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Soviet Military Employment of Space (U)

12 NOVEMBER 1985

PREPARED BY
U.S. AIR FORCE
AIR FORCE SYSTEMS COMMAND
FOREIGN TECHNOLOGY DIVISION

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PREFACE

(U) This study responds to a need expressed by the intelligence community for a new approach to assessment of the Soviet space threat. In the past, threat assessments have focused on the scientific and technical parameters that characterize Soviet space systems. This approach has tended to provide the US with a false sense of security, since Soviet space systems taken individually are, in general, technologically inferior to their US equivalents. The new approach undertaken by this study attempts to balance this perspective by considering the high effectiveness of Soviet space systems in their intended roles. Accordingly, this study emphasizes the actual and potential employment of Soviet space systems during real-world crises and military exercises in the context of Soviet space policy, organization, and doctrine.

(U) The authors of this study acknowledge the following individuals for their contributions: Mr. [redacted] who accomplished much of the study's preliminary research and writing, [redacted] and [redacted] who contributed Section VI (Future Soviet Space Systems Military Employment); [redacted] who provided many valuable comments and suggestions, including a thorough technical and editorial critique; [redacted] who ably and patiently managed the word processing from beginning to end; and finally the analysts of the Space Systems Division (SDS), who contributed in many ways to the study.

(U) Comments or suggestions relative to this study should be forwarded to the Defense Intelligence Agency, ATTN: DT-4D, Washington, D.C. 20301.

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SOVIET MILITARY EMPLOYMENT OF SPACE (U)

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SUMMARY

(U) Since the launch of Sputnik 1 on 4 October 1957, the USSR has shown an extraordinary commitment to the exploitation of space for political and military purposes. This study illustrates the character and achievements of Soviet space operations. The exploitation of space is consistent with Soviet policy and unified military doctrine, which calls for an integrated effort of all forces to achieve Soviet objectives. Soviet military doctrine has been closely related to major technological developments, such as tanks during World War I and nuclear-tipped missiles in the late 1950's and early 1960's. The development of space-based directed energy weapons may inspire a new Soviet military doctrine in the future. Soviet statements and actions suggest that their programs of disinformation, promotion of treaties in their self interest, and space weapons development are all aimed at ensuring Soviet preeminence in space.

(S) Almost all levels of the Soviet hierarchy that are involved in strategy and tactics are affected by space technology or are involved in its development and use. The Main Intelligence Directorate (GRU) of the General Staff is a key element in all aspects of space intelligence operations. Some elements of the Strategic Rocket Forces, National Air Defense Forces, and Soviet Navy are generally subordinate to the GRU in matters of spacecraft operations.

~~(S REL UK, Canada, and Australia WNINTEL)~~ The close involvement of high-level Soviet leadership and the General Staff with space exploitation has led to a massive commitment of resources to the program. The three major missile and space test centers at Tyuratam, Plesetsk, and Kapustin Yar have a large number of launch pads, transporters, checkout buildings, storage and assembly buildings, and other associated space launch equipment.

~~(S REL UK, Canada, and Australia WNINTEL)~~ Two new space launch vehicles are currently under development. These systems have potential applications for launching reconnaissance spacecraft, space weapons, large manned space stations, and planetary probes.

(S) Significant Soviet resources have also been devoted to the development of an extensive space mission control network. The network is constantly updated and expanded to take advantage of new signal and computer technology for more secure and efficient spacecraft control. For example, relatively recent improvements include the use of low probability of intercept (LPI) techniques, high data rate transmission equipment, high gain antennas for deep-space and weak-signal applications, and precision tracking capability.

(S) In many ways the Soviet space program reflects differences between the US and Soviet approaches to major endeavors. The most notable differences pertain to the types of engineering and operational techniques applied. Soviet spacecraft, in general, are physically sturdy and heavy, somewhat less sophisticated than US counterparts, but nevertheless fully capable, reasonably reliable, and very useful. In total, the spacecraft comprise a balanced fleet including weapons, reconnaissance and targeting, indications and warning, communications, weather, navigation, and various other support spacecraft.

(S) Currently, the Soviets launch about 110 to 125 spacecraft per year; 95 percent of these spacecraft are military-related, and support many different military functions. Figure S-1 displays which space systems are used by the Soviet hierarchy to support the five military functions: force application; reconnaissance and targeting; indications and warning; command, control, and communications; and support. As an example, the only Soviet military organizations directly involved with the use of the ASAT are the Leadership/Supreme High Command and Air Defense Forces. As another example, Figure S-1 shows that every level of the Soviet military hierarchy can use communication satellites to establish command, control, and communications (C^3) between forces.

