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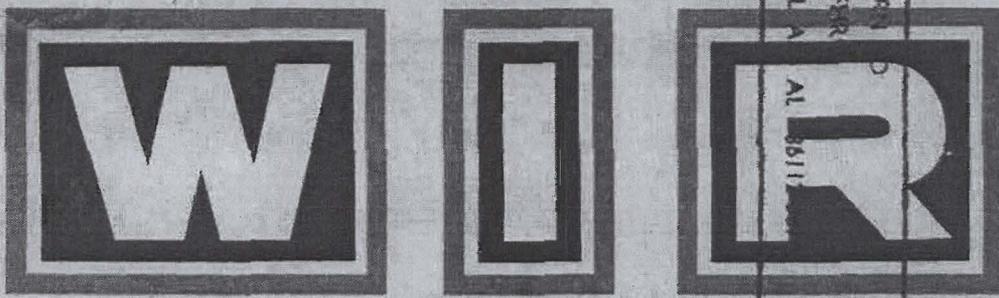
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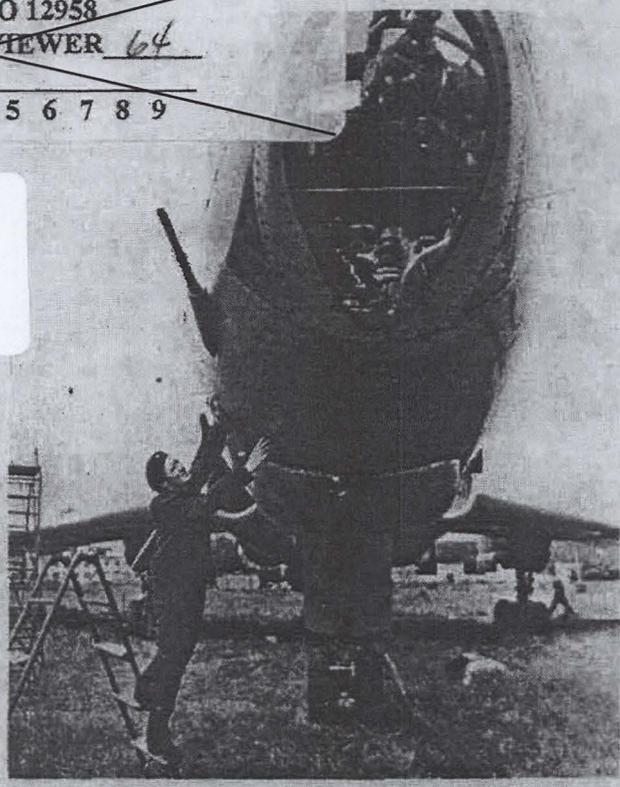
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Weekly
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K410.607-230

Issue No. 13/68, 29 March 1968

The WIR in Brief

Portion identified as non-responsive to the appeal

BETTER CHEMICAL ROCKET PERFORMANCE
SOUGHT THROUGH INCREASED CHAMBER
PRESSURE
Interest in 2,000-3,000 psi range suspected.

Portion identified as non-responsive to the appeal

Portion identified as non-responsive to the appeal

Space

COSMOS 208 ANOTHER RECCE SATELLITE,
OVERLAPS FLIGHT OF RECCE COSMOS 207
5th recce satellite this year. 14
COSMOS 209 TESTED A MANEUVERING SYSTEM
PROBABLY FOR MILITARY MISSION 14
Apparently third of a test series.
MORE LUNAR LAUNCHES EXPECTED SOON, AS
SOVIETS RESUME THEIR ASSAULT ON THE MOON 15

COVER: BADGER bomber at Soviet Airfield
(OFFICIAL USE ONLY) (from Aviation
Week and Space Technology)
NOTE: Pages 26, 28, 29, 32, 33, 36, 37, 40,
41, 44, and 45 of this issue are blank.

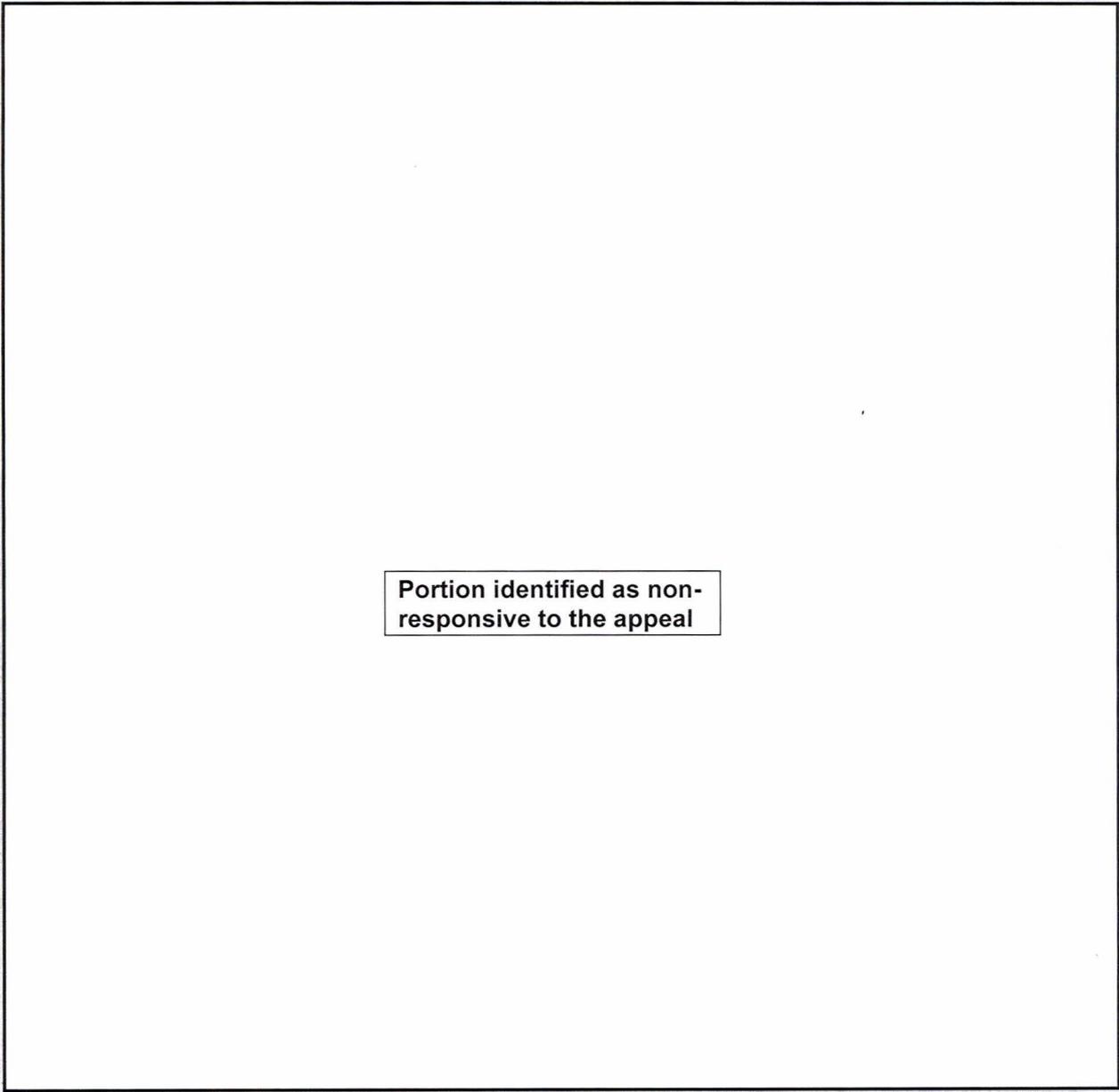
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Better Chemical Rocket Performance Sought Through Increased Chamber Pressure

Soviet interest in raising the performance of chemical-propellant rockets by increasing the chamber pressure has been evident at international scientific congresses, and in what is known of the USSR's space launchers. It is felt that the Soviets, to improve rocket performance, are exploring chamber pressures in the 2,000-3,000 psi (pounds per square inch) range.

Gains in missile performance through improved chemical propellants





are likely to be limited, with a few exceptions, such as flourine and hydrogen. There is room for appreciable gains, however, by increasing combustion-chamber pressures. The Soviets evidently have been following this approach previously. Their RD-107 engine, used in their main space booster, the SS-6, uses LOX-kerosene at 60 atmospheres pressure (885 psi) with a reported specific impulse (I_{sp}) of 314 seconds. The US counterpart, the Atlas sustainer, operates at about 600 psi with an I_{sp} of about 300 seconds. The Soviets' RD-119, used in the upper stage of Cosmos research satellites, operates at 90 atmospheres (1175 psi) with a reported vaccum I_{sp} of 352 seconds using dimethyl hydrazine-oxygen as the propellant.

