MEMORANDUM

THE WHITE HOUSE

WASHINGTON

INFORMATION

TOP SECRET
CONTAINS CODE WORD

January 10, 1972

MEMORANDUM FOR: GENERAL HAIG

FROM: TOM LATIMER

SUBJECT: New Developments in Soviet Conventional Ground Force Equipment

The attached CIA memo notes that while improvements in Soviet strategic forces have attracted much notice in recent years, the ground forces have also undergone significant changes.

Among the most significant new ground force weapons systems is a medium tank now undergoing field testing and possibly limited series production.

-- The new tank [redacted] probably does not represent a significant technological advance over the design of the T-62. It does appear to be lower, faster and quieter than present tanks, however.

-- The Soviets have also developed a new light tank which is probably air transportable and air droppable.

-- Another significant item of equipment which has already begun to enter service is the infantry combat vehicle (BMP). It is a heavily armed vehicle designed to carry a mounted infantry squad. The USSR has produced more than 1,000 BMP's thus far and the Czechs are preparing to produce some 8,000 by 1975 for themselves.

CIA believes that the Soviets are conducting research to develop improved conventional munitions for tube artillery and rockets. They are hampered in developing improved rounds for their artillery, however, because the high degree of miniaturization and automation technology required is beyond their current capability.

TOP SECRET

-- The Soviets are attempting to increase the effectiveness of their conventional artillery through the use of rocket-assisted projectiles (RAP) which utilize a sustainer rocket to increase range by as much as 50 percent. The Soviets have already deployed RAP-type rounds with the RPG-7 and SPG-9 recoilless anti-tank weapons.

-- A logical application of this technology is for the smooth-bore 76mm gun on the BMP and reports [redacted] suggest that such a round has been deployed. The Soviets prefer smooth-bore guns which are lighter, longer lasting and more compatible with the highest velocity rounds.

Over the past five years, the Soviets have significantly increased their battlefield air defense capabilities with particular emphasis on mobility and defense against low-level attack.

Attachment

CW-547

Top Secret

[redacted]

HR70-14

DIRECTORATE OF
INTELLIGENCE

Intelligence Report

New Developments in Soviet
Conventional Ground Force Equipment

[redacted]

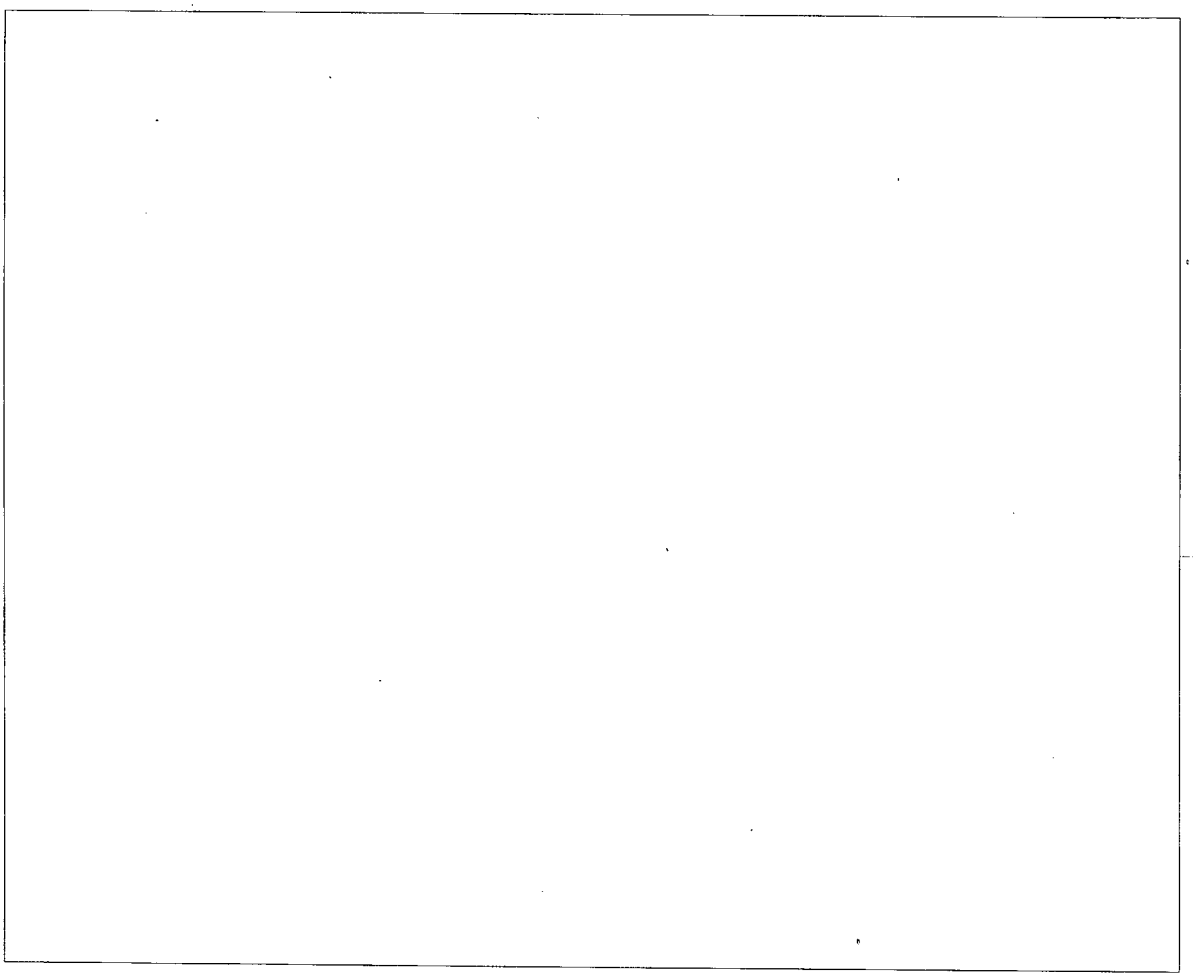
Top Secret

SR IR 71-18

[redacted]

December 1971

Copy 6



CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
December 1971

INTELLIGENCE REPORT

New Developments in Soviet Conventional Ground Force Equipment

Introduction

Although the impressive Soviet gains in strategic forces have occupied the headlines in recent years, the Soviet conventional ground forces have also undergone significant--if less publicized--qualitative changes since the early Sixties. The T-62 tank has been widely deployed and some of the weapons which were in developmental stages in the early Sixties--such as the new infantry combat vehicle and the SA-4 and SA-6 mobile surface-to-air missile systems--have entered operational service. Evidence of continuing research and development for new ground force weapon systems continues to accumulate.

Some of the new weapons now being deployed or in research and development status would be effective both in nuclear and nonnuclear war. Certainly, more modern tanks, armored personnel carriers, and infantry combat vehicles would serve Soviet doctrine in either type of conflict. Other new weapons, such as improved conventional munitions and rocket-assisted projectiles, are primarily intended to increase Soviet capabilities in conventional warfare. In either case, the new systems are serving to increase the firepower, mobility, and air defense capability of Soviet ground forces--without necessarily increasing the size of the forces.

Note: This report was prepared by the Office of Strategic Research and coordinated within CIA.

Two factors which emerged in the Sixties have provided impetus to the Soviet conventional ground force modernization programs. The NATO policy of "flexible response" has increased the probability that at least the initial stages of a war in Europe would be fought with conventional forces. As part of the doctrine, NATO has placed additional emphasis on its conventional capabilities to meet a Warsaw Pact attack. Although the Soviets enjoy a numerical superiority in most items of combat equipment, they have been modernizing their forces continually to keep pace with the high level of technology of the NATO forces. Examples of this are the large-scale NATO deployment of the 105mm tank gun, which probably at least hurried the deployment of the Soviet T-62, and the increased US reliance on helicopters, which possibly promoted the proliferation of rapid-fire antiaircraft weapons to Warsaw Pact forces.

The buildup of forces along the border with China has also raised the requirement for more modern equipment. There, the Soviets evidently judge that only a clear advantage in mobility and firepower will serve to offset the potentially great advantage in manpower the Chinese could bring to bear in any large-scale encounter. Accordingly, the Soviets have provided the most modern equipment to forces along the Chinese border.

This report reviews ground force weapon modernization programs which will have an important impact on the Soviets' conventional ground war fighting capability during the Seventies--including improvements in major combat vehicles, munitions, and tactical air defense systems. Soviet efforts to develop more effective tactical nuclear weapons for the ground forces are not discussed.

A summary begins on page 37.

Contents

Illustrations

Illustrations (continued)

Ground Force Modernization

Modernization of a ground army as large as that of the Soviet Union tends to evolve slowly, with gradual phasing out of older equipment and introduction of new.