(S) Currently, the Soviets have the world's only operational antisatellite (ASAT) system. While its design imposes certain limitations in altitude and responsiveness, it nevertheless poses a threat to US low altitude satellites. Its primary purpose is assessed as enabling attack against high-priority US spacecraft, most likely reconnaissance satellites. Such an attack would be of highest utility during a period of tension just prior to an outbreak of either conventional war or theater nuclear hostilities. In such a situation, for example, the ASAT could be used to deny the US its use of satellites to update the Strategic Air Command (SAC) on the location of mobile anti-air defenses in the Soviet Union. It is believed that the current Soviet ASAT system would have little value after the start of a general nuclear war, since the ASAT launch pads would probably have been destroyed during the initial phases of the conflict.

(S) The Soviets have extensive experience in the use of space for reconnaissance and targeting. The Soviets are currently developing an Imaging Satellite (IMSAT) system to further enhance this capability. Photoreconnaissance is used primarily for strategic target planning, as shown by the preponderance of US

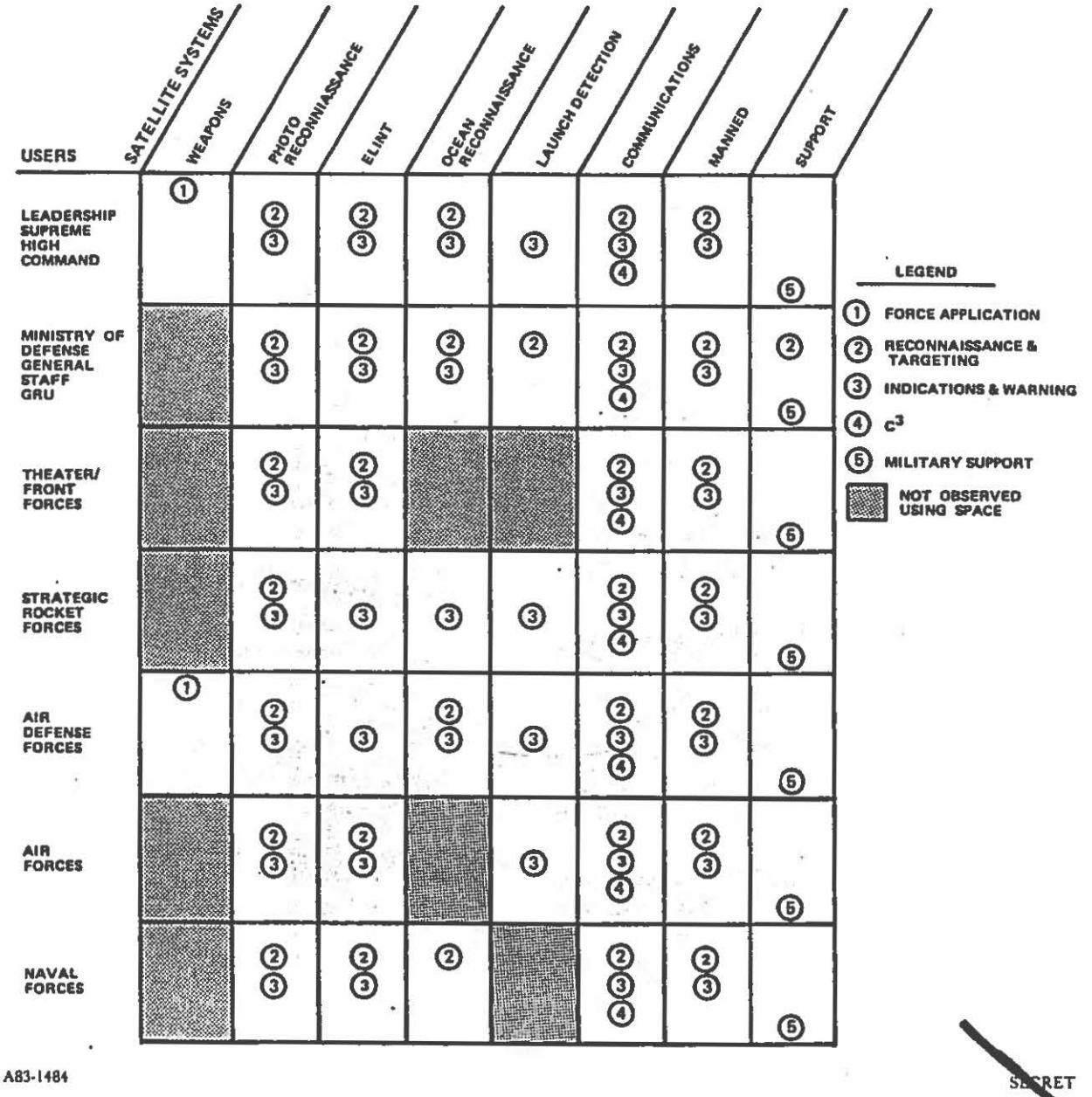


Fig. S-1 (U) Satellites and Their User Organizations

strategic facilities targeted in their photo operations. Mapping and data derived from imagery are widely used in military planning. Electronic intelligence (ELINT) satellites also contribute to strategic and tactical targeting.

(S) Ocean surveillance satellites provide comprehensive coverage of broad ocean areas for Soviet naval reconnaissance and targeting. They constitute one of the greatest threats to the US posed by the Soviets' entire space program. As an example of their possible utility, Figure S-2 graphically depicts how the Radar Ocean Reconnaissance Satellite (RORSAT) and ELINT Ocean Reconnaissance Satellite (EORSAT) could provide most of the tracking by the Soviets of a US carrier battle group transiting from Norfolk to the United Kingdom. As the group approaches the European landmass, Soviet land-based and ship-based reconnaissance aircraft become more effective. In wartime, with the attrition of patrol aircraft and ships in battle, space assets could become the major source of targeting data.

(S) Just prior to the outbreak of hostilities, Soviet combined arms strategy would team naval and space forces in order to defend the homeland and strategic assets. Among these strategic assets would be submarines, many of which would seek refuge behind the Greenland-Iceland-United Kingdom Gap and in the Northwest Pacific Basin. Protected by barrier forces of attack submarines, cruise-missile equipped ships, and carrier-based aircraft, space-based targeting would be used to defend against approaching US carrier battle groups and antisubmarine forces.

(S) In 1981, the network of Soviet early warning satellites in Molniya-type orbits reached initial