Increased chamber pressures have the disadvantage of requiring heavier missile structure. This was evident from the heavy plates used in the Soviet RD-107, which was shown at the Paris Air Show, as compared with the much thinner chambers of the Atlas. However, this is a trade-off which is being considered for future advanced US chemical-propellant rockets.

(CIA)

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Military Spending in USSR Forced Up By Broader Goals of Khrushchev's Successors

Soviet military spending has always taken up a disproportionate share of the gross national product (GNP) of the USSR. Under the Brezhnev-Kosygin leadership, military spending is progressively taking up still larger shares of the GNP. In 1968, for the third year in a row, the rise in outlays will probably equal or exceed the rate of growth of the Soviet economy. The increases of 1966 and 1967 had already swelled military spending by an amount greater than the increases accumulated in the 8 years of 1958-1965.

This ever-increasing spending appears to involve every major component of the armed forces. The dominant view among Soviet leaders appears to be that the USSR should have a wider spectrum of military capabilities than are now at hand.





Although the necessity for higher military expenditures appears to be accepted by all sectors of the leadership, there may be a shakier consensus as to which sector of the national economy will have to make the corresponding compensating sacrifices. The leadership appears to have chosen to sacrifice investment in further industrial growth. Some Soviet leaders recognize that they are thus risking an eventual slowdown in economic growth. As higher military costs are translated into program curtailments and postponements, they will add fuel to Kremlin controversy.

Past Trends in Military Spending. From the end of the Korean War until 1965, the long-term trend in total military spending was one of only moderate growth. Since the year after Khrushchev's ouster (October 1964), however, the rise has been sharp (chart on page 35).

Between 1952 and 1965 the percentage of GNP allocated to the military actually declined. From 1957 (the year of minimum military outlays for this period) through 1965, military and space expenditures grew at an average rate of about 2% per year, while the economy grew by about 5% per year. This trend coincided closely with Khrushchev's program to change the Soviet military establishment from a primarily conventional force to one which fully encompasses the new military technology of missiles and nuclear weapons.

The ability of the USSR to moderate its military spending in the 1950s resulted largely from a decision to gradually reduce the armed forces from about 6 million men under arms in 1952 to a steady level of about 3 million men from 1961 to 1965. This reduction was acceptable to political leaders during the 1950s, because equipment and armament being furnished to the ground forces at the time increased their capabilities in the form of improved mobility and greater fire power. The large increases in spending on strategic forces was dampened first by these reductions and, after 1960, by the stability in lower ground forces costs. (Chart pages 38, 39, and 42.)

Another stabilizing factor was the fact that the various options of strategic weaponry did not open up all at once to the USSR. Their costs, therefore, did not all peak in the same year. With regard to the strategic attack mission, for example, first came the strategic bomber programs of 1953-1957, then the concentrated effort on deploying medium- and intermediate-range missiles during 1958-1962, and, since 1962, the deployment of ICBMs.

As an exception, in 1955 the Soviet budget felt the effects of both the bomber deployment program plus heavy expenditures for air-defense fighters and new surface-to-air missiles. Also, the reduction in the ground forces was temporarily halted that year. The result was an uncharacteristic rise in the military budget for 1955 (chart on page 35).

The period 1956-1957 saw some retrenchment, as ground forces reductions were resumed, and spending on new strategic systems remained at their former levels.

The military budgets for the years 1958 through 1962 saw a steady but





modest growth, as investment in strategic attack systems climbed rapidly and military and space R&D programs began to exercise a greater influence. Stability in strategic-defense spending and slight reduction in costs of the general purpose forces did much to counter the trend toward greater expenditures.

Manpower reductions virtually ceased after 1961; since then, the costs for maintaining and operating the forces in being, with their new weapons systems has begun to grow as a factor in the budget. (Chart on page 43.)

Military hardware, all this time, was becoming more and more expensive. Military spending could have risen much more sharply than it did, had it not been for the fact that Khrushchev, committed to a long-term program of economic development, was inclined to bank on a policy of deterrence based on strategic offensive missiles. From this standpoint, he was able to justify a reduction in spending on the general-purpose forces, even though modernizing them at the same time.

His military strategists, however, had their misgivings. They became restive about the strategic imbalance; they did not believe that they had a credible capability to wage a nuclear war (and win), and foresaw the possibility that the next war might not start with a surprise nuclear attack.

The steady but moderate rise in military expenditures reached a peak in 1963. During 1964, Khrushchev's last year, they actually declined, and in 1965, the first budget year for the Brezhnev-Kosygin team, they rose back only to the 1963 level. The deployment of strategic missilery was down, the MRBM and IRBM programs having been completed, and SAM deployment also slowed markedly during this period.

Since Khrushchev, however, military spending has tended to rise sharply with each budget. The former trend, under which military spending, though rising moderately, was taking up slightly reduced proportions of the GNP, reversed itself.

Initially, this trend resulted from efforts to improve Soviet deterrence. More recently, Soviet concern has broadened to encompass the complex possibilities that local wars that impinge on the interests of both major powers may escalate.

Soviet leaders evidently have reappraised the strategic environment and their relations with the US and have concluded that further detente is not likely and that an improved military posture is required during the present period of recurring crises and rising tensions. They seem to feel that the US has displayed an increasing willingness to undertake initiatives that the USSR must be prepared to counter and that the Soviet Union should have the wherewithal to support initiatives of its own. They believe that the USSR must improve its military potential in ways that will reduce the US's freedom of action and give the USSR greater influence in the international arena.

Military spending began its sharp rise in 1966 with the resumption that year of major new deployments of both strategic attack and strategic defense equipment. Expenditures for ICBMs in 1967 were double the level of 1965,



while expenditures for SAMs and ABMs rose by about 70%. Outlays for strategic missions added more than 1.7 billion rubles to the military budget during this period. Outlays for R&D and space rose by nearly 30% during 1966-1967, adding another billion rubles to the military burden. In other major areas, former spending patterns persisted.

The increased spending announced for 1968 appears to be aimed at increasing the capabilities of both strategic and theater forces. Although some particular requirements may not be permanent -- such as moves to strengthen Soviet forces near China, Soviet naval operations in the Mediterranean, and support for the Arabs -- outlays for similar purposes will probably continue at present levels in the next few years, if not increase. In other spending categories, primarily new weapons deployment, it will take several years to complete the major investments in several programs which are now in their early stages. These programs, when completed, will also require annual appropriations for operation and maintenance.

Prospects in General. The Soviets are planning and building their military forces with the recognition that nuclear war is possible, and they believe that a publicized and credible ability to wage such a war is a necessary condition for averting it. They will thus continue strengthening their deterrent, both to increase their military potential and to reinforce the world's image of the Soviet Union as a great power.

At the same time, giving broader consideration to the total range of military needs and opportunities, Soviet leaders now recognize that deterrence alone is not enough, that other forms of power will also be needed if Soviet freedom of action in world affairs is to be expanded and the US's freedom of action diminished.

Prospects for Strategic Programs. There is evidence that the SS-9 and SS-11 ICBM deployment programs continue and that new starts of SS-11 silos may be extended into 1968. Indications are that a new solid-propellant ICBM may be deployed soon. New Polaris-type submarines will be appearing in some numbers in coming years, and a system that could lead to the deployment of a fractional-orbit bombardment system has been tested successfully. Air-defense capabilities will almost certainly continue to be expanded. ABM deployment seems certain to continue, with no readiness on the part of the Soviets to agree to a freeze; without such an agreement, the USSR is also almost sure to continue large R&D efforts, either to improve the Moscow system or to develop a completely new system, even while it is completing the deployment at Moscow.

Deployments will contribute to rising costs for strategic missions in the next few years, and to the costs for operating and maintaining strategic forces over an even longer time period. Soviet costs for equipping and operating strategic attack and strategic defense forces are expected to average about 6 billion rubles per year (about \$12 billion in terms of US buying power)



over the next few years, compared with 5 billion rubles averages for the period 1963-1967.

Even if the numerical levels of new strategic weapons systems do not expand as fast as they have in the past two years, qualitative improvements in US strategic forces will press Soviet leaders to make similar improvements; this alone will tend to maintain relatively high spending levels. At the same time, the operating and maintenance costs for the systems now being deployed will have reached higher levels and will also tend to keep total military spending from dropping.

Prospects for General Purpose Forces. The USSR, no longer tied to the single contingency of general nuclear war, is expanding and otherwise strengthening its general purpose forces, to give them the potential for responding over a broad spectrum of possibilities in the furtherance of Soviet foreign policy.

The army, navy, and air force elements in these forces are large but are not yet well structured for future nonnuclear conflicts. Molded in the late 1950s and early 1960s as an adjunct to the missile forces in a nuclear war, they were not given equal consideration in budgeting.

Since 1960, the general purpose forces and the command and general support establishment have been supported by relatively stable expenditures of about 9 billion rubles (about \$19 billion) annually. With this financing, increasing numbers of modern weapons, such as tactical missiles, supersonic fighters, and submarines were procured and deployed. But the means for moving men and equipment in meaningful numbers beyond Soviet borders and for sustaining them there in extended operations were lacking. But now the force structure, equipment levels, and service support are probably getting added attention. Tactical aviation will soon receive equipment better suited to its mission. The naval forces' deficiencies in fleet air defense, open-ocean antisubmarine warfare, and amphibious operations are now being corrected. Additional air logistics support will probably be provided to improve mobility of forces and supplies.

The costs for these improvements could increase spending for general purpose forces by 1 billion or more rubles per year. The full extent of the increase will depend not only on the levels of capabilities sought but on the ways the forces are actually operated in the years ahead. Costs could be sizable if the USSR continues to expand its influence and presence in the Mediterranean and Middle East, to increase its forces in the Far East and along the China border, and to broaden its proxy support to North Vietnam and to Communist-sponsored military and guerrilla movements elsewhere in the world.

Prospects for R&D and Space. Soviet military R&D programs and the space effort will probably also spend more money each year. Over the longer term there is some prospect that the level of effort in R&D and space may stabilize,



but with continued competition in space and in military technology, costs in this field are unlikely to be reduced significantly.

Prospects for the Economy. Military spending imposed a heavy drain on the resources needed for Soviet economic growth, even under Khrushchev, when military spending over-all experienced only moderate increases. Growth was particularly rapid in expenditures for advanced military hardware and for military and space R&D, which drained human and material resources from industrial expansion, thus hampering Khrushchev's efforts to improve technology in civilian industry. (See page 46.) Demands were heavy on precision machine-building, electronics, high-purity metallurgy, and related resources.

Ustinov, planning boss for Soviet defense industry, warned in 1959 that the demands of military programs in these areas would be intense.

When the resources available proved inadequate to meet all the nation's needs, expansion and modernization of the civilian industrial plant was hampered. This, in turn, intensified pressures to revamp the Soviet structure for planning and managing the economy.

The sharply rising military spending now in evidence is bound to affect Soviet economic development plans. The regime apparently has chosen to reduce investment, thereby raising the risks of another slowdown in economic growth. Some evidence of controversy over investment goals was seen in the Soviet press following the 1968 budget announcement. Although such articles no longer appear, the issue probably is still alive and could be revived in the "I told you so" manner as an important element in Kremlin politics if the economy suffers setbacks that significantly affect major economic goals.

(CIA; NORAD)

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significant
intelligence
on space
developments
and trends

Cosmos 208 Another Recce Satellite, Overlaps Flight of Recce Cosmos 207

Cosmos 208, which the Soviets launched from Tyuratam at about 0951Z, 21 March, is a military reconnaissance satellite capable of photo-recce and collection of ELINT. It carries a low resolution camera system; this system, with a ground resolution of 20-30 feet at altitudes of 100 n. m. has been referred to in the past as "medium resolution."

Cosmos 208's flight overlapped that of Cosmos 207, a high-resolution recce satellite, by nearly three days. An overlap of orbital lifetimes by Soviet recce satellites is unusual but not unprecedented. (Cosmos 207 was de-orbited on 24 March, during the early part of Rev 125; it impacted in the USSR, probably about 0725-0730Z.)

Cosmos 208 is the 5th Soviet recce satellite launch of 1968. The first of these, Cosmos 199, failed during flight. The rate of launch of recce satellites this year appears to be about the same as last year: the 5th recce satellite of 1967 was launched on 22 March, the 5th for 1968 on 21 March.

It may or may not be relevant that Cosmos 208 was launched about 24 hours after the Israeli attack on infiltration bases in Jordan. (Also see last para. of next article.)

(NORAD)
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Cosmos 209 Tested a Maneuvering System Probably For a Military Mission

Cosmos 209, which the Soviets launched from Tyuratam at about 0933Z, 22 March, appeared to have tested a spacecraft-maneuvering system, probably for use in military missions of the future. It appears to be the third in a series of tests: its estimated predecessors were Cosmos 185 and Cosmos 198.

NORAD Space Defense Center reports that Cosmos 209 was initially injected into a suborbital trajectory and then an orbit of the following parameters:

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Inclination	65.1 degrees
Period	88.97 minutes
Apogee	260.57 km (140 n. m.)
Perigee	237.63 km (128 n. m.)

At about 1058Z, 23 March, a propulsion event occurred which reinjected the payload into a higher orbit, with parameters almost the same as those of Cosmos 198:

	<u>Cosmos 209</u>	<u>Cosmos 198</u>
Inclination	65.1 degrees	65.7 degrees
Period	103.1 minutes	103.9 minutes
Apogee	952 km (512 n. m.)	951 km (511 n. m.)
Perigee	868 km (466 n. m.)	895 km (476 n. m.)

50X1 and 3, E.O.13526

50X1 and 3, E.O.13526

The launch vehicle, therefore, has not been identified positively, but was probably the SL-13 system, which also launched Cosmos 198 and Cosmos 185. (The SL-13 system consists of the SS-9 ICBM and a restartable third stage.)

The use of the SS-9, the Soviets' largest true military booster for these tests, suggests that the operational version of the Cosmos 185-198-209 series will have a military mission. Such missions might include orbital weaponry; interception, inspection and disablement or neutralization of foreign satellites; or reconnaissance (by development of a second-generation recce satellite).

With regard to the possible satellite-interception mission, it may be significant that Cosmos 209's orbit was co-planar with that of Cosmos 208, a recce satellite launched less than 24 hours earlier -- also from Tyuratam. (NORAD; FTD)

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More Lunar Launches Expected Soon, as Soviets Resume Their Assault on the Moon

The Soviets appear to be resuming in 1968 their assault on the Moon which was very much in evidence in 1966 but not in 1967. There were six lunar launches in 1966 but only one in 1967. There have already been two this year and preparations for more appear to be getting under way.

1967. The only lunar-related launch of 1967 was the apparent attempt on



22 November to launch an unmanned Soyuz-type spacecraft around the Moon and back to Earth for recovery. (The Soyuz is the type of payload aboard which Cosmonaut Komarov met his death last year.) Other similar flights may have been scheduled prior to 22 November, but were canceled; this possibility is suggested by the fact that ships intended to support such flights were deployed several months earlier.

1968 -- to Date. The Soviets have already executed two lunar-related launches this year.

On 7 February they launched a probe, probably a lunar orbiter, tasked to photograph potential landing-site areas on the Moon in which the Soviets are interested. The mission failed; the vehicle never reached parking orbit of the Earth.

Zond 4, which the Soviets launched on 2 March, was lunar-related, although its trajectory did not carry it in the direction of the Moon. It was, in fact, launched in the opposite direction. Sent into a very high trajectory, Zond 4 was probably intended to test the ability of the Soyuz-type spacecraft to withstand the heat caused by the high speeds characteristic of re-entry of the Earth's atmosphere by spacecraft returning from lunar missions. It is not known whether the Zond 4 mission was successful or not. The Soviets have been silent on its results, but this silence does not necessarily spell failure.

Coming Lunar Missions. The Soviets, if they are to maintain the momentum of their program for eventually landing a man on the Moon, can be expected to launch several more Moon-related spacecraft in coming months.

One or more lunar orbiters can be expected to be launched, to obtain photography of potential landing sites on the Moon. Two Soviet lunar orbiters launched in 1966 met with little success: Luna 12 sent back only 3 or 4 poor pictures of the lunar surface, Luna 11 none at all. Lunar orbiters launched this year would carry improved photographic systems.

One or more attempts to launch unmanned-Soyuz-type spacecraft around the Moon, for recovery on Earth, can be expected. One of these might carry a dog.

A manned circumlunar flight with recovery on Earth may be expected in the last half of the year, if all goes well with the unmanned circumlunar flights.

A report that 5 Soviet space-associated merchantmen are expected to deploy from the Baltic soon suggests that preparations for the first unmanned circumlunar flight are already getting under way.

(NORAD; CINCLANT; CIA)

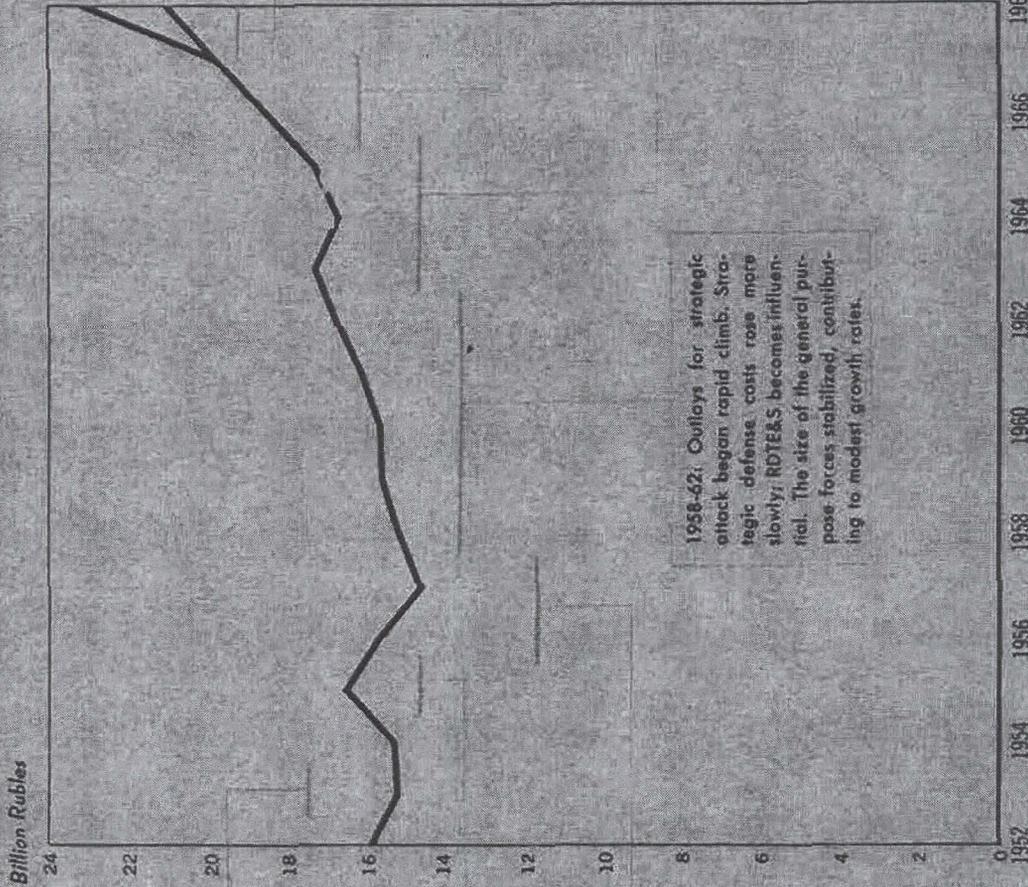
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USSR: ESTIMATED DEFENSE AND SPACE EXPENDITURE TRENDS AND UNDERLYING CAUSES, 1952-68

(CIA)



1953: Cutback from Korean War peak. Almost all cuts occurred in Soviet ground troops.

1955: Simultaneous emphasis on strategic attack (both long-range and medium bombers) and strategic defense (SA-1 system). Reduction in ground forces was temporarily halted.

1956-57: Growth rate in spending for both strategic missions slowed markedly and heavy reduction in ground forces was resumed.

1958-62: Outlays for strategic attack began rapid climb. Strategic defense costs rose more slowly; RDT&S becomes influential. The size of the general purpose forces stabilized, contributing to modest growth rates.

1963: Growth trends of 1966 and 1967 to continue. Includes upgrading of both strategic and general purpose forces programs and continued growth of RDT&S.

1964-67: Large concurrent programs in strategic attack and defense and continued growth in RDT&S.

1963-65: Marked cuts in costs of strategic attack, offset by continued rapid growth in RDT&S. Continued stability in general purpose forces.

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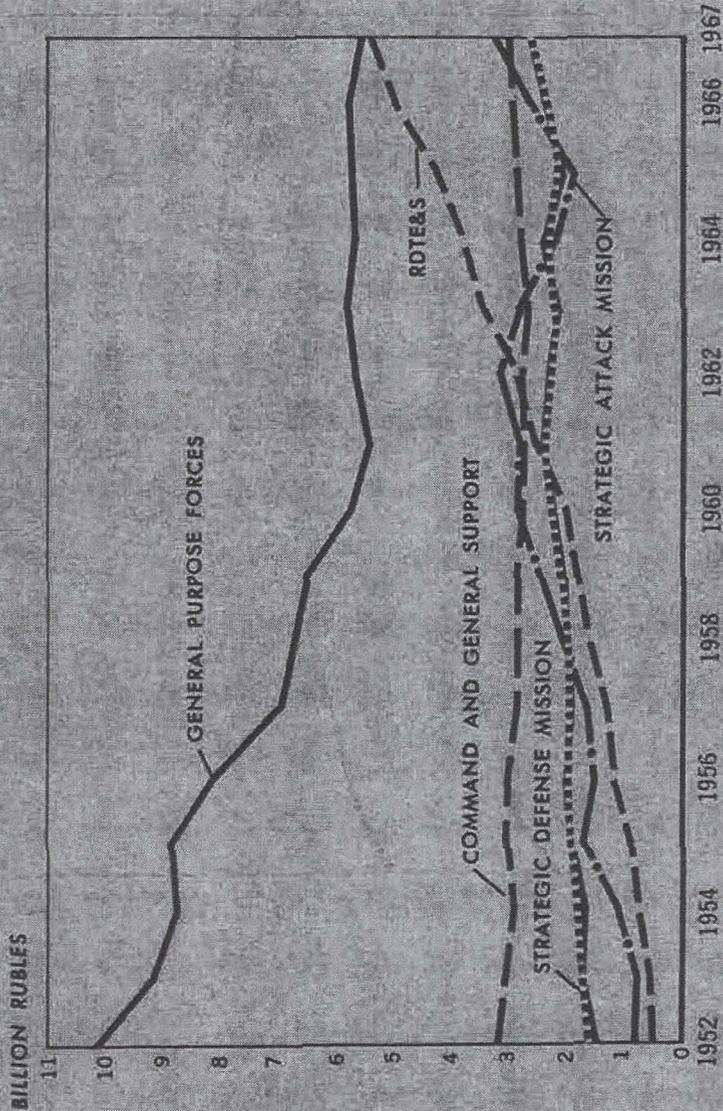
RDT&S: Research, development, test, evaluation, and space activities

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(CIA)

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USSR: MILITARY AND SPACE EXPENDITURES BY MAJOR MISSION, 1952-67



RDTE&S: Research, development, test, evaluation, and space activities

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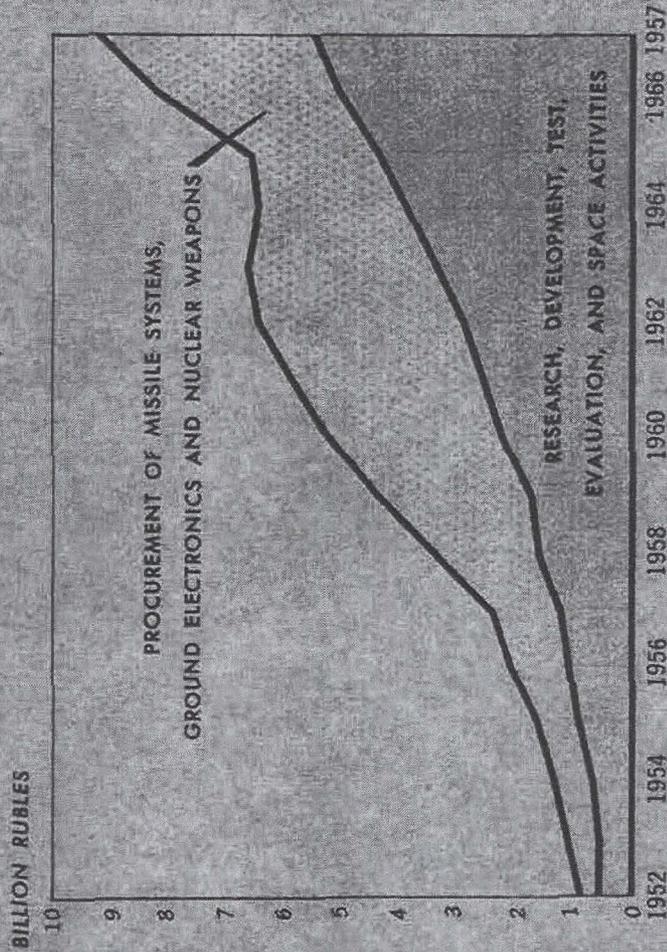
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USSR: RESEARCH AND DEVELOPMENT AND PROCUREMENT FOR ADVANCED WEAPONS AND SPACE SYSTEMS, 1952-67



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