This gradual but continuous modernization process is principally a function of the large equipment requirements of the Soviet army and the high cost of replacing all units of a particular type of equipment. For example, the Soviets presently hold some 35,000 tanks in their operational inventory. Clearly, replacing this large number of tanks with, say, new T-62s (which cost roughly the equivalent of $140,000 apiece), is a long-term project. The same phenomenon of large numbers applies to much of the rest of the Soviet ground force equipment inventory as well.

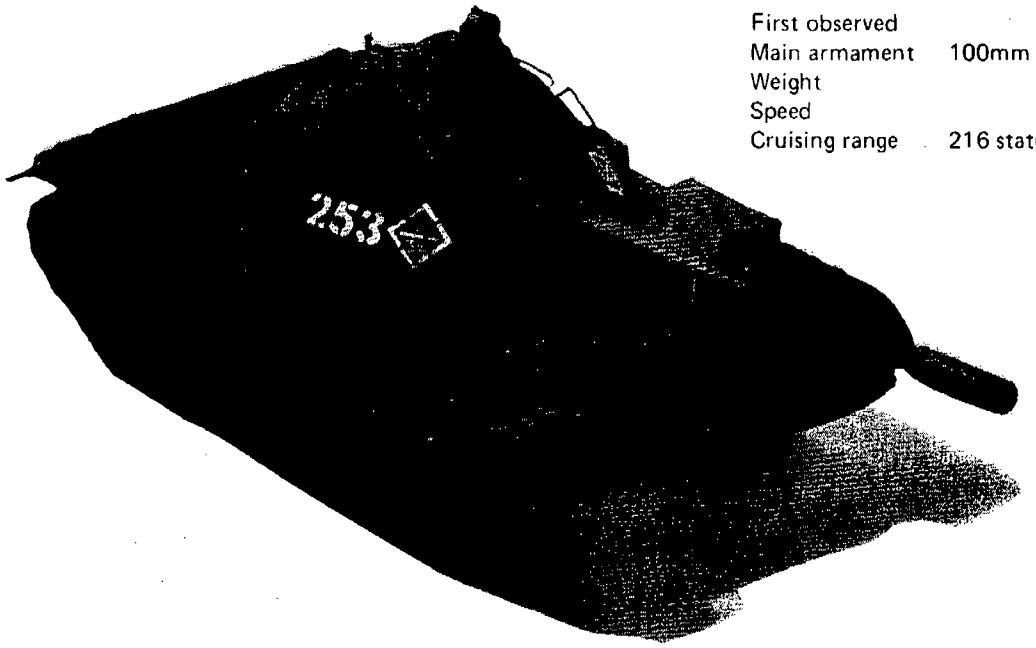
The gradual pace of Soviet ground force modernization is also a function of the relatively slow pace of technological advance in this field. Unlike strategic weaponry, there are few breakthroughs in ground force weapon technology which open the door for startling new equipment concepts.

Unless reordering of Soviet priorities occurs in the next several years, and a significantly larger portion of the military budget is devoted to procurement of new ground force equipment, the relatively slow pace of Soviet army modernization will continue, as will the requirement for selectivity in choosing items to be mass-produced. Shortages of armored personnel carriers in the Soviet army and a growing number of obsolescent tanks suggest that equipping

Principal Soviet Tanks Currently Deployed

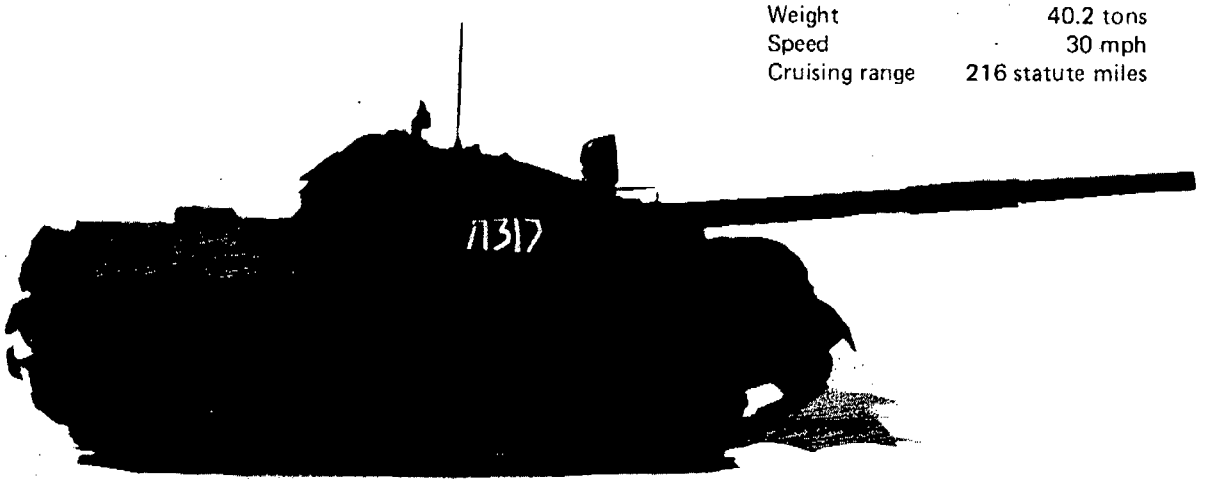
T-55

First observed	1959
Main armament	100mm tank gun
Weight	40 tons
Speed	30 mph
Cruising range	216 statute miles



T-62

First observed	1961
Main armament	115mm smooth-bore gun
Weight	40.2 tons
Speed	30 mph
Cruising range	216 statute miles



560738 12-71

Soviet forces with major combat vehicles will be a first-priority task. Mass procurement of sophisticated ancillary items, such as laser range finders and submissile artillery projectiles, almost certainly will have a lower priority. Indeed, Soviet backwardness in the fields of production automation, miniaturization, and quality control technology tends to drive up the cost of such sophisticated gear--which in many cases will preclude its being procured at all.

The Tank Force

Since World War II the Soviets have begun series production of at least four known medium tanks--T-44, T-54, T-55, and T-62. Even with this production, some tanks in production over 20 years ago continue to be found in Soviet units. At present the T-62 (see bottom photograph on page 6), the most modern operational tank, is being produced at the rate of some 950 per year. Production of the T-55 (see top photograph), which entered service some 13 years ago, also continues although one of the two plants which manufactured these tanks recently phased out T-55 production. The requirement for export tanks for the Middle East and India must be met from the production line as well as from stocks of rebuilt equipment. Therefore, production of the T-55 to meet foreign demand may continue even after a new tank has entered series production.

The T-62

The early T-62s may not have been all that the Soviets had hoped for--requirements for a follow-on tank were being discussed even as the T-62 was entering service. Production of the T-62 continues, however, and some 8,000 to 9,000 have been produced thus far. They presently make up about

one-quarter of the inventory although this proportion is higher in the forward area.

When the T-62 appeared in the early Sixties, it was estimated to be a stopgap measure to counter the 105mm gun tanks entering service with NATO countries. Classified military writings indicated that the smooth-bore 115mm gun on the T-62 was having accuracy problems, and by the late Sixties the Western intelligence community was anticipating the tank's replacement.

In 1963, when the T-62 first appeared with Soviet forces in East Germany, it was allocated in regimental strength to tank divisions, suggesting that it was a specialized antitank weapon. Since then, however, entire divisions have been equipped with the T-62, indicating that it is a main battle tank. A complete family of ammunition has also been developed for its 115mm gun. Continued use of this weapon indicates that the Soviets have solved--at least to their satisfaction--the accuracy problems they were reportedly encountering with the gun.

Production of T-62s--with various improvements and possibly new designators--probably will continue through the late Seventies, both to fill Soviet needs and eventually for export to Warsaw Pact countries and other Soviet arms clients. Reports indicate that the Czechs were tooling up to begin production of a new tank in the early Seventies. The most likely candidate is the T-62 although a different tank cannot be ruled out. Non-Soviet Warsaw Pact forces have only a few T-62s and a production effort extending over the next decade might be required to replace the T-54 and even older T-34 tanks in these forces.

New Medium Tank

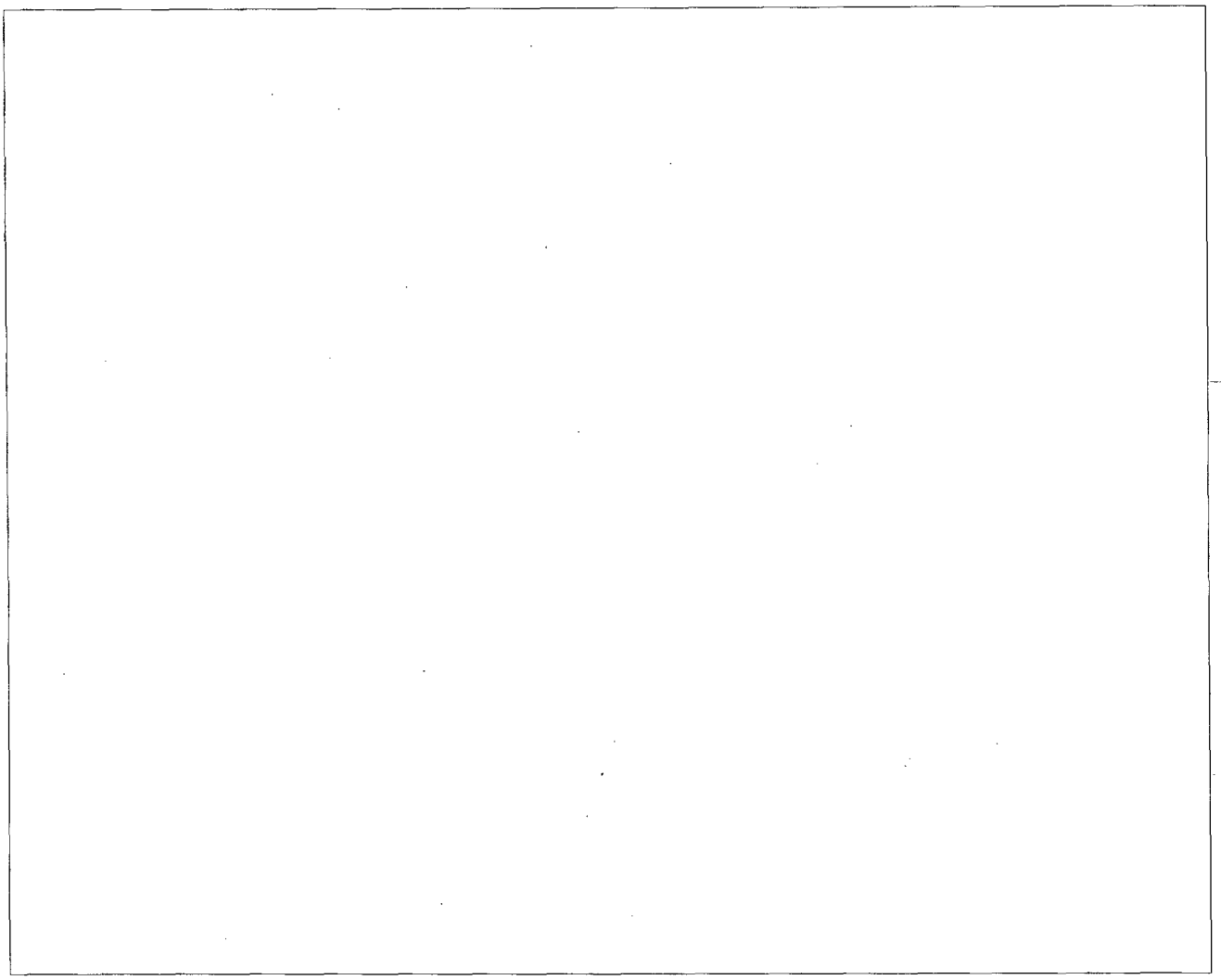
One reason for the continued production of the T-55 and possibly the adoption of the T-62 as the main battle tank might be troubles--technical, economic, or both--with a planned follow-on to the T-62. In the early Sixties, Soviet marshals referred to a new tank which was to be developed. Since then numerous reports from less reliable sources have been received that new tanks were being tested. A new medium tank has not entered production, however, suggesting that the follow-on vehicle has run into technical problems or possibly competition for funds with other weapon systems.

Information on the characteristics of what may be the follow-on is available principally from satellite photography, a Soviet magazine photograph, a photograph [redacted] who had seen the tank. The magazine and [redacted] of the tank [redacted] observed indicate that they probably concern the same vehicle. Analysis of the photography and the [redacted] reporting indicate that the tank in question is of a conventional design and probably does not represent a significant technological advance over the design of the T-62. The new tank reportedly is lower, faster, and quieter than present Soviet tanks. It probably has spaced armor to reduce spalling and to provide better protection from radiation. It may have bar armor to defeat shaped-charge ammunition.

The low silhouette described by the source and the small road wheels which [redacted] suggest that the tank has a variable height suspension similar to the US

New Soviet Medium Tank

There have been numerous reports since the early Sixties that a new Soviet tank was under development. The first clear evidence that the tank had reached the field-testing stage appeared in the May 1970 Soviet magazine photographs reproduced at left. The tanks shown were purportedly participating in the "Dvina" maneuvers of the previous March. The tank in the foreground of the large photograph and that in the inset are of a new type. Most of the tanks in the background appear to have similar characteristics.



MBT-70 (XM-803). A low silouette--characteristic of Soviet tanks--presents a smaller target, but usually is achieved at the expense of crew comfort and ground clearance. The minimum ground clearances on present Soviet tanks restrict speed and mobility over deep snow, rough ground, and mud. A variable height suspension would present a small target when lowered but would, when elevated, enable the tank to increase speed and mobility in the deep snow and mud characteristic of the European battleground. Such a suspension system could, however, be a source of technical problems.

The tank appears in other respects to be based on proven concepts, which is typical of Soviet design practice. The gun appears to be the same as the 115mm gun mounted on the T-62.

The characteristics of the new tank's range-finding system are not known. Soviet open sources first made reference to laser range finders in 1962 and there have been several reports since then indicating that the Soviets had developed a laser range finder for the T-62. The East Germans reportedly are producing laser range finders but there has been no evidence to confirm this. Ground-level photography of T-62s has not shown any modifications--such as an aperture for a sender and receiver--that would be characteristic of a laser range finder system. Such a device--which operates by bouncing a beam of light off the target and timing its return--is within the Soviets' technological capabilities, but they may not have the manufacturing technology to mass-produce it successfully.

Satellite photography taken in August 1970 and in the spring of 1971 revealed three tanks of a new type near Leningrad.

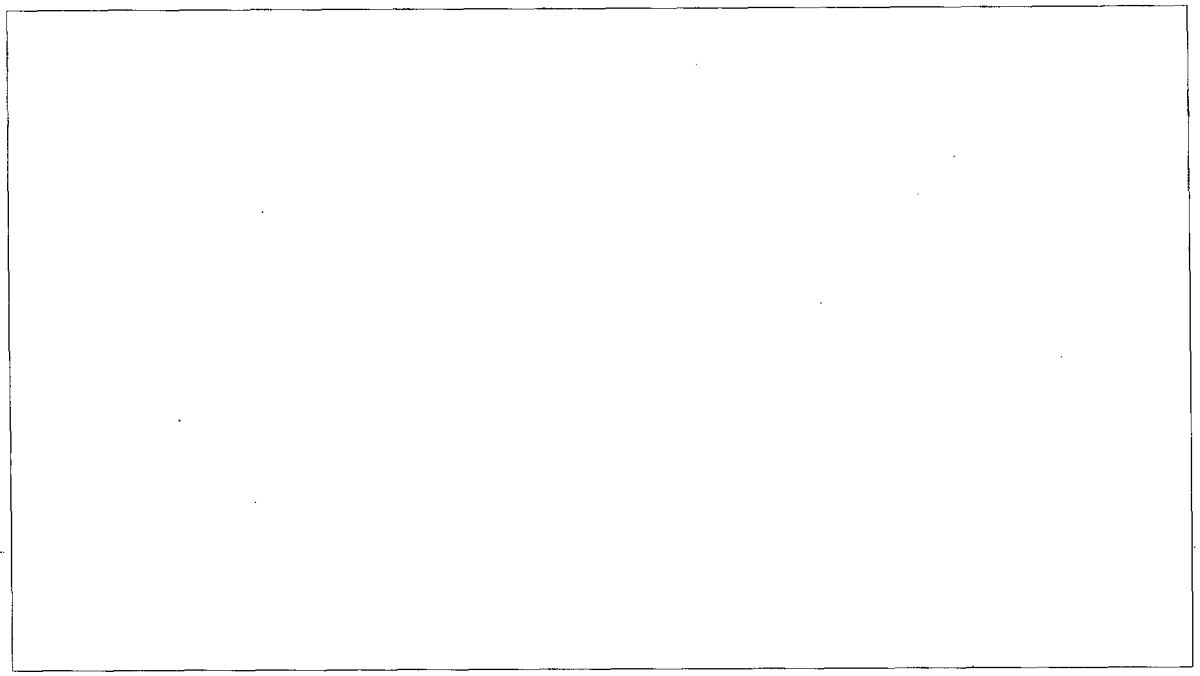
satellite photography of the tanks obtained in August 1971 indicated that they are similar to those shown in the magazine During the same month, as many as 60 other tanks with characteristics similar to those seen at Leningrad were seen at three ground force installations in the western USSR. The Soviets probably settled on this design several years ago, and while there is no firm evidence that this tank will be placed in large-scale series production, it is, at least, a primary competitive design. the tanks reportedly have been undergoing field tests since at least 1967.

The 1971 coverage also provided the first evidence that the Soviets are preparing to begin series production of a new tank.

It is doubtful the Soviets would let the plant stand idle, and retooling for a new tank probably has begun. There has been no evidence of development of any other vehicle which would be a candidate for large-scale production.

If the tanks photographed at Leningrad and at the ground force installations are of the same type, the number--more than 60--would indicate that the Soviets have settled on this design and have placed the tank in limited production for troop testing prior to series production. The plant that produced these tanks has

not been identified, however. None of this type has been photographed at Omsk, Kharkov, or Nizhnyy Tagil--the locations of all the known Soviet tank producers. The weight of the evidence--particularly the number of the Leningrad-type tanks observed--suggests that the type seen at Leningrad will be the next tank to enter large-scale production.



Past Soviet practice suggests that the new-generation tank will use many of the same components as the T-62. Items such as an improved engine or variable height suspension--if they have been incorporated--could make the new tank considerably more expensive than its predecessors.

Soviet offensive doctrine calls for large numbers of tanks. About 24,000 of the 35,000 tanks in the

Soviet ground forces are T-54s and T-55s which the new tank presumably would begin to replace. Depending on the complexity of the new tank and its similarity to previous designs, it could cost twice as much as the T-55, which costs on the order of $130,000. Plans to replace older tanks on a one-to-one basis would, therefore, almost certainly encounter competition for funds from other expensive programs such as the new infantry combat vehicle.

US planners reason that the new MBT-70 tank has sufficiently increased firepower over the M-60 series that it will not be necessary to replace the M-60s on a one-to-one basis. Although the new Soviet tank does not appear to be as radical an improvement as the MBT-70, the Soviets may also reason that the efficiency of their new tank will allow them to replace T-54s and T-55s at less than a one-to-one ratio without any degradation in overall firepower. If this is the case, the introduction of the new tank could lead the Soviets to change the TO&E of the normally tank-heavy Soviet divisions or even to reduce the number of divisions.

New Light Tank

The Soviets have also developed a new light amphibious tank. Ground-level photography shows a light tank with airborne insignia driving off what appears to be an airborne drop platform. The vehicle has a turret mounting a 76mm smooth-bore gun and a launch rail for an antitank guided missile. It appears to weigh about 7 tons--less than half as much as the PT-76--and to be air droppable, and also air transportable by MI-6 and MI-10 helicopters. This is the first evidence that such a tank is under development.

The most significant visible feature of the new tank is its variable height suspension--the first confirmed use of this type of suspension by the Soviets. The vehicle appears to be raised when on the drop platform to help absorb the shock of the landing and lowered when it is driven off the platform. The appearance of this type of suspension indicates that the Soviets are at least testing the concept and reinforces other evidence that the new medium tank also has this type of suspension.

There is no information as to the deployment plans for the new light tank. If the tank is intended to equip only airborne units, total production probably will be less than 500. If it is intended to replace the PT-76 in all the ground forces, then a production effort of some 3,000 would be required.

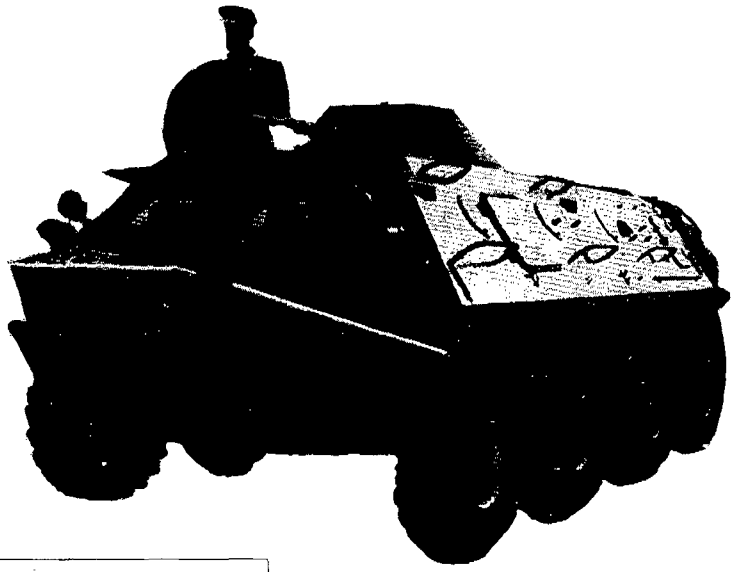
Infantry Vehicles

The second most important major items of ground force equipment in terms of numbers and expense are the armored personnel carrier (APC) and the infantry combat vehicle (BMP). (See photographs on page 18.)

Armored Personnel Carriers

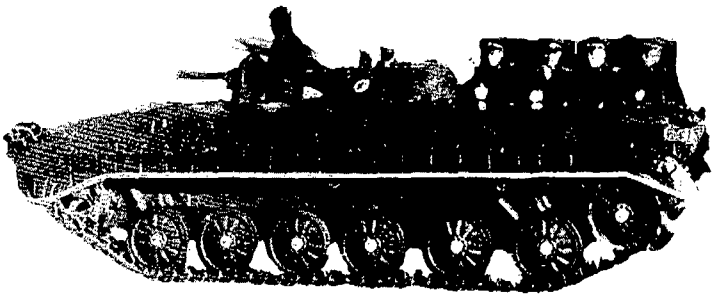
Soviet doctrine and organization indicate that line divisions are authorized one APC for each rifle squad plus additional carriers for support units. The number of APCs believed to be authorized per unit, multiplied by the estimated number of divisions and other units which have APCs, results in a total requirement of about 37,000. There now are only some 20,000 APCs in the Soviet inventory, however.

Soviet Infantry Vehicles



BTR-60 PB Armored Personnel Carrier

First observed	1961
Main armament	usually one 14.5mm and one 12.7mm machine gun
Cruising range	311 statute miles
Speed	50 mph on land 6.2 mph in water
Capacity	Earlier models carried 18 troops. BTR-60 PB shown carries 10 troops but mounts machine gun turret.



BMP Infantry Combat Vehicle

First observed	1967
Main armament	76mm smooth-bore gun Sagger antitank missile
Cruising range	180 statute miles
Speed	35 mph on land 4 mph in water
Capacity	3 crew members 8 troops

Despite a production effort continuing over the past 20 years, the Soviets have never produced enough APCs to equip their forces completely. As late as the Czech intervention in 1968, some Soviet infantry troops in the key western military districts were being transported in trucks or crowded with as much as an entire platoon in a single APC.

This situation is improving, however, at least in the forward areas. The Soviets now have sufficient armored personnel carriers to equip their forces in Germany on the basis of one APC for every one and a half rifle squads. This probably has been accomplished at the expense of some units in the western USSR which satellite photography shows have a much lower ratio. Moreover, many of the APCs now in use are BTR-152s which have been in service for some 20 years and are essentially armored trucks without an amphibious capability.

The eight-wheeled BTR-60 family of amphibious APCs has been in production for more than ten years. Earlier models carry 18 troops. Later models mount a 14.5mm machine gun in a turret but carry fewer troops. The BTR-60 does not have the cross-country capability of a tracked vehicle, but is faster on prepared roads and--because it is wheeled rather than tracked--requires less maintenance. The Soviets apparently are satisfied with it. The Gor'kiy motor vehicle plant is producing about 900 of the vehicles per year and another plant which is possibly involved in APC production was identified in August 1971. No new APCs have been identified in the development stage, and production of the BTR-60 probably will continue through the mid-Seventies.

Infantry Combat Vehicle

Classified Soviet military writings in the early Sixties called for a tracked vehicle with increased

firepower from which a mounted infantry squad could fight. The vehicle they described was essentially an infantry combat vehicle rather than an armored personnel carrier. Such a vehicle (see photograph on page 18), which the Soviets call BMP (boyevaya mashina pekhoty), first appeared in 1967 and appears to meet the earlier stated Soviet requirement for a heavily armed squad combat vehicle.

The first regimental operational deployments of the BMP were detected in 1969 with units along the Sino-Soviet border. The BMPs replaced the trucks one motorized rifle regiment had been using as personnel carriers and replaced the APCs in another regiment. Since then they have appeared with forces throughout the USSR and in small numbers--about 50 have been observed thus far--with Soviet forces in Eastern Europe. Polish airborne units have also received a limited number of the BMP--which is air transportable--but these may be for evaluation purposes only. Although production facilities for the new vehicle have not been identified and a production rate has not been determined, the numbers appearing with the troops suggest that some 1,000 BMPs have been produced and assigned to units.

[redacted] the BMP is scheduled for a large production effort in Czechoslovakia. [redacted] the Czechs are preparing to produce some 8,000 BMPs by 1975 for themselves, the Soviets, Poles, East Germans, and Yugoslavs.

The Poles had also reportedly been asked by the Soviets to undertake large-scale production of the BMP. Poland was to produce some 5,000 vehicles--half of them for the Soviets--and further production was anticipated for other Pact armies and for the Arab

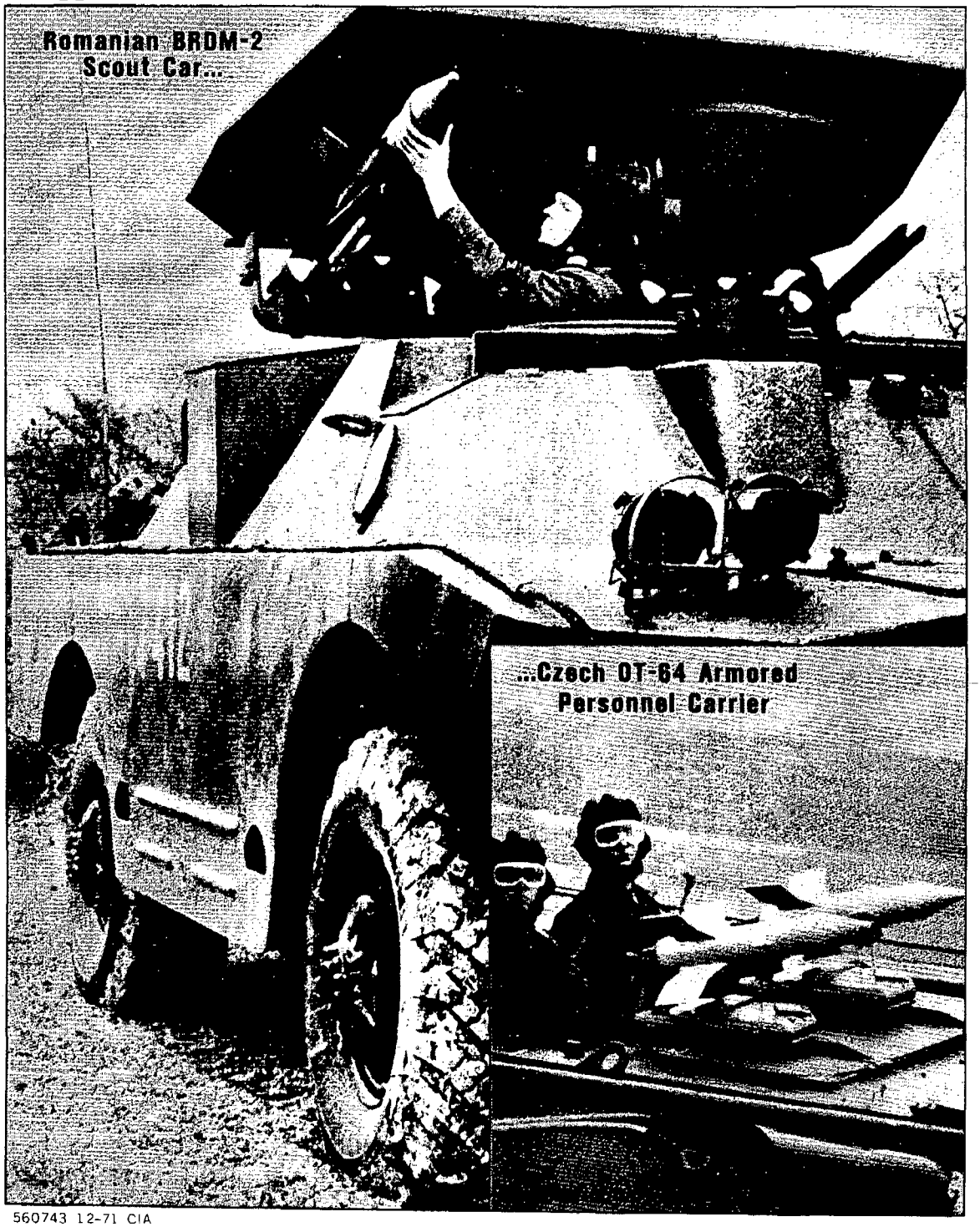
countries. The Poles reportedly refused to produce the vehicle because of the prohibitive cost and because their heavy industry was already taxed to its limits.

Soviet plans for total force requirements for the BMP are not clear. Although it evidently meets the Soviets' requirement for a squad vehicle as set down in the early Sixties, several factors weigh against their making the BMP a standard item in all army units. Foremost among these is the expense. The reports from Czechoslovakia and Poland indicate that the BMP is unusually expensive--costing more than twice as much as the BTR-60, which has a price tag of about $35,000. Adding to the expense problem is the vehicle's limited troop-carrying capacity. It carries fewer men than present Soviet armored personnel carriers and, therefore, more vehicles are required to carry the same number of troops. For example, the motorized rifle regiment along the Sino-Soviet border received 90 BMPs to replace its 60 APCs.

In the 20 years the Soviets have been producing APCs they have succeeded in filling only about half their requirement. Whatever the cause of this shortfall, it is unlikely that they could equip their units entirely with the more complex and more expensive BMPs when they fell so far short of their goal for the cheaper APCs.

Rather, they probably will complement the BMP production with a continuing large-scale production of larger, cheaper APCs similar to the BTR-60 PB. Some of these could be modified with antitank missiles or a 23mm gun. The choice of armament for modified APCs could be influenced by the type of weapon and armor put on the US mechanized infantry

Sagger Antitank Missiles Mounted on...



560743 12-71 CIA

combat vehicle (MICV) now under development. The MICV will be similar in concept to the Soviet BMP but not as heavily armed.

There is evidence that at least the Romanians and Czechs are mounting antitank guided missiles on some of their late-model armored vehicles (see photographs on page 22). The size and weight of the Sagger antitank guided missile make it adaptable to mount on almost any combat vehicle, and the Soviets probably will mount it on an increasing number of combat vehicles--particularly reconnaissance vehicles.

The BMP and the new tank may be part of an integrated procurement plan. The requirements for both apparently were established at about the same time and they may have been considered together. If the Soviets replace older tanks with fewer new tanks, they may rely on the BMP with its 76mm gun and antitank guided missiles to compensate for the smaller number of tanks. Some of the firepower burden could, therefore, be shifted from the tanks to the infantry combat vehicles and modified APCs.

Other Developments

Evidence of testing of tanks and other combat vehicles usually becomes available through satellite photography [redacted] reporting [redacted] before the vehicle is operationally deployed. This cannot be said, however, of smaller research and development efforts such as those for ammunition or improvements to existing systems. In most cases, evidence of new ammunition developments and other system improvements is limited to only the most general indications of interest in a type of system--information on specific systems usually is not available until they have been deployed.

Improved Conventional Munitions

Although no improved conventional munitions (ICM) have been identified specifically, satellite photography of two munitions test areas in the USSR suggests that testing for such systems may be under way.

These types of weapons include the cluster bomb units and submissile and fleshette artillery rounds of the type used by US forces in Vietnam. The first artillery weapons of this type were used in Vietnam in 1968 and since then numerous dud rounds probably have been recovered by Communist units and sent to the USSR for testing and exploitation. The arrays at Leningrad and at Krasnoarmeysk could be used for evaluation of recovered US rounds and for testing rounds that the Soviets may have developed.

There is no evidence of Soviet production or storage of this type of ammunition for tube artillery. The development of the production technology for ICM is difficult. The components of an ICM artillery round are extremely small. For instance, the first-generation US 155mm artillery round carries 60 small grenades--each with its own fuze. A newer round has been developed which contains 132 individually fuzed grenades. The economical production of this type of ammunition requires miniaturization and automation technology which the Soviets may not possess.

The Soviets probably would require some eight years to develop submissile artillery rounds without outside assistance, but by reverse engineering of US ammunition, this period could be reduced to about three years. Although the development of improved conventional munitions is within the Soviets' technological capabilities, production problems and high production costs may preclude a large-scale procurement of such weapons.

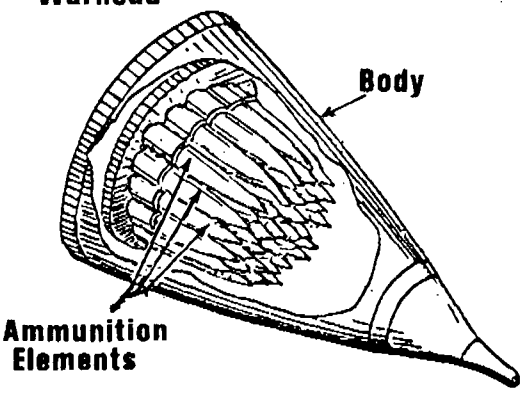
The Soviets have long had the technology to develop and manufacture the larger, less sophisticated bomblet warheads. An early example of this is the Soviet PROSAB-250 cluster bomb. This bomb was developed in the Fifties and was originally intended as an antiaircraft weapon, but it could be adapted for use by aircraft or artillery rockets against ground targets.

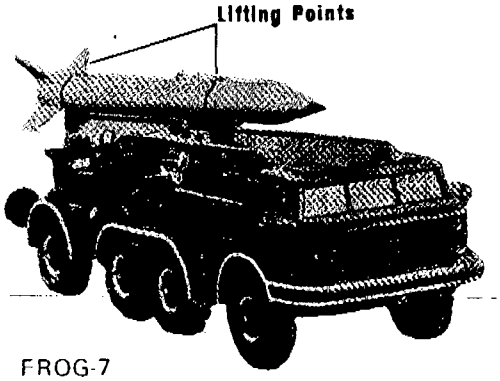
The bomb contains 108 separately fuzed fragmentation bomblets each about 3½ inches long and 2½ inches wide--about the size of a large baby-food jar. The bomblet container and burster charge unit weighs about 500 pounds and is about 3½ feet long and one foot in diameter. The weight and dimensions of the bomblet container are compatible with the FROG (free rocket over ground) rockets currently deployed with Soviet forces. By reducing the number of submunitions the larger multiple rocket launchers--such as the BM-20 and BM-24--could be equipped with bomblet warheads. A PROSAB-250 warhead recovered by the US had two bands--one blue and one white--painted on the forward ends, apparently to designate the type of load. A new elongated FROG-7 warhead also with two painted bands--black and white--has been seen. Other FROG warheads are not banded. No other relationship has been established between these markings and the loads of the PROSAB-250 and the FROG-7. The similarity in markings could, however, reflect a similarity in the type of round.

Submunitions based on technology encompassed in the PROSAB-250 probably are already deployed on the FROG-7 (see illustration on page 26).

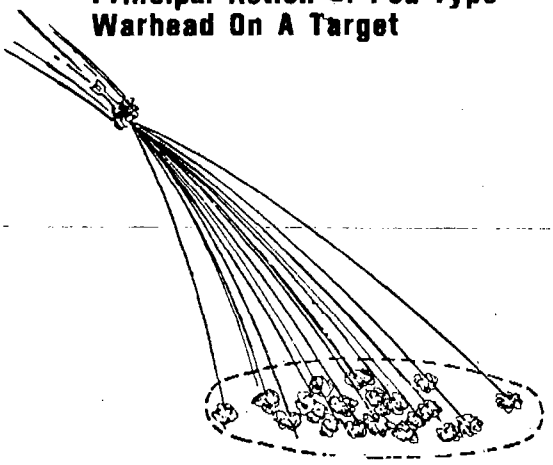
Soviet Bomblet-Type Munitions

The drawings at the right were taken from a book published by the Soviet Ministry of Defense in 1968 which explained the principles of an ICM "pod-type" rocket warhead. The warhead (at top) would be detonated above the target, scattering the submissiles over a wide area. According to the article, such a warhead would be as destructive as a salvo from as many as 100 guns.

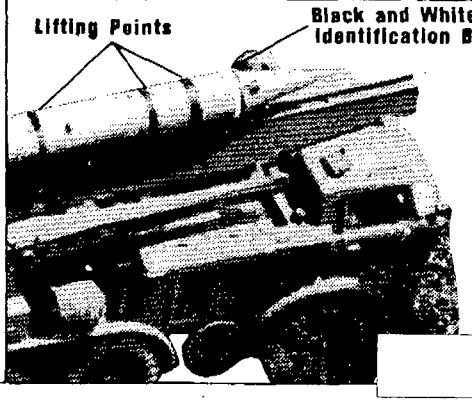




FROG-7
(Free Rocket Over Ground)
range 37 nm



Until 1970, the FROG-7 (above) had been observed many times in parades and exercises—but never with a banded warhead. In early 1970, however, a longer uniquely banded warhead on a FROG-7 tactical rocket was observed with Soviet forces in East Germany (photograph at right). This round probably has a bomblet-type warhead.



560744 12-71 CIA

[redacted]

[redacted]

[redacted] training activity and increased coverage of the new-type warhead in Soviet magazines suggest that the deployment of bomblet warheads is widespread. This deployment would accord with a trend over the past several years to increase the conventional firepower of Soviet ground forces.

The FROG-7 launchers have been deployed in Egypt, where they could be used as counterbattery weapons using bomblet ammunition against mobile Israeli artillery.

[redacted]

The significantly increased firepower of ICM has been proven by US operations in Vietnam and the Soviets can be expected to continue the development of this type of ammunition. Although bomblet weapons have probably already been developed for the FROG-7, it is unlikely that the Soviets have separately fuzed bomblets for tube artillery rounds. The US has not

[redacted]

found it economical to apply ICM technology to artillery rounds of less than 155mm, and the Soviets--with artillery ranging from 122mm to 152mm--probably are bound even more by similar cost and miniaturization restrictions.

Proximity Fuzes

The most effective utilization of bomblet and controlled fragmentation munitions is somewhat dependent on the same kind of technology as that used for proximity fuzes for conventional artillery and antiaircraft shells. These munitions have greater "kill" areas when they are detonated at preset distances from the target to give the maximum dispersion of lethal fragments. Proximity fuzes- sense the distance to the target provide the most effective means to detonate the round at a preset optimum distance from the target. The Soviets apparently have developed such proximity fuzes for antiaircraft guns. Soviet proximity fuze signals--probably for a 100mm projectile--were detected as early as 1960, and the Czechs reportedly produced proximity fuzes for 85mm and 100mm antiaircraft projectiles in the early Sixties. the Soviets were producing proximity fuzes as early as 1957.

There is no firm evidence that the Soviets have developed proximity fuzes for field artillery projectiles. The Soviets apparently have the technology to produce them, but the indications of such production are fragmentary and inconclusive.

Rocket-Assisted Projectiles

Another area in which the Soviets are conducting research to improve their conventional firepower is rocket-assisted projectiles (RAP). This ammunition utilizes a sustainer rocket which ignites after the round leaves the gun tube. Most of the advanced arms producers in the world have done research with RAP rounds to increase the range of conventional tube artillery and mortars. US developments have yielded

a 50-percent increase in the range of the 105mm round. This round and a 155mm RAP round have been used in Vietnam for several years. Presumably some of them--as with the ICM--have found their way into Soviet hands.

Evidence of Soviet interest in RAP technology [redacted] with the Soviet 130mm field gun--which has the longest range of any gun in the Warsaw Pact arsenal. The 130mm gun has been lauded as a long-reaching and accurate weapon by the Israelis, who have been on both ends of it--having themselves used such guns captured from the Egyptians. [redacted] in 1968-1969 the Czechs had shortened the long barrel of the gun to howitzer length and using RAP ammunition had achieved the same range and accuracy as the long-barrel gun. [redacted]

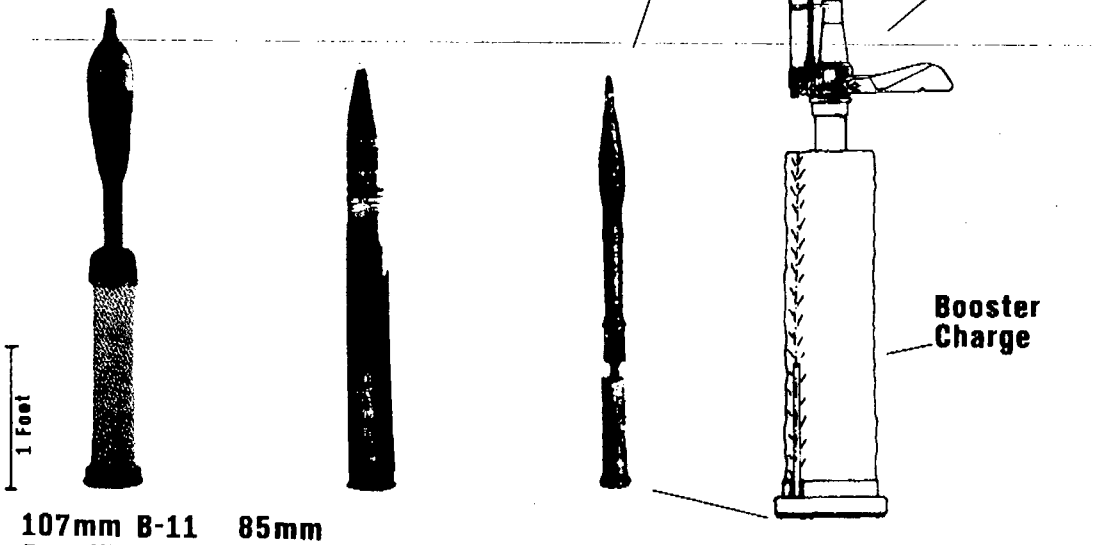
There is no evidence that the Soviets have deployed RAP artillery rounds. This, again, is within their technical capabilities but the widespread deployment of these rounds--as with the ICM--would be expensive and the priority that the Soviets attach to this program is not clear. Over the past several years, there have been reports that US bases in Vietnam have received mortar fire which counterbattery radars indicated was coming from well beyond the range of known Soviet mortars. These reports have caused speculation that RAP rounds were deployed or being tested in Vietnam, but none of the reports has been confirmed. The application of RAP technology to mortars would greatly extend the firepower range of infantry and guerrilla units and complicate perimeter defense problems.

The Soviets have already deployed RAP-type rounds for direct-fire recoilless antitank weapons. The RPG-7 antitank grenade used so effectively for the past several years in Vietnam utilizes an initial charge to propel the shaped-charge projectile from the tube and then a sustainer rocket maintains velocity to the target.

Soviet Rocket-Assisted Projectiles

The photograph above from a Soviet newspaper shows a training exercise with the SPG-9 recoilless rifle. The soldier at the right is carrying a round which appears to be a rocket-assisted projectile (RAP).

The BMP may also fire a RAP round. A [redacted] reported that the BMP fired a round which resembles a B-11 recoilless round. But the BMP has a sealed turret and could not fire a standard recoilless round because of the back blast. The resemblance of the B-11 recoilless round to the SPG-9 rocket-assisted round suggests that the source observed a RAP round.



560745 12-71 CIA

This type of round also appears to be used in the new SPG-9 73mm recoilless rifle (see illustration on page 30). Training manual photographs show a round which consists of a finned rocket-propelled projectile and a launching charge of the recoilless-rifle type.

In standard recoilless rifles the release of most of the charge through the rear of the weapon reduces the initial velocity and, consequently, the range. The sustainer rocket of the SPG-9 round maintains the velocity imparted by the charge so the effective range --870 yards--is more than double that of the older B-10 83mm recoilless rifle. The Czechs reportedly are working on a similar recoilless rifle with a rocket sustainer to be designated RPG-15.

The performance of conventional tanks and antitank guns could also be improved by the use of RAP rounds. The sustained velocity of these rounds can increase the range, accuracy, and penetrating power of kinetic-energy and shaped-charge ammunition. The accuracy of conventional direct-fire weapons is dependent upon a flat trajectory and high velocities. As a result, direct-fire armored vehicle weapons require a heavy chassis, bulky recoil mechanism, and a thick-walled gun to absorb the shock of the charge needed to impart the high velocity to the round. This has prohibited the effective installation of high-velocity guns on light armored vehicles such as the BMP.

In contrast, RAP rounds ignite after the shell has been propelled from the barrel by a low-energy charge and provide the required velocity without paying the size and weight penalties of conventional rounds.

A logical application for this type of round is for the low-pressure smooth-bore 76mm gun on the BMP. This gun utilizes a short-recoil, low-pressure system which would yield poor velocity and range using conventional ammunition. Performance probably could be improved significantly with a RAP round similar to that fired from the SPG-9. Rather than vent some of the blast through the breech, the short-recoil gun would absorb this energy and impart a greater initial velocity to the

round than that of the SPG-9. The sustainer rocket could then maintain velocity to the target.

A RAP round similar to the SPG-9 round may already be deployed with the BMP. [redacted] a model of the round for the BMP gun. [redacted] claimed that the round resembled that for the B-11 recoilless rifle (see illustration on page 30). The BMP has a sealed turret and could not fire a standard recoilless round because of the backblast. Nevertheless, the [redacted] description of the BMP round indicates that it is different from conventional gun rounds. The B-11 round resembles the SPG-9 round but does not have a sustainer rocket. Both the SPG-9 and the BMP gun are smooth-bore weapons. Although the 73mm SPG-9 round is slightly smaller than the 76mm bore of the BMP gun, it could be adapted to the BMP gun by increasing the diameter of the round's obturator bands.

Smooth-Bore Guns

In conjunction with the RAP development effort, the Soviets probably will continue the deployment of smooth-bore guns. As previously mentioned, the Soviets had experienced accuracy problems with the smooth-bore gun of the T-62 in the early Sixties but these apparently have been overcome. Some 9,000 T-62s have been produced and two more smooth-bore weapons--the M-1965 antitank gun and the 76mm gun on the BMP--have been deployed. The new Soviet tank may also have a smooth-bore gun. Smooth-bore guns characteristically have not had the accuracy of conventional rifled-bore guns found on most tanks. Technology has increased the muzzle velocities and accuracy of present antitank rounds, however, and smooth-bore guns appear to be better suited to take advantage of these technological advances. Without the rifling of conventional guns,

smooth-bore guns are lighter, longer lasting, and more compatible with the highest velocity rounds.

Night-Vision Devices

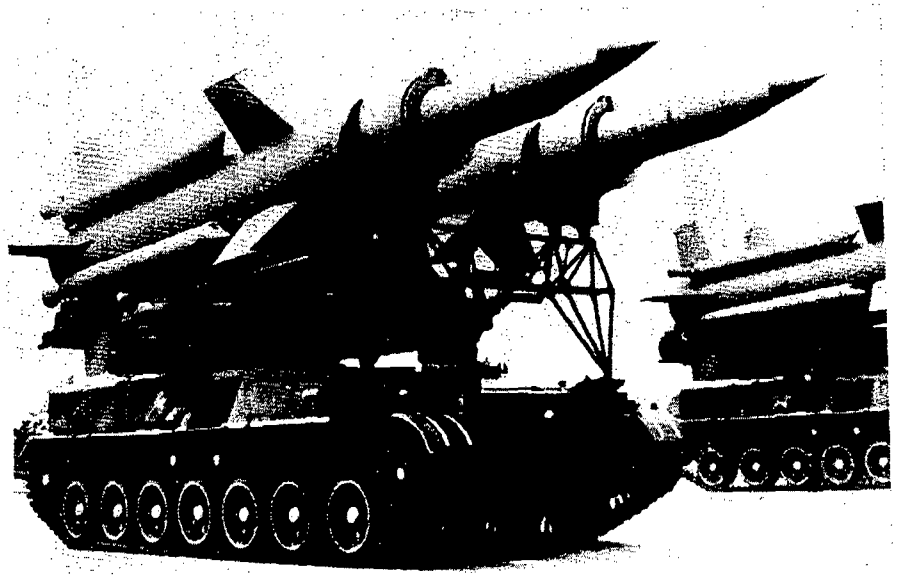
The Soviets apparently are continuing to place emphasis on their capability to fight at night. [redacted] the information on the new medium tank reported that it mounted a dual-purpose xenon white and infrared light. This light probably is similar to those found on current NATO tanks.

The Soviets probably are also experimenting with passive night vision devices similar to the "starlight scopes" used by US forces in Vietnam. Starlight scopes have been used for a number of years and some of them probably have fallen into enemy hands. Unlike the infrared lights, they emit no radiation but rather intensify the available moon and star light. Thus there is no detectable signature to reveal their presence to the enemy.

Air Defense

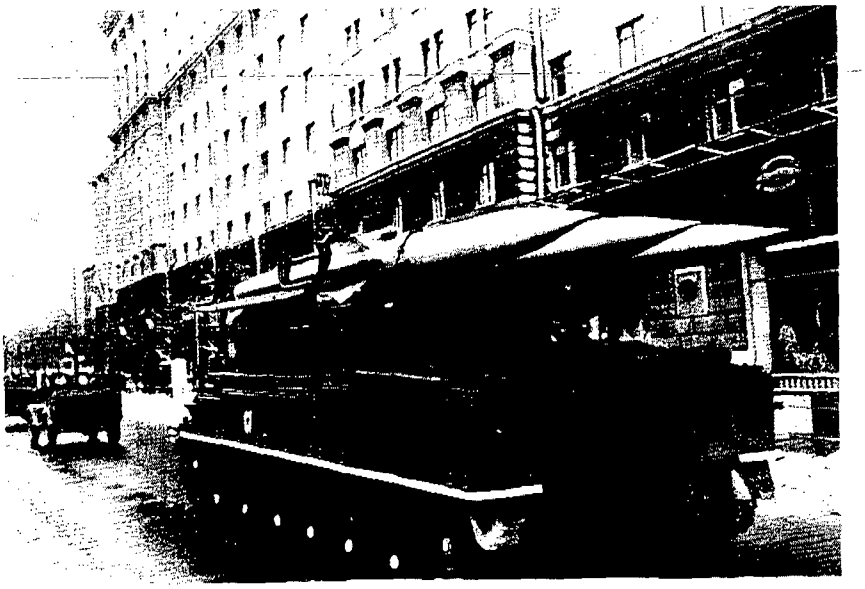
One of the most significant developments in the Soviet ground forces over the past five years has been the increase in battlefield air defense capabilities. The emphasis in this development has been on mobility and on the capability to defend against low-altitude attack. Some of the impetus for these developments may have come from the use of US air power in Vietnam. Two mobile surface-to-air missiles (SAMs) have been deployed with Soviet ground forces and two more systems have been identified in the research and development or field-testing stages.

Soviet Mobile SAM Systems Currently Deployed



SA-4

Introduced	1967
Range	35 nautical miles
Altitude	1,000-80,000 feet



SA-6

Introduced	1970
Range	10-15 nautical miles
Altitude	300-40,000 feet

560746 12-71 CIA

Deployed Systems

The SA-4 and SA-6 missiles (see photographs on page 34) are launched from tracked launchers designed to keep pace with rapidly advancing tactical units. They complement each other--the SA-4 engaging targets at medium altitude and the SA-6, lower altitude attackers.

New Systems

The Soviets evidently have also developed two SAMs which will be more responsive to the low-echelon commanders. A new mobile SAM, the SA-X-8, similar in concept to the US Chaparral or the Franco-German Roland, was observed in satellite photography of the Emba missile test range in the USSR in 1968, and testing could have begun a year before that. The SA-7--a small man-portable infrared homing SAM fired from the shoulder, similar to the US Redeye--apparently was deployed in Egypt in late 1969. The mobile SAM may be deployed in the same manner as the Chaparral to defend airfields and with divisional units to defend maneuver elements, artillery, and areas of concentration. The SA-7 will be deployed with smaller units probably down to the company level--as is the Redeye--to defend against slow, low-flying aircraft.

Inasmuch as the SA-7 has been deployed with Egyptian forces in Egypt it probably has also been deployed, at least in limited numbers, with Soviet forces elsewhere. There is, however, no evidence to confirm this. The pace and nature of the testing suggest that the SA-X-8 is not yet deployed.

The SA-X-8 may replace the ZSU-57-2 self-propelled antiaircraft guns in the division and will be supplemented by the ZSU-23-4 self-propelled antiaircraft guns already deployed. The shoulder-fired SA-7 probably will be a net addition to the division. If the mobile missiles replace the 57mm guns on a one-to-one basis, the divisional TO&E probably will increase, reflecting the additional support equipment and personnel required by the more complex systems.

* * * * *

Summary

While the Soviet strategic forces have made impressive gains over the past five years, the ground forces have also undergone significant--if less heralded--changes. The NATO policy of "flexible response" has increased the likelihood that at least the initial stages of a war in Europe would be fought with conventional forces. This and the potentially great manpower advantage of the Chinese have almost certainly provided additional impetus to the Soviet ground force modernization programs. Weapons such as the infantry combat vehicle have already begun to enter operational service, and a continuing research and development effort is under way to provide a variety of new weapons for the Seventies.

The most significant new Soviet ground force weapon system is a medium tank now undergoing field testing and possibly limited series production. The Soviets now hold some 35,000 tanks in their ground force inventory, many of which are models that have been in production for over 20 years. The newest operational tank--the T-62--entered service in the early Sixties.

Satellite and ground photography, a Soviet magazine article, [redacted] have provided the first good information on the characteristics of the next generation of Soviet tank. The available evidence indicates that the tank is of a conventional design and probably does not represent a significant technological advance over the design of the T-62, although it reportedly is faster, lower, and quieter than present Soviet tanks. Satellite photography of August 1971 showed at least three of the new-type tanks at a test area near Leningrad and more than 60 similar tanks at ground force installations in the western USSR. These numbers suggest that the Soviets have settled on this design and probably are preparing for full series production.

The Soviets have also developed a new light tank which is probably air transportable and air droppable. Ground-level photography [redacted]

recently provided the first evidence that such a tank is being developed. The tank's most significant feature is its variable height suspension--confirming Soviet interest in the concept. There is not yet any evidence suggesting Soviet production plans for this tank. If it is intended to replace the PT-76 light tanks throughout the Soviet army, some 3,000 would be required.

Another significant item of equipment--which has already begun to enter service--is the infantry combat vehicle (BMP). The design of this vehicle appears to respond to Soviet requirements laid down in the early Sixties for a heavily armed combat vehicle to carry a mounted infantry squad. The Soviets apparently intend that the BMPs play an important part in their future ground forces. Thus far more than 1,000 have been produced in the USSR and the Czechs are preparing to produce some 8,000 by 1975 for themselves and for their Pact allies including the Soviets. The BMPs are expensive, however, and because of this the Soviets probably will not attempt to equip all their ground forces with them. They may instead continue to maintain in their inventory large numbers of the wheeled armored personnel carriers such as the BTR-60, which have a greater capacity.

The Soviets probably are conducting research to develop improved conventional munitions (ICM) for their tube artillery and rockets. This type of ammunition greatly increases the effectiveness of these weapons in conventional war.

The US has used ICM rounds for several years in Vietnam and dud rounds presumably have been recovered and sent to the USSR for testing and exploitation.

Soviet progress in developing and producing ICM rounds is not known. There is no evidence that ICM tube artillery rounds have been deployed with Soviet forces. It is difficult to develop and produce ICM rounds for tube artillery, and this requires a

high degree of miniaturization and automation technology which the Soviets may not possess. The Soviets have, however, developed and produced less sophisticated bomblet rounds for gravity bombs and evidently for the FROG-7 rocket. A submissile bomb has been recovered and there is evidence from [redacted] Soviet publications that a bomblet warhead for the FROG-7 has been deployed.

These munitions--as well as conventional ammunition--have greater "kill" areas when they are detonated at an optimum distance from the target. The most effective means to do this is through the use of proximity fuzes which transmit radio waves and sense the distance to the target. Although the Soviets have apparently developed proximity fuzes for antiaircraft projectiles, there is no firm evidence of proximity fuzes for field artillery.

The Soviets are also attempting to increase the effectiveness of their conventional artillery through the use of rocket-assisted projectiles (RAP). This ammunition utilizes a sustainer rocket which ignites after the round leaves the gun tube and increases range by as much as 50 percent. The Czechs reportedly have done some effective RAP research with the Soviet 130mm field gun and the Soviets have already deployed RAP-type rounds with the RPG-7 and SPG-9 recoilless antitank weapons.

A logical application of this technology is for the smooth-bore 76mm gun on the BMP and reports [redacted] suggest that such a round has been deployed. This application would increase the range and accuracy of the short-recoil gun in the direct-fire antitank role. In conjunction with their RAP developments the Soviets probably will continue the development of smooth-bore guns. Without the rifling of conventional guns, smooth-bore tubes are lighter, longer lasting, and more compatible with the highest velocity rounds.

Over the past five years, the Soviets have significantly increased their battlefield air defense

capabilities. The emphasis has been on mobility and on defense against low-level attack. Two mobile surface-to-air (SAM) systems--the SA-4 and SA-6--have been deployed to keep pace with rapidly advancing tactical units and two newer SAM systems have been developed. The SA-7, a shoulder-fired SAM, has been deployed at least in Egypt, and the SA-X-8, a new mobile SAM, has been undergoing tests since at least 1968. These new systems probably will replace some of the older antiaircraft guns in the Soviet divisions.

07/17/02/025

Top Secret

[redacted]

Top Secret