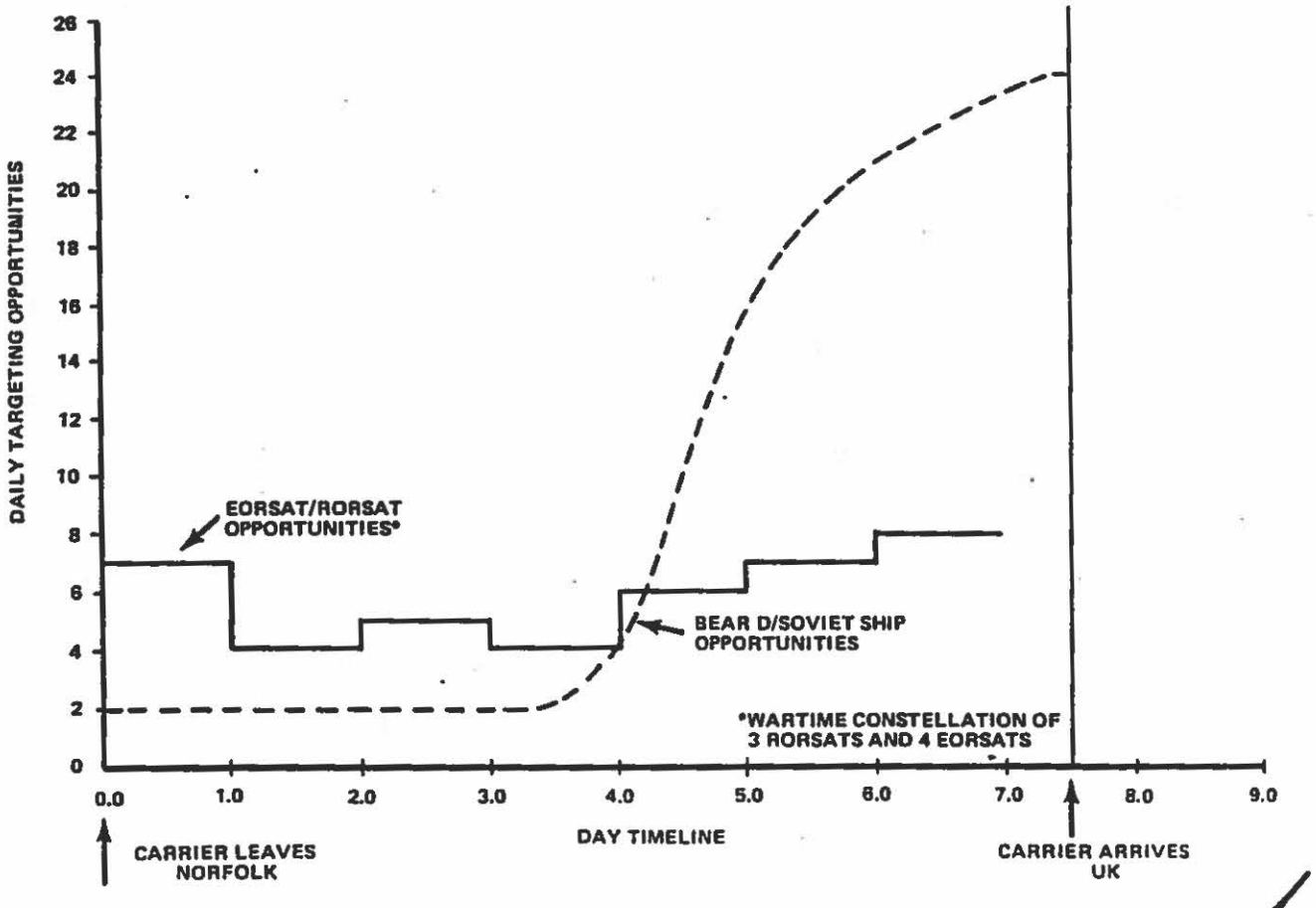


Fig. S-2 (U) Targeting Opportunities

operational capability. This infrared-sensing, missile-launch detection system provides 24-hour surveillance of the US Intercontinental Ballistic Missile (ICBM) fields. It would probably be a major input to any decision to go to war with the US. In 1984, the Soviets began tests of geosynchronous LDS-2 satellites that may, in the future, provide warning of sea-launched ballistic missile (SLBM) launches. [redacted]

(S) The Soviets' manned space program has shown a steady evolutionary growth since the early 1960's. The only known deviation from their planned goals was the failure and subsequent cancellation of their manned lunar program in the late 1960's. That failure was followed by a redirection of their program that resulted in a series of major successes for their manned space program, centered about the Salyut Space Station. The Soviets began flights of the Salyut vehicle in 1971 and have now successfully orbited seven of these 19,000 kg spacecraft. In 1977, the Soviets began to resupply the Salyut space stations with propellants and other equipment, thus increasing the useful lifetime of each to five years. Using the Soyuz-T spacecraft to transport men and the Progress vehicle to ferry fuel and supplies, they have built an impressive record for manned presence in space. As of 31 December 1984, Soviet cosmonauts have accumulated over 3,691 man-days in space, almost three times the US total (1294). The record for consecutive days in space is 238, an achievement attained in 1984 by a team of three cosmonauts. The US record for continuous manned presence by one crew is 84 days, set during the US Skylab program.

(S) Satellites are part of the vital political and military communications links of the USSR. The Soviets maintain about 24 overt communications satellites in orbit and have filed with the International Frequency Registration Board (IFRB) for about 28 more. Approximately 24 covert satellites support government leadership and intelligence communication requirements. The widespread use of communication satellites is attested to by the proliferation of communication satellite ground stations throughout the Soviet Union, including a large number of mobile types deployed with Soviet forces. The fixed and mobile COMSAT terminals together provide a reliable communications medium in addition to cable, troposcatter, high-frequency radio, and microwave.

(S) A number of Soviet satellites provide important support functions to military forces. Meteorological satellites provide weather updates for targeting and deployment. Navigation satellites provide timely position fixes to ships and submarines with a circular error probable less than 100 meters for stationary users. Aircraft may also have the capability to use navigation satellites in the future. Calibration satellites regularly test and exercise the ability of Soviet ground-based radars to conduct anti-ballistic missile operations and to track and command other satellites.

(S) In summary, satellites provide a wide variety of services to the Soviet leadership and military hierarchy. In some cases, space is the best medium from which to conduct these services. In other cases, satellites effectively complement terrestrial equipment and forces. The pervasiveness of space systems in many areas of Soviet military employment is evident. The widespread application by the Soviets of space systems to military operations requires a corresponding effort by the intelligence community to understand Soviet space doctrine and employment. This study systematizes part of the growing body of knowledge about how the Soviets employ military space systems, particularly from the perspective of integrated asset usage. The purpose is to aid US and Allied planners, operators, and commanders to respond effectively to the Soviet challenge in space.

(S) The study begins with a scenario that traces the course of a hypothetical world conflict, starting with political and economic tensions, moving to conventional war and ultimately to general nuclear war. During the stages depicted in the scenario, satellite operations provide the Soviets with definite warfighting capabilities. In the section that follows the scenario, Soviet military doctrine and history are examined to ascertain Soviet intentions in space. The third section of the study is a detailed exposition of what is known about Soviet employment of space systems. This section is organized around the five military functions, with a focus on the users of space systems. The fourth section illustrates Soviet military employment of space during military exercises and real-world incidents. The fifth section outlines the composition of Soviet space systems networks during war and peace. The last two sections address future Soviet space systems and utility and dependency of Soviet space systems, respectively.

SECTION I

INTRODUCTORY SCENARIO (U)

[redacted]

• (U) Pro Leftist groups inspire worldwide anti-US demonstrations. North Korean troops are strengthened along the demilitarized zone (DMZ). Oman is threatened by Middle Eastern neighbors. Iran blockades the Straits of Hormuz. Soviet-inspired terrorists sabotage oil production and storage facilities in Saudi Arabia, Oman, and Kuwait. The US deploys a task force to protect vital American interests.

[redacted]

[redacted]

• (U) Soviet overflights, military mobilization, and a general threatening posture prompt the US to increase readiness and begin reinforcement of selected overseas Army units and the Sixth Fleet. Civil defense, war reserve, and emergency energy conservation plans are implemented. The US draft is instituted.

[redacted]

• (U) **February 20**—Soviet naval and air planners use data from METSATs to plan for wartime operations.

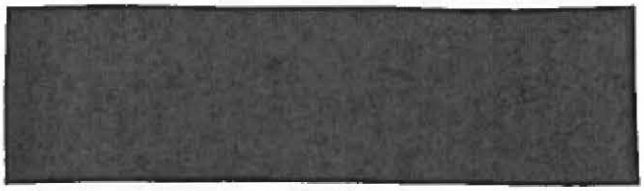
• (U) **February 23**—Soviet, Bulgarian, and Hungarian forces invade Yugoslavia in response to destabilizing effects of Yugoslav separatist movements. Warsaw Pact members mobilize, and the Soviets strategically position ships and amphibious craft. Photo satellites are launched every 4-5 days with film returned every 4 days.

[redacted]

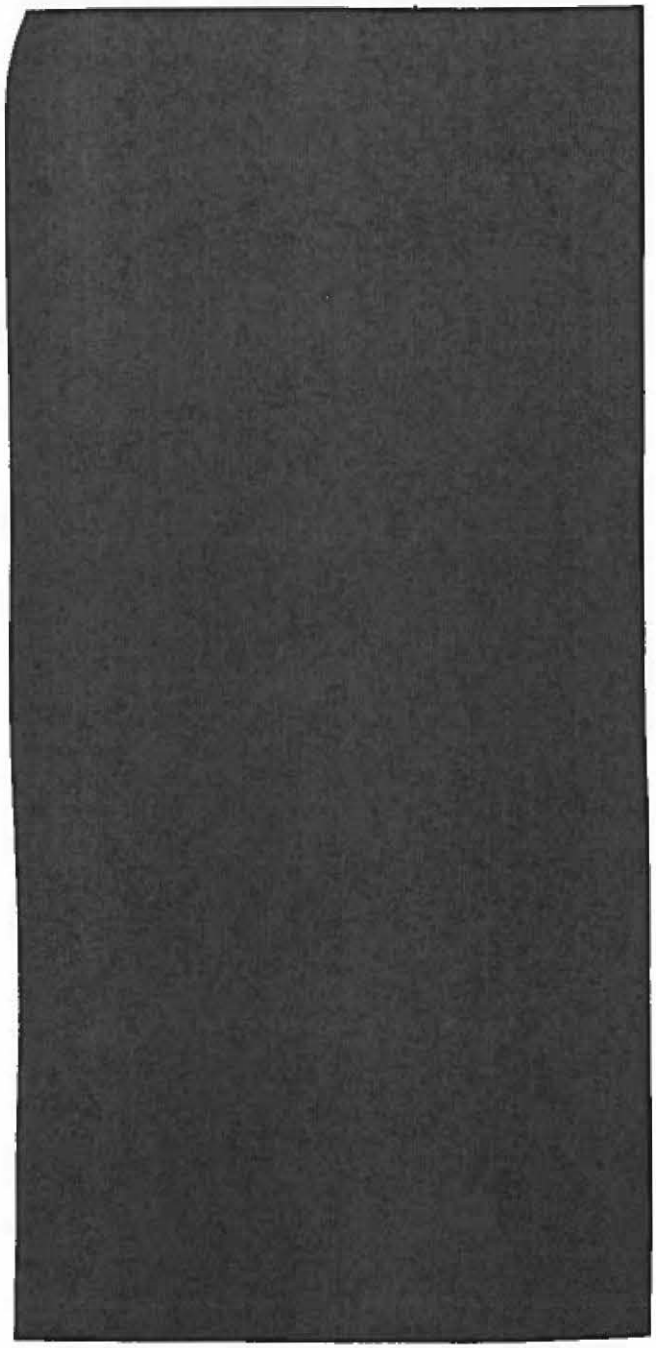
[redacted]

• (U) **March 15**—NATO and Warsaw Pact forces exchange gunfire along the border between East and West Germany. Soviets implement wartime systems to process photoreconnaissance data and disseminate results quickly to Front Commanders.

[redacted]



• (U) **March 19**—The US calls for withdrawal of Soviet forces from West Germany. Soviets employ METSAT derived and other weather data to predict upper airflows for nuclear strike planning.



• (U) **May 30**—Warsaw Pact Forces are occupying mainland Europe. Official peace initiatives are exchanged via the US-USSR Hotline employing Gorizont and Intelsat satellites. Soviet negotiators operate from the alternate command center outside Moscow.

• (U) **June—UHF-VHF radio communications are slowly restored as equipment is repaired and communication links are reestablished.**

• (U) **Just as the Soviets' satellites performed important functions during hostilities, their surviving space assets continue to be a valuable resource as the nation rebuilds.**

[redacted]

SECTION II

SOVIET INTENTIONS IN SPACE (U)

(S) Soviet intentions in space are assessed to reflect primarily military influence. Despite their repeated claims of peaceful uses of space, the Soviets consider space to be simply another arena through and in which future wars will be fought. They intend to gain the capability to control space during times of conflict and operate in space to accomplish objectives in the following mission areas: force application; reconnaissance and targeting; indications and warning; command, control, and communications; and support. These intentions can be discerned by examining Soviet policy and doctrine, the evolution of their space program, the organizational structure for the production and use of space intelligence data, and by investigating the nature of their employment of space vehicles. This section discusses doctrine and policy, program evolution, and organizational structure that illustrate a perspective of Soviet intentions in space and provide a background for subsequent discussion of Soviet space operations. Section III addresses Soviet employment of space vehicles.

1. Soviet Military Doctrine and Policy (U)

(U) Current Soviet military doctrine emphasizes strategic nuclear warfare using long range ballistic missiles. In the future, if directed energy (DE) weapons become sufficiently developed, Soviet military doctrine may change to advocate the use of directed energy weapons from spacecraft as well as from other platforms. From this perspective, the Soviets' intent for their various military forces can be summarized as urging the integrated use of spacecraft in their operational art to achieve co nmon force objectives.

(U) Because Soviet milit y terminology often has a meaning different from that used in the West, definitions of fundamental terms are presented first. This is not a comprehensive treatment of Soviet military concepts; rather it provides explanations as necessary for this study. Next, military doctrine, policy; and military art are discussed in terms of their relevancy to space.

1.a. Definitions (U)

1.a.(1) Soviet Military Doctrine (U)

(U) Soviet military spokesmen state the Soviet Union has developed a unified military doctrine possessing both political and military-technical aspects. This concept of military doctrine, which was described by M. V. Frunze in 1921, who later became Chief of Staff of the Red Army, remains current today. Many Soviet writers have since more fully defined the term, but essentially all definitions remain the same. Marshal N. V. Ogarkov, former Chief of the Soviet General Staff, wrote about military doctrine in 1982 using almost the same words that Marshal A. A. Grechko, former Minister of Defense, used in 1975. Specifically, military doctrine was described by these prominent Soviet leaders as:

> "... a system of views adopted by a given state at a given (certain) time on the goals and nature of a possible future war and the preparation of the armed forces and the country for it, and also the methods of waging it."

(U) Marshal Ogarkov continued by stating that military doctrine answers several questions, among which are:

What enemy will be faced?

What will be the nature of the war?

What armed forces will be needed?

What weapons will be used?

1.a.(2) Policy (U)

(U) Policy is not a Russian term. However, the term can be applied to the Soviets to define the following concept:

> A semi-official course of action adopted and followed by a government or institution not because of doctrine, but because of individual organizations, or other parochial pressures.

(U) Although high-level policy can precede doctrine, a more narrow view is taken in this study by attributing Soviet developments in space to a space policy. That is, there is a space policy which provides the guiding philosophies for the use of space by the Soviet military services to accomplish their respective functions, objectives, and missions.

1.a.(3) Military Art (U)

(U) Military art is comprised of strategy, operational art, and tactics:

- Soviet Strategy (U)

(U) Strategy for Soviet forces is common to and unified for all branches of the country's military forces in that war is waged not by any one service or branch of the Armed Forces but by the combined efforts of all elements. The positions of military strategy are common, both for waging war as a whole and for conducting strategic operations, while taking into account the actual conditions or circumstances in different Theaters of Military Operations (TVDs). Paraphrasing from a 1979 book by Admiral Gorshkov, CINC Soviet Navy, the single Soviet military strategy can be defined as:

> The consolidation of all components of the military might of the state so that, in solving one task or another in correspondence with circumstances, the organic whole will be significantly bigger than the simple sum of its parts.

- Operational Art (U)

(U) Paraphrasing statements from the Soviet *Officer's Handbook* and Marshal Ogarkov, operational art can be defined as:

> The resolution of problems associated with preparing for and conducting joint and independent combat actions by operational formations of the services of the Armed Services in accordance with overall strategic design and plans within individual TVDs.

- Tactics (U)

(U) The tactics of all Services of the Armed Forces have an inherent diversity of forms and methods for combat operations. Tactics can be defined as:

> The resolution of problems associated with preparing for and conducting combat operations by subunits, units, and formations of all the branches and Services of the Armed Force on land, in the air, and at sea.

1.b. Soviet Military Doctrine (U)

(U) Since the Russian Revolution in 1917, two new Soviet military doctrines have evolved. The first occurred in the 1920's, and the second around the early 1960's.

(U) In the 1920's the Soviet leadership concluded that to fight future wars successfully they would need forces capable of breaking through enemy lines and penetrating deeply to destroy reserves and supplies. The Soviets witnessed the introduction of two new weapons during World War I that would make such deep operations possible—tanks and aircraft. Although the requirement for tank and aircraft production was not announced as a new "military doctrine," it would have been just that in Soviet terminology today. This "doctrinal" decision, made by the Party leadership, formed the basis for the Five-Year Plans which were designed to develop the industrial base required to build tanks and aircraft (and also artillery to provide the necessary fire power support).

(U) Both Party Secretary Khrushchev in 1960 and Minister of Defense Marshal Malinovskiy in 1961 explicitly stated a basic premise of Soviet military doctrine which holds that any major future war would be unleased by the "imperialist aggressors" and would take the form of a nuclear rocket war. This and other similar statements resulted in the Soviet "nuclear missile doctrine," a doctrine only slightly modified since that time.

(U) Minister of Defense Marshal Zhukov, in an address to the 20th Party Congress in October 1956, stated:

> "Future war, if it is unleashed, will be characterized by the mass use of air forces, various rocket weapons and various means of mass destruction such as atomic, thermonuclear, chemical, and bacteriological weapons . . . "

(U) Also, a similar view was expressed by Party Secretary Khrushchev in an interview in the late 1950's, wherein he stated:

> "If a war is now loosed by aggressive circles of the United States, it . . . will immediately be extended to the territory of the United States, because intercontinental ballistic missiles now afford the capability of striking targets in any region of the globe."

(U) Soviet doctrine is believed to drive the technology necessary to implement weapons systems. The Soviet doctrine relating to the decisive nature of nuclear weapons was probably already in effect by 1956-1957. The statements of Marshal Zhukov and Party Secretary Khrushchev pointed in that direction. However, it was not until the early 1960's that these concepts were assimilated as military doctrine by the Soviet leadership. The 1960's doctrine of nuclear warfare remains the basis of Soviet military thought, although it was modified in the 1970's to recognize the importance of conventional forces. An understanding of Soviet doctrine relating to space must be acquired from this basic doctrine plus current Soviet policy on their space program.

(U) In reviewing the development of Soviet doctrine, two common factors are noted. First, concepts of

future wars were used to stimulate production and preparation for war using force application weapons that were still in the early stages of development. In other words, doctrine caused military art to mature and foster development of new types of weapons, i.e., tanks and aircraft in the 1920's and nuclear missiles in the 1950's. Second, when force application weapons fostered a new major military doctrine, they usually represented a quantum leap over those war-fighting capabilities current at the time, especially in terms of surprise, deep operations, and scope. (Deep operations involve penetrating the enemy's defenses until their reserves can be engaged and destroyed, whereas scope includes not only number of weapons, but also the concept of fewer weapons with enough power to be sufficient for the mission.) These same factors are expected to be found in an enhanced form when the next new major doctrine is observed. Note that the use of a medium of warfare such as space, air, land, or sea is not the basis for new doctrine but that new weapons represent the new foundation.

(U) Space is not a known documented element in current Soviet military doctrine, although space assets are fully integrated into Soviet military strategy and operations. What form could a new doctrine take in the future and will space be involved in that doctrine? One major breakthrough that would represent a quantum leap over nuclear missiles as an offensive force-application weapon (such as the quantum leap represented by the tank over the foot soldiers, or the intercontinental ballistic missile over long-range aircraft) would be the development of a directed energy (DE) weapon. Current technological assessments suggest that both ground based and airborne high energy laser (HEL) weapons systems in the Soviet Union have advanced to the prototype testing stage. In addition, ground mobile air-defense weapons are at a similar stage of development. None of the systems mentioned above have any major technical limitations that would impede their deployment. The applicable technology to be used is proven, and so the only thing keeping the Soviets from deploying HEL weapons seems to be the time required for systems integration. When the Soviets begin to deploy HEL and other DE weapons, they will do it in a manner designed to integrate the newer systems with the old. If a DE offensive weapon with the capability to inflict battlefield damage (1) without prior warning (surprise), (2) on the enemy's reserve forces (deep operations), and (3) simultaneously over a wide area (scope) were to be developed, a new corresponding doctrine could possibly also evolve.

(S/NOFORN/WNINTEL) Considering the three characteristics discussed above, plus the line-of-sight restrictions on DE weapons, one platform ideally suited for DE weapons deployment would be a spacecraft. [redacted] The rapid rate of construction and the estimated size of the facility indicate a very high priority project. Since 1979 a large increase in the level of effort devoted to all aspects of HEL development has also been noted.

(S) Thus, if DE weapons prove feasible, a new Soviet doctrine based on DE weapons is possible sometime in the near future. At that time, such a new doctrine might include a statement similar to the following: War in the future will include spaceborne, airborne, and ground-based DE weapons capable of destroying spacecraft in orbit, strategic missiles during their powered flight, elements of the enemy's front line, and the deep reserves and supplies of the enemy. This hypothetical new doctrine is listed in Table II-1 along with the 1920's and 1960's doctrines for comparison.

(U) Certain points about past Soviet practices are worth noting:

(1) (U) Having made the doctrinal decision in the 1920's to concentrate on tanks and aircraft and to use artillery for fire support, the Soviet Air Forces had squadrons of four-engine bombers by the mid-1930's, long before the United States Army Air Corps had aircraft of a comparable type. Also, their tank production in the 1930's was several times that of the United States.

(2) (U) In the early 1960's, statements about nuclear concepts made by Party Secretary Khrushchev, Marshal Zhukov, and his successor, Marshal Malinovskiy, were largely ignored by the West because it was then apparent that the Soviet leaders did not have the usable and deployed nuclear forces required to support their military doctrine. However, one fact was overlooked: Soviet military doctrine is concerned with *future* military forces, and thus provides the guidelines for the further development of weapons systems and military organizations. By the late 1960's it was recognized that the doctrine, