. In line with their program of increasing the mobility of the Soviet Army, the Soviets have not neglected the development of their own amphibious vehicles. The three amphibious vehicles listed below are now habitually used by all Soviet divisions. In addition to the military amphibious vehicles, the Soviets have also produced several amphibious tractor vehicles for use primarily by their lumber industry. One model, the VL-3, can readily be adapted to military use. (U)

(2) GAZ-46 Amphibious Truck -- The GAZ-46 is a small amphibious truck which is constructed on the chassis of the GAZ-69 truck. Often referred to as the "MAV" (Maly or small Amphibious Vehicle) it resembles an amphibious jeep; however, it is larger and a more powerful vehicle in the water than the old United States amphibious jeep. It is propelled in the water by a single propeller. Used principally by Soviet Engineer units it is also found in use by Soviet reconnaissance units. A typical load in the water is five men and the driver. (C)

(3) "BAV" Amphibious Truck -- This amphibious truck is the Soviet version of the old United States DUKW 6x6 amphibious truck. Constructed on the chassis of the ZIS/ZIL-151 truck, the BAV bears a close resemblance to the United States DUKW; however, it can be readily distinguished from the DUKW by the long cargo compartment which extends completely to the rear of the vehicle and by the provision of a tail gate. Capable of carrying 25 men or an 85-mm divisional gun and crew when in the water, this vehicle is propelled in the water by a single large propeller. The BAV is found in all Soviet line divisions and is also pooled in ferrying battalions under Army control. Soviet Engineer bridging units have been observed using the BAV as a tug for moving sections of float bridge or ferry rafts in relatively slow moving rivers. (C)

150. See Table, page 140.

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Figure 150. TABLE OF CHARACTERISTICS OF AMPHIBIOUS VEHICLES

Designation	Vehicle Weight Empty	Cargo Capacity on Land	Cargo Capacity in Water	Engine Type	Max Speed on Land	Max Speed in Water	Cruising Range w/o Refueling	Operationally Available*	Quantity Produced* As of 1 Jan 58	Annual Rate of Production*
GAZ-46, 4x4, Amphibious Truck	2.5-Tons	0.5-Ton	0.5-Ton	55 HP, gasoline	60 mph	6 mph	250 miles	1954	2,350	750
"BAV," 6x6, Amphibious Truck	7.5-Tons	2.5-Tons	3.8-Tons	90 HP, gasoline	40 mph	6 mph	300 miles	1952	4,300	750
K-61, Full-Tracked Amphibian	10-Tons	3.5-Tons	5-Tons	237 HP(?), diesel	25 mph	10 mph	155 miles	1950	4,350	1,000

* Estimated

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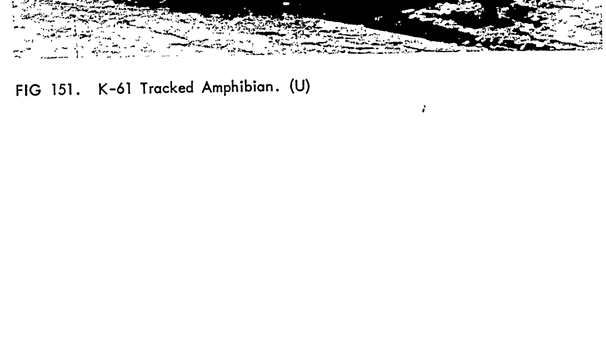

FIG 151. K-61 Tracked Amphibian. (U)

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(4) K-61 Tracked Amphibian[151] -- This full-tracked amphibian is a unique Soviet design. It has a long, fairly deep cargo compartment whose rear panel overhangs to the rear and is hinged to form a loading ramp when lowered. The K-61 is capable of carrying in the water a load of 50 men, or a 122-mm or 152-mm howitzer and crew, or a GAZ-63 truck. The K-61 is found in all Soviet Tank and Mechanized divisions and is also pooled in ferrying battalions under Army control. Powered in the water by two large propellers, the full-tracked unarmored K-61 can travel on land without damage to the tracks and the suspension system. (C)

c. Tracked Prime Movers[152]

(1) General -- As soon as possible after World War II, the Soviets introduced a series of full-tracked prime movers to replace the engineer-type tractors and older cumbersome tracked prime movers that they had used during World War II. By 1949 they had started to produce a new generation of high-speed artillery tractors or prime movers. All the Soviet artillery prime movers are fitted with a truck-type body for transporting gun crews, ammunition, and accessories. There are three general categories of tracked prime movers in use by the Soviets at the present time: light, medium, and heavy. (U)

(2) M-2 Tracked Prime Mover -- The M-2 light tracked prime mover is no longer in production; however, it generally supplemented or replaced the older Ya-12 and Ya-13 prime movers and is still used in Soviet units as a prime mover for heavy mortars and medium artillery. The M-2 was often used as the basic chassis on which to mount electronic van bodies. The M-2 is gradually being replaced by the Ya-14 light prime mover, below. (C)

(3) Ya-14 and Ya-14 (Modified)[153] -- The Ya-14 light prime mover has been on issue to Soviet units since 1953 as a replacement for the M-2 light prime mover. Originally equipped with a suspension system similar to that used on the SU-76 SP Gun, the suspension system of the Ya-14 was modified in 1956 to change the six small road wheels to five large ones. (C)

(4) Medium Tracked Prime Mover M1954(?)[154] -- This prime mover is readily identifiable by its large snub-nosed cab and its suspension system with eight small road wheels. It is estimated that this vehicle became available for issue in 1954, hence the interim designation M1954 until more specific nomenclature can be obtained. This prime mover replaced the older Komintern model as a prime mover for medium and heavy artillery, and it has been distributed to other Bloc countries whenever necessary. The basic chassis has also been used to carry the new 12-round 240-mm rocket launcher, thus giving full tracked mobility to a weapon which in the past has been transported on a 6x6 wheeled chassis. (U)

151. See photograph, page 141.
152. See Table, page 144.
153. See photograph, page 143.
154. See photograph, page 143.

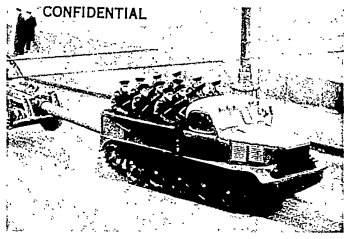

FIG 153. YA-14 (Modified) Light Tracked Prime Mover. (U)

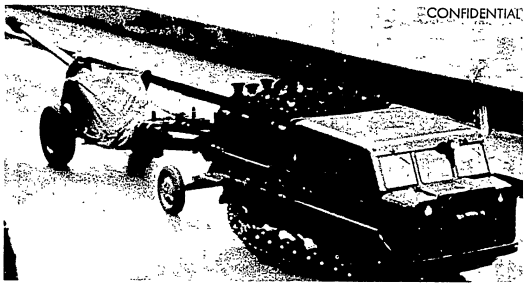

FIG 154. Medium Tracked Prime Mover M1954. (U)

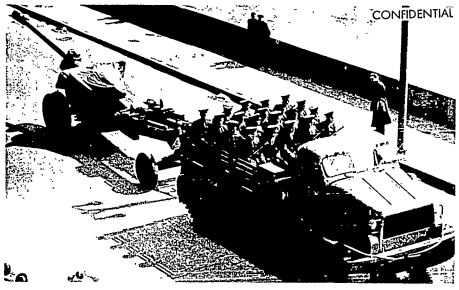

FIG 155. Heavy Tracked Prime Mover M 1950. (U)

Figure 152. TABLE OF CHARACTERISTICS* OF TRACKED PRIME MOVERS

Designation	Vehicle Weight Empty	Cargo Capacity	Max Towed Load	Engine Type	Max Speed	Cruising Range w/o Refueling	Operationally Available	Quantity Produced As of 1 Jan 58	Current Rate of Production
Light Tracked Prime Mover M-2	9-Tons	3-Tons	9-Tons	110 HP, diesel	30 mph	200 miles	1949	2,350	Note 1
Light Tracked Prime Mover, Ya-14 and Ya-14 (Modified)	9-Tons	3-Tons	9-Tons	140 HP, diesel	30 mph	200 miles	1953 (1956) Note 2	3,600	1,000
Medium Tracked Prime Mover, M1954	13-Tons	4-Tons	15-Tons	210 HP, diesel	25 mph	200 miles	1954	1,800	500
Heavy Tracked Prime Mover, M1950	25-Tons	7-Tons	22-Tons	350 HP, diesel	25 mph	300 miles	1950	5,300	750

* All characteristics are estimated.

Note 1. No longer in production.
Note 2. Ya-14 (Modified) replaced Ya-14 in production in 1956.

Figure 156. TABLE OF CHARACTERISTICS OF MISCELLANEOUS SPECIALIZED VEHICLES

Designation	Vehicle Weight Empty	Carrying Capacity	Engine Type	Max Speed	Cruising Range w/o Refueling	Operationally Available	Quantity Produced As of 1 Jan 58	Current Rate of Production
GAZ-47 Tracked Transportor	4-Tons	9 passengers or 1 Ton	70 HP, gasoline	22 mph	450 miles*	1956*	Unknown	Unknown
"Pinguin" cross-country vehicle	12-Tons*	2.5-Tons*	250 HP, diesel	25 mph*	400 miles*	1957*	5*	Unknown
Self-driving chassis, DSSH-14	1.7-Tons	0.2-Tons	14 HP, diesel	Unknown	Unknown	1956*	Unknown	Unknown
NKL-16 Aerosled	1 Ton	4 passengers or 0.4-Tons	100 HP, gasoline	50 mph	100 miles	1941*	Unknown	Unknown
TSAG-4 Aerosled	1.5-Tons	6 passengers or 0.5-Tons	100 HP, gasoline	40 mph*	186 miles	Unknown	Unknown	Unknown
OSGA-2 Aerosled	2.75-Tons	12 passengers or 1.6-Tons	300 HP, gasoline	100 mph*	Unknown	Unknown	Unknown	Unknown

* Estimated

(5) Heavy Tracked Prime Mover M1950(?)[155] -- This prime mover, introduced in 1950, is used primarily to haul heavy field artillery and heavy antiaircraft artillery. It can be identified by the T-34 tank-like suspension system with 5 large road wheels. (U)

d. Miscellaneous Specialized Vehicles[156]

(1) GAZ-47 Tracked Transporter[157] -- This unarmored, low ground pressure tracked transporter was developed for operations in those northern and eastern parts of the Soviet Union where marshy terrain, snow, and extreme cold make use of conventional forms of transportation unfeasible. Called a "VEZDEKHOD", or literally "vehicle which can go anywhere", it has a ground pressure of only 2.84-pounds per square inch. The GAZ-47 is currently being used by the Soviet Antarctic Expedition for overland movements. It has an open-topped cargo body which is normally provided with a canvas cover. Due to its sealed-hull construction and light weight, it is amphibious and can be propelled in the water by its tracks to a maximum speed of 2.5 miles per hour (hydro-jet or propellers are not provided). It is estimated that only limited numbers of this vehicle have been produced, primarily for the Soviets Arctic and Antarctic Expeditions and some for experimentation and testing. However, development of this type vehicle is expected to receive ample attention, and there are some indications that the GAZ-47 has already been tested as a prime mover for light weapons such as the 57-mm Antitank Gun M1943. (C)

(2) "PINGUIN" Cross-Country Vehicle[158] -- This unarmored cross-country vehicle resembles in many respects the Canadian "WAPITI" Northland Utility Carrier. The "PINGUIN" was built specifically for use by the Soviet Antarctic Expedition; however, there are no reports to indicate that it has been employed in the Antarctic to date. While not reported as a military vehicle, the military applications are obvious and, if experience with this vehicle in the Antarctic indicates acceptable performance, it is possible that it would be produced for use as a specialized vehicle for Arctic type military operations. The "PINGUIN" features a boat-like hull, identical in configuration to the hull of the Soviet's amphibious armored personnel carrier, upon which is mounted a box-like superstructure that extends almost the total length of the vehicle. The metal used in the vehicle body is not believed to be armor but is probably only strong enough to provide structural rigidity. The suspension system has "double-width" tracks. The vehicle is amphibious and can negotiate ice and deep snow with ease. The "PINGUIN" is reported to be equipped with a diesel-electric engine and drive system which is designed to work readily under conditions of rarified air at elevations up to 13,000 feet above sea level. The vehicle is reported to be able to tow a 20-ton sled or sled-train. (C)

155. See photograph, page 143.
156. See Table, page 145.
157. See photograph, page 147.
158. See photograph, page 147.

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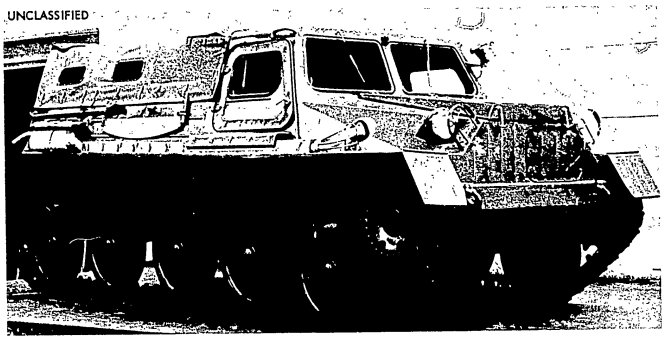

FIG 157. GAZ-47 Tracked Transporter. (U)

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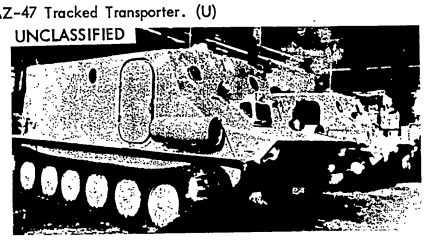

FIG 158. "PINGUIN" Cross-Country Vehicle. (U)

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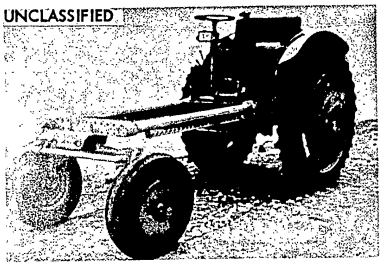

FIG 159. DSSH-14 Self-Driving Chassis. (U)

(3) Mechanical Mule[159] -- There are no reports which specifically indicate the development by the Soviets of a vehicle similar to the United States "mechanical mule"; however, in 1956, the Soviets started production of an agricultural tractor-type vehicle called the "Self-driving Chassis DSSH-14". This tractor vehicle features an engine mounted to the rear of the large main driving wheels and has a bare, U-shaped tubular frame about 53-inches long and 32-inches wide forward of the drivers seat. It is intended that various agricultural implements or a cargo platform can be clamped to the bare U-frame as desired. While this tractor is approximately 61-inches high over-all and 135-inches long, it has a 23.5-inch ground clearance and the axle width can be altered, within an 18-inch adjustment, to assure good balance when high loads are carried. The basic design of this tractor seems fairly readily convertible to the requirements of a mechanical mule type vehicle, however, no evidence exists that this has been or is being done. (U)

(4) Aerosleds -- During World War II, the Soviets devoted considerable effort to the development of several self-propelled sleighs or aerosleds. These snow vehicles usually consisted of lightly constructed airplane fuselage-type bodies which were mounted on three or four metal skis. They were driven by a pusher-type airplane propeller powered by automobile, boat, motorcycle, or more commonly by light airplane motors. Some aerosleds, used for reconnaissance and patrol duty, were equipped with light armor and mounted one or more machine guns. The principal use for the aerosleds was for the transportation of supplies and personnel. The basic aerosleds identified by the end of World War II were the NKL-16 and NKL-26, both 4-passenger aerosleds; the TSAG-4, a 6-passenger aerosled; and the OSAG-2, a 12-passenger aerosled. Because such a vehicle is notoriously hard to manuever, is extremely difficult to stop or slow without reversable propellers, and is unstable or readily damaged when moving over rougher ground, the Soviets seem to have dropped active development since World War II. The only reports of the recent use of such vehicles has been for sport or for the transporting of maintenance and inspection crews along the telegraph and telephone lines in the northern areas of the Soviet Union during the winter months. No information is available to indicate that any aerosleds for military use are currently in production. (U)

(5) See amphibious ferries under paragraph 3, Bridging.

3. Bridging

a. General

(1) The major developmental trend in Soviet bridging has been to design and produce numerous items of amphibious weapons and equipment that have greatly lessened the requirement for stream crossing assault bridging. For true bridge equipment the trend has been to improve and modify war tested equipment. Bridge equipment has remained

159. See photograph, page 147.

simple in design and use. Most fixed bridges are constructed from locally available materials. A 1956 Soviet manual on "River Crossing" by A. A. Khovratovich makes the following statements. "In the post-war period were created the newest pontoon parks;- The "Light Pontoon Park" (LPP) and the "Heavy Pontoon Park" (TPP) which surpass all earlier pontoon parks of the Soviet Army. The modern standard crossing equipment of the Soviet Army is self-propelled and moves with the troops. The construction data of the equipment make it possible to accomplish on the move assault, ferry and bridge crossings." (C)

(2) The following discussion will treat floating bridges, amphibious-ferry-bridge equipment, and dry gap bridges. Assault boats, foot bridges, semi-permanent fixed bridges and other accessory bridge items are not treated. Department of the Army Pamphlet 30-19-1 dated 15 February 1957 provides details of most bridge and stream crossing equipment that has been used by the Soviet Army. (U)

b. Floating Bridges

(1) The most common bridge is the TMP (TPP) heavy ponton bridge that can be constructed to carry loads of 16, 50, 60, and 100 metric tons. The TMP bridge was battle tested in World War II. Since the war, this bridge has been improved in minor particulars and is now known as the TPP bridge.[160] The difference between the TMP and the TPP is the indented rib reinforcing noticeable on the sides of the TPP whereas the TMP was relatively smooth. The steel skinned pontons are much less vulnerable to heat from an atomic weapon than rubber pontons. The steel skin is reported to be 1.5-mm thick on the sides and 1-mm on the deck. A center section of the TPP ponton[161] is 4.94 m (16.2 ft) long; 2.4 m (7.9 ft) wide; 1.05 m (3.4 ft) high and weighs 1100 kg (2425 lb). An end section[162] is 5.97 m (19.6 ft) long; its weight and other dimensions are the same as the center section. (C)

(2) The TPP (TMP) equipment may be quickly assembled into bridge sections or ferries. Ferry capacities vary according to construction and may have capacities of 16, 20, 30, 50, 70 and 100 metric tons. Construction time for TPP bridges is fast under ideal conditions. In a demonstration in East Germany a 50-ton bridge 670 feet long was in use by tanks in less than one hour and ferries were operational in 20 minutes. (C)

(3) Soviet light ponton equipment is reliably reported to have bridge or ferry capacities of 10, 25, and 40 metric tons. It is probable that the Soviets have modified and improved their DLP bridge to serve as their standard light ponton equipment. It is probable that the old DLP wooden bridge is now made of light metal. (C)

160. See photograph, page 150.
161. See photograph, page 151.
162. See photograph, page 151.

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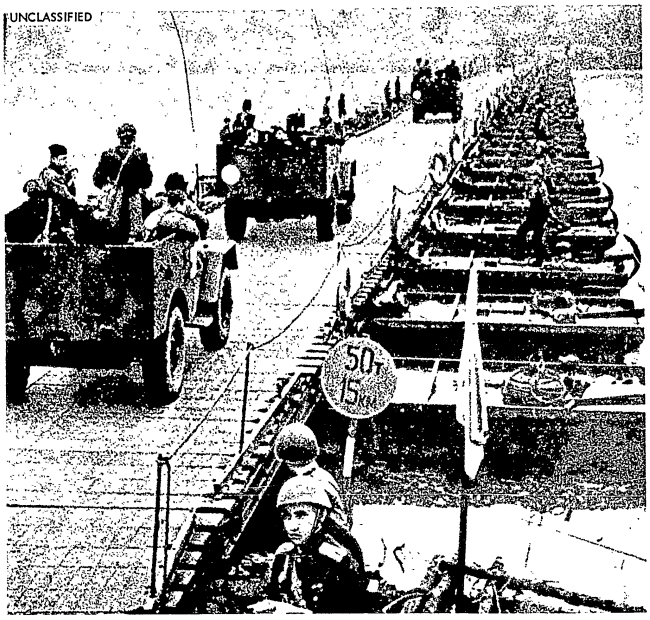

FIG 160. TPP Heavy Ponton Bridge. (U)

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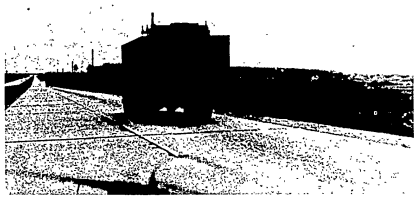

FIG 161. Center Section TTP Ponton W/Typical Load Of Steel Balk And Chess. (U)

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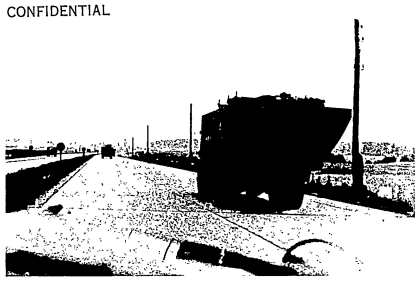

FIG 162. End Section TTP Ponton W/Typical Load Of Accessory Equipment. (U)

(4) Soviet light and heavy bridging is now operationally available and is in the hands of troop units and adequate reserves probably exist. No specific data is available on the number of bridges produced or the rate of production. It is estimated that no major modifications will be made to current standard ponton bridging during the next five years. (C)

c. Amphibious Ferries - Bridges -- A source of proven reliability has reported the Soviets have a self-propelled amphibious ferry known as the K-71 that can carry a maximum load of 52 metric tons in the water, including tanks and self-propelled guns. The K-71 reportedly has a cruising range of about 250 km and can travel on roads at speeds of 35 km/hr and in water at 10 km/hr. Another reliable source states the K-71 is wheeled and is so large it cannot be shipped on certain railroads. Thirty-six of the K-71 amphibians are believed to be held by a Soviet ferrying battalion along with thirty-six K-61 (transporters) and thirty-six BAV (DUKWs). Several other sources of unknown reliability report both tracked and wheeled amphibians that are assembled together in the water to form a bridge. There is no data available on other technical characteristics, operational availability, number produced, rate of production or anticipated modifications during the next five years for amphibious ferries-bridges. (S)

d. Narrow Gap Bridges

(1) A source of proven reliability has reported the Soviets have fixed, portable bridges with capacities of 20, 50, 70, and 100 metric tons. (S)

(2) A standard Soviet dry gap bridge known as the RMM-4, a bridge similar to the United States H-20 portable steel highway bridge, is the only identified portable steel fixed bridge known. This bridge would be useful for narrow gaps only. (C)

(3) The RMM-4 is described in detail in DAP 30-19-1 on pages 55-56. No further information is available. Several different portable bridges have been observed in East Germany. They may well be local field expedients. Four of the bridges seen in East Germany are worthy of further comment. (U)

(4) A folding bridge carried on a trailer was photographed in May 1956.[163] This may well be a standard bridge for narrow gaps. No details are known. (C)

(5) A T-34 tank mounted bridge[164] was photographed in East Germany in the spring of 1957. This bridge is more likely to be a standard short gap bridge than any other seen. No further details are known. (C)

163. See photograph, page 153.
164. See photograph, page 153.

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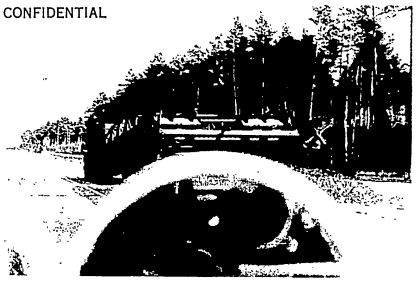

FIG 163. Unidentified Steel Folding Assault Bridge. (U)

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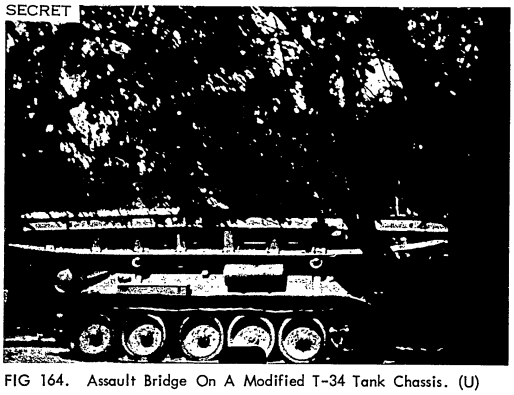

FIG 164. Assault Bridge On A Modified T-34 Tank Chassis. (U)

(6) In April 1956 a bowstring truss treadway bridge[165] about 40 feet long was observed and photographed. As may be seen from the illustration, the bridge is carried atop a truck and is probably launched in front of the truck by means of cables. No further details are known. (C)

(7) In March 1956 a ZIS-151 truck[166] was observed carrying prefabricated box truss sections and towing a two-wheeled trailer loaded with treadway sections. How these sections are assembled to form an assault bridge is not known nor are other details known. (C)

(8) It may be concluded that the Soviets have developed portable assault fixed bridges but have successfully kept them concealed. (C)

4. Soviet Mine Warfare Equipment

a. The Soviets ended World War II with an arsenal of more than fifty different mines. The trend has been toward minor improvements to their war tested designs. The Soviets devote nearly 25% of Engineer troop training time to mine warfare. We have reasonably firm evidence of only two new antitank mines - the TM-44 and the TM-46. It is known that the Soviets ordered 6,500 plate charge mines developed by Colonel Misnay in Hungary during the latter part of WWII. Later Hungary was effectively prevented from further production of these modern, powerful, tank killer mines. It is assumed the Soviets have some type of plate charge and/or shaped charge mine. Detailed information on Soviet mine warfare equipment will be found in DAP 30-17-1 dated 11 February 1957. (C)

b. Reports from several sources confirm the nomenclature TM-44 and TM-46 as Soviet mines. Both are believed to be conventional designs of cylindrically shaped AT mines. Reports give conflicting data as to total size and explosive charge in each. No other details are known. (C)

c. A drawing of a plate charge mine is shown in Figure 167. This design concept has been adopted by some Western countries. The design produces a powerful shaped charge jet that readily punches through armor followed by a steel, plastic, or glass plate that acts as a projectile driven at a velocity of about 6,200 feet per second. Additional details are contained in DAP 30-17-2 dated 18 March 1957. (S)

d. It may be assumed that the Soviets have developed simple fuze devices that will withstand high overpressures from an atomic detonation. (C)

e. There have been no explosive mine clearing devices reported. Mine clearing is done by hand probe, grapnel, or by steel disks or rollers

165. See drawing, page 155.
166. See drawing, page 155.
167. See drawing, page 156.

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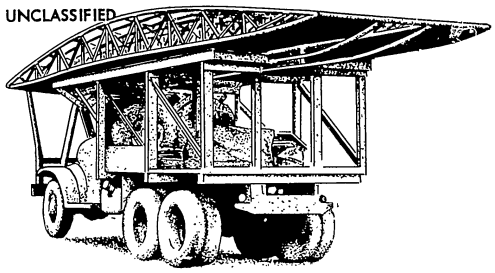

FIG 165. Unidentified Bowstring Truss Treadway Bridge. (U)

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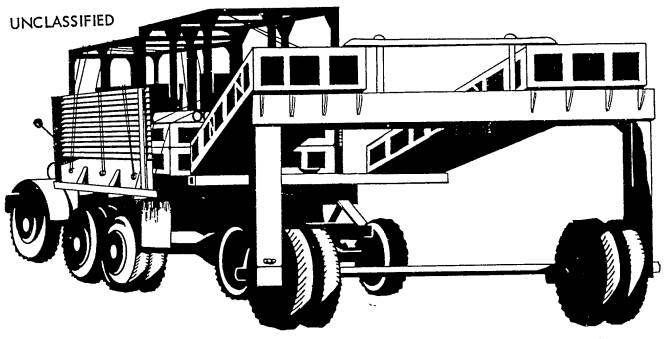

FIG 166. Unidentified Prefabricated Box Truss Sections (In ZIS-151 Truck) W/Trailer Loaded With Unidentified Treadway Sections. (U)

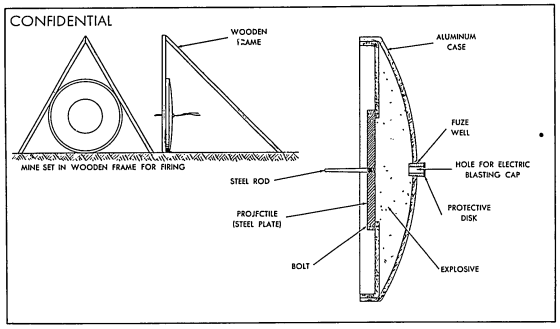

FIG 167. Schematic Drawing Of A Plate-Charge Anti-Tank Mine. (U)

pushed before a tank. A reliable source reports frails are not used, one major reason being the accompanying dust cloud which results in loss of surprise and pinpoints the target area. No post World War II metallic or nonmetallic mine detectors are known. (C)

5. Camouflage

a. All known Soviet camouflage equipment consists of conventional materials, such as nets, net sets, drapes, garnishing, sniper suits, and paints. No prefabricated devices for visual or sonic deception are known to be available; dummies and decoys for deception purposes are normally constructed in the field from any materials available. (U)

b. The Soviets are believed to be conducting research and development on camouflage equipment, especially in the field of counter measures against electronic detection devices. Good results have been obtained in developing infrared camouflage properties in uniforms and in obtaining a low coefficient of thermal radiation in Soviet tanks. (C)

6. Entrenching and Excavating Equipment

a. General -- The Soviet Army has made rapid progress in providing mechanical means for entrenching and excavating. The purpose has been two fold:

(1) To save manpower; and
(2) To provide better protection for personnel, weapons, equipment, and supplies, on an atomic battlefield. Ditching machines, huge tractor drawn plows, and crane-shovel excavators and back-hoes have appeared in ever increasing quantity and quality. Details of this type of equipment may be found in Department of the Army Pamphlet 30-18-1 dated 21 March 1957. (C)

b. Ditching Machines -- The following listed ditching machines will be discussed. Technical details provided will be limited to basic essentials:

Trench Excavator, ET-352
Trench Excavator, ET-251
Trench Excavator, ET-141
Trench Excavator, ET-121
Trench Rotor Excavator KG-65 (U)

(1) The ET-352[168] is a ladder-type, crawler-mounted, diesel-powered ditching machine with 13 buckets. It digs up to 11.4 feet in depth and 2.6 feet in width at a rate of 12 to 123 inches per minute depending depth and soil conditions. It weighs 29,040 pounds. It is manufactured in the Machine Plant in Dmitov. Production quantity unknown. (U)

168. See photograph, page 158 .

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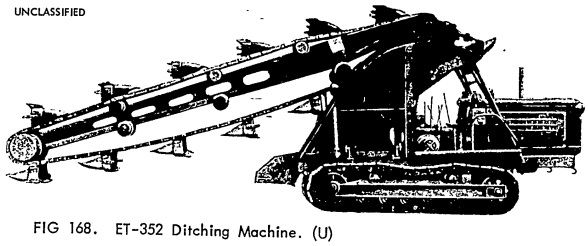

FIG 168. ET-352 Ditching Machine. (U)

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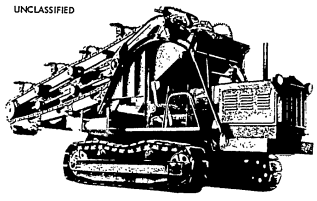

FIG 169. ET-251 Ditching Machine. (U)

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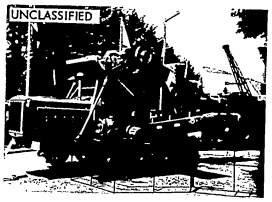

FIG 170. ET-251 Ditching Machine (Later Model). (U)

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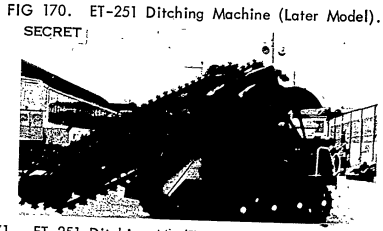

FIG 171. ET-251 Ditching Machine W/Special Cutting Teeth. (U)

(2) The ET-251[169] is a ladder-type machine designed to dig to a depth of 8.2 feet and to a width of 2.6 feet which can be extended to 3.6 feet. It digs from 19 to 141 inches per minute. A latter model[170] is shown in Figure 170. A model[171] probably used to cut coal or limestone deposits is shown in Figure 171. Note the cutting teeth in this machine. It is not known how the spoil is conveyed to the top of the cut as no buckets are to be seen. Manufactured in Machine Construction Plant, Dmitov. (U)

(3) The ET-141[172] is crawler mounted, ladder type, diesel powered. It digs 4.6 feet in depth by 1.4 feet in width at from 45 to 100 inches per minute. Location of manufacture or production data is unknown. (U)

(4) The ET-121[173] is mounted on a DT-54 crawler tractor. It digs 1.6 feet wide to a depth of 3.9 feet. Digging speed is from 48 to 100 inches per minute. It has been identified with military units. It is manufactured by the Machine Plant in Dmitov. (U)

(5) The KG-65,[174] also known as the ETR-152 in later models, is a near copy of the U.S. "Cleveland, Model 110." It is a rotary excavator and digs perpendicular or sloped-side ditches up to 4.9 feet deep by 2 feet wide at a rate of 70 to 354 inches per minute. It has been identified with military units digging fire and communication trenches. Production data is not known. (U)

c. Plows -- The PLT-60 is a huge trench plow usually pulled by an S-80 tractor.[175] It can dig trenches up to 60 cm deep by 90 cm upper width and 50 cm lower width in soil of medium quality. Maximum digging speed is 2 km/hr and the average working speed is 1.5 km/hr. This plow can be towed by a truck along roads at speeds of 25-30 km/hr. The total length of the plow is 5.5 meters, width 2.28 meters. In travel position it is 2.2 meters high. Total weight is 2,110 kilograms. Production data for the PLT-60 is unknown. (U)

d. Tunneling Machine

(1) The Soviets have designed and developed a new machine which, they claim, tunnels six times faster than by conventional methods of drilling and blasting -- and at half the cost. This tunneling machine, the PKG-1[176] was designed by a Soviet engineer, Ya. Ya. Gumennik; it is now used successfully in coal mines throughout the U.S.S.R. The following table, from the Soviet periodical Mekhanizatsiya Trudoyemkikh i Tyazhelykh Rabot ("Mechanization of Labor-Consuming and Heavy Work"), February 1956, compares the performance of the PKG-1 with conventional drilling and blasting methods:

169. See photograph, page 158.
170. See photograph, page 158.
171. See photograph, page 158.
172. See photograph, page 161.
173. See photograph, page 161.
174. See photograph, page 161.
175. See photograph, page 162.
176. See photograph, page 162.

Item	Operation in a Vein On an Upward Incline		Section Boring	
	PKG-1	Blasting	PKG-1	Blasting
Length (feet)	2,270	384	918	377
Cross-section (square feet)	34.5	57	34.5	57
Number of 24-hour days (Stopping time not included)	32	36	15	43
Average daily progress (feet)	70	10	61	9
Maximum daily progress (feet)	334	15	196	18
Cost per foot without shoring (in rubles)	28.5	47.9	21.3	47.8 (U)

(2) The equipment consists basically of two components: A tractor and a cutting unit. The tractor supplies power for moving the entire unit, and power for the cutting disks. Stability is achieved by a track which is mounted on top of the tractor thus providing the unit with three points of traction for pushing the cutters against the material to be cut. The teeth of the 16 cutting disks are made of a hard-alloy metal, and, according to the Soviet article, only 6 teeth of the entire cutting unit wear out after every 300 feet of boring. (If hard rock formations are encountered, the drilling and blasting operation is combined with the machine boring). Other technical data available on the PKG-1 are as follows:

Length	21.3 ft
Width	4.3 ft
Height	6.0 ft
Weight	6 tons
Speed of cutters	108.8 rpm (U)

(3) According to latest reports, this machine thus far has been used only in the coal-mining industry. However, the machine has a military potential because of its high tunneling speed and considerable savings in manpower requirements which would make it extremely useful in constructing underground installations. (U)

e. Tractors

(1) Production of a prototype 250-horsepower tractor[177] by the Chelyabinsk Tractor Factory has been discussed in several leading Soviet newspapers. (U)

177. See photograph, page 163.

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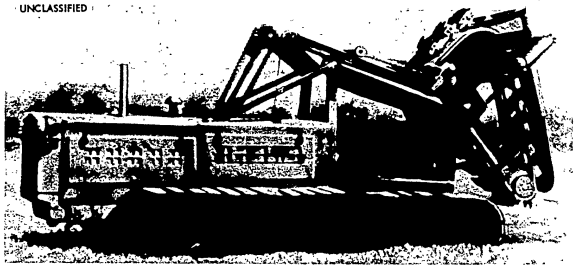

FIG 172. ET-141 Ditching Machine. (U)

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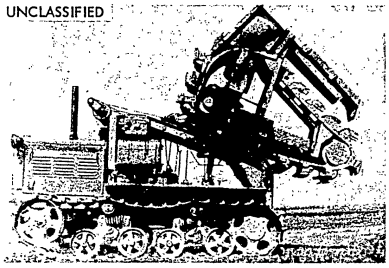

FIG 173. ET-121 Ditching Machine. (U)

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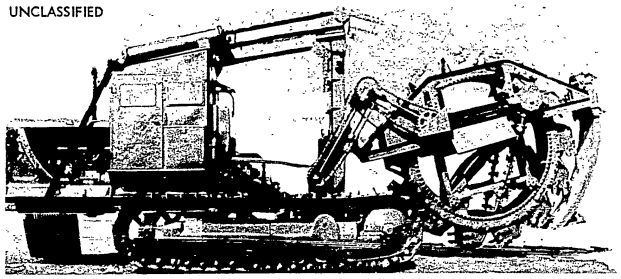

FIG 174. KG-65 (ERT-152) Rotary Excavator. (U)

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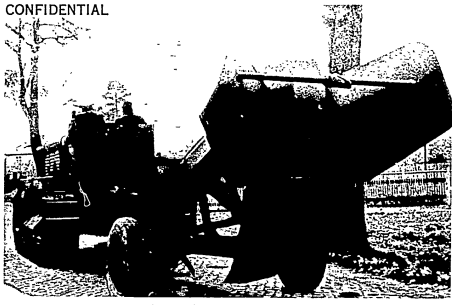


FIG 175. PLT-60 Plow. (U)

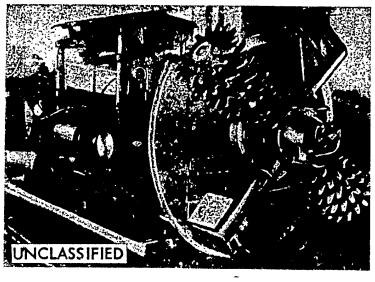


FIG 176. PKG-1 Tunneling Machine. (U)

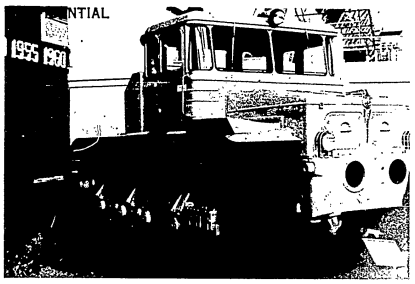


FIG 177. DET-250 Diesel Electric Tractor. (U)

(2) According to the articles, the crawler-type tractor, designated the DET-250, is equipped with an electric transmission (two generators and an electric traction motor) which automatically adjusts the tractor's performance to various working conditions. The tractor weighs 25 tons; it is about 20 feet long, is more than 9 feet in height and 9 feet in width, and has a maximum speed of approximately 12 miles per hour. As indicated by the newspapers, "the tractor has a V-2 engine" (probably two V-type engines) and a tank which can hold one ton of fuel, permitting the tractor to operate continuously from 22 to 24 hours. (U)

(3) A special preheating system enables the tractor to start its engines in cold-weather temperatures as low as -58° F. (U)

(4) The tractor is intended for operation with large, modern earthmoving equipment on large-scale construction projects, and in lumbering and agriculture. It is also capable of serving as a mobile power station, with a 60-kilowatt power output said to be "sufficient to light a village of 300 houses." USARMA Moscow observed this tractor on exhibit in Moscow. The exhibit card listed horsepower: 250; draw bar pull: 22,000 kg (48,501 lbs); track pressure: 0.545 kg/cm^2 (7.74 lbs/sq. in.) (C)

(5) These are the first available reports regarding the development and prototype production of this giant tractor. In addition to its power and size, the DET-250 incorporates a series of new ideas which may affect future designs of tractors. Its increased horsepower parallels the trend of other Soviet-designed earthworking equipment toward greater capacity, horsepower, and performance of multiple operations. Other data on Soviet construction equipment may be found in DAP 30-18-1 dated 21 March 1957. (C)

7. Body and Flexible Armor

There is no information to indicate that the Soviets presently have body armor of any kind. The only indication a flexible armor may have been developed is in connection with the design of the top edge of the personnel compartment of the new Soviet armored amphibious full-tracked personnel carrier. In this carrier, personnel are completely exposed to overhead fire. The wide edge of the carrier personnel compartment may be designed to receive a flexible armor blanket made of a plastic or steel. No other data is known. (C)

8. Medical Equipment

a. General -- Medical equipment available to the military forces of the U.S.S.R. ranges from the rugged and somewhat primitive, to delicate and sophisticated. That which has application to field military use is rugged, durable, and apparently not as highly developed as that seen in the U.S. Army. On the other hand, the equipment that is used in definitive rather than emergency treatment is similar to that used by the medical profession of the Western world, and in some instances is somewhat more sophisticated. (U)

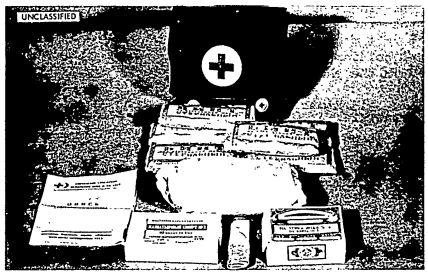


FIG 178. Soviet First Aid Kit. Personnel Type Contents. (U)

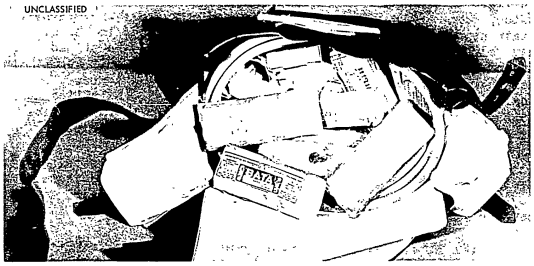


FIG 179. Soviet First Aid Kit. Aid Station Type Contents. (U)

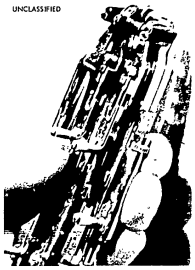


FIG 180. Soviet Blood Vessel Stitcher. Instrument Assembled For Use. (U)

FIG 181. Component Parts Of Instrument. (U)

b. Individual First Aid Kit -- The individual first aid kit is more voluminous than that of the U.S. Army, and contains more items. It will permit more immediate self-aid than is available to the individual soldier of the United States. The contents of this kit are displayed in the photograph.[178] (U)

c. Aid Station First Aid Kit -- The type of equipment that is available to the aid stations of the Soviet Army is not as comprehensive or as adequate as comparable equipment in the U.S. Army. It is rugged and durable, but apparently is not as highly developed as similar U.S. equipment. The general type of materiel that is contained in this kit is shown in the photograph[179] below. (U)

d. Surgical Instruments

(1) Surgical instruments have equal application in both civilian and military medicine. In field medical installations, the type of instrument generally found is not quite as advanced as those found in fixed installations. In fixed installations the more complicated, or more advanced design is generally found. The U.S.S.R. has certain novel surgical instruments that are not found in the U.S. These may well have considerable impact in the medical care of the wounded, and may assist in permitting an early return to duty for personnel that might other wise have a prolonged convalescence. Additionally, recent advances in medical equipment is of significance in that it indicates the high state of development within the medical fields. (U)

(2) The two photographs[180,181] shown are of a novel Soviet instrument which is designed to secure an instantaneous blood-vessel suture by means of metal staples. It permits rapid and accurate anastomosis of blood-vessels. (U)

(3) The state of development of equipment for radiation therapy is indicated in the photograph[182] shown. The equipment is rugged, but appears to be effective. It represents the degree of advancement that the Soviets have made in this field of medicine. (OFFICIAL USE ONLY)

(4) The two photographs[183,184] depict the use of inhalation anesthesia during a surgical procedure. This use of inhalation anesthesia is becoming more common in the U.S.S.R. It represents an indication of the rapid strides that are being made in Soviet medicine. The use of such equipment greatly enhances their capability to furnish superior definitive treatment for the sick and wounded. (C)

178. See photograph, page 165 .
179. See photograph, page 165 .
180. See photograph, page 165 .
181. See photograph, page 165 .
182. See photograph, page 167 .
183. See photograph, page 167 .
184. See photograph, page 167 .

FIG 182. Therapeutic Gamma Apparatus. (U)

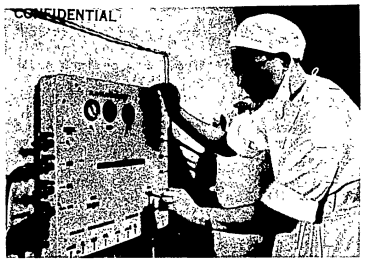
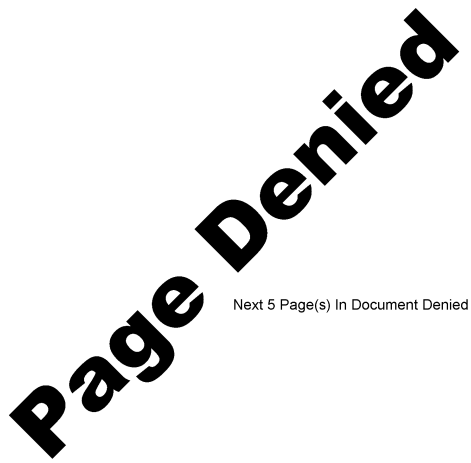


FIG 183. Preparing Gas Anesthesia For Heart Operation. (U)

FIG 184. Anesthesia During Heart Operation. (U)

50X1-HUM



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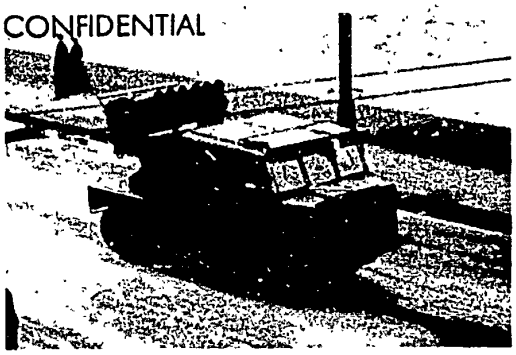

FIG 38. 240-mm Rocket Launcher (12 Rounds) On Tracked Prime Mover M1954. (U)

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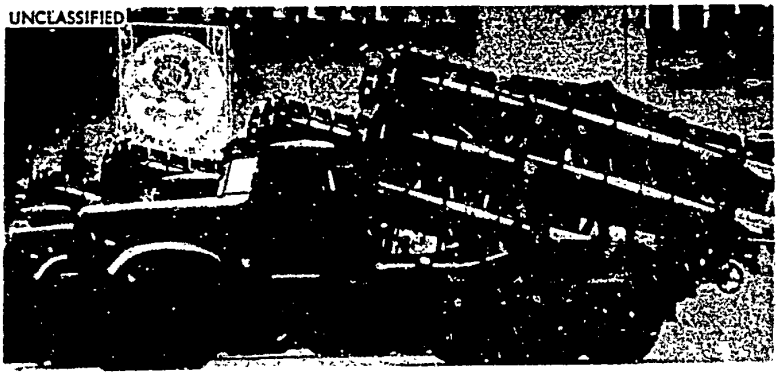

FIG 39. 250-mm (?) Rocket Launcher (6 Rounds). (C)

f. 240-mm Rocket Launcher (12 round) on Tracked Prime Mover M1954 -- Constant Soviet efforts to improve ground mobility are readily detectable in this item of equipment.[38] The mounting of this 12-tube launcher on the chassis of a medium artillery tractor provides a much greater cross-country capability than that of its predecessor, the 240-mm truck-mounted rocket launcher (12 round) BM-24. The ballistic performance of the new weapon is apparently very similar to that of the BM-24. Unlike the BM-24, however, the rockets are launched from short tubes instead of from open crate-types frames. (C)

g. 250-mm (?) Rocket Launcher (6 round) on YaAZ-214 -- First seen in the November 1957 Moscow parade, this is the largest and most effective weapon in the range of Soviet multilaunch rockets.[39] Mounted on the latest heavy (8 ton) truck chassis, the 6 x 6 YaAZ-214, the launcher is of typical Soviet design, imparting slow spin to the fin-stabilized rockets by means of helical guide rails. The rocket motor is of the single-venturi, solid propellant type, and the warheads used are probably high explosive and chemical. Elevation and a few degrees of traverse are achieved by handwheels at the rear, and the elevation can also be mechanically or hydraulically controlled from the driver's cab. Jack pads at the rear are lowered to improve the stability of the platform. (C)

h. 1-round Rocket Launcher on Amphibious Chassis -- This is the smallest of the Soviet missiles[40] first displayed in November 1957. It is unguided and corresponds tactically to the United States "Honest John", though its full-tracked amphibious chassis gives it a high degree of mobility. The unusual shaped warhead weighs about 1000 pounds and could have a nuclear, CW, or HE capability. The rocket motor is a solid propellant type and is in two non-separating sections. The reason for this is not clear; it may be for range zone purposes, to simplify manufacture and transport or to give high initial boost from one section followed by sustained thrust from the other. To maintain accuracy from the short launching rail the rocket is probably spun by canted jet nozzles. (S)

i. 1-round Rocket Launcher on JS Type Chassis -- This rocket[41] is estimated to have a range of 35 nautical miles and, with a 1500-pound warhead, it could have a nuclear, CW, or HE capability. The unusual jacket-type launcher may incorporate a heating element to prevent cold-weather damage to the solid propellant of the motor. The main exhaust exits through seven venturi at the rear, but additional canted nozzles are probably provided to impart slow spin for accuracy. The armor thickness of the chassis is expected to be the minimum consistent with necessary rigidity. The maximum road speed is estimated at 21 m.p.h., and the cruising range at 90 miles. Elevation is by hydraulic means, and the launcher can probably be traversed only a few degrees relative to the chassis. (S)

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38. See photograph, page 39 .
39. See photograph, page 39 .
40. See photograph, page 41 .
41. See photograph, page 41 .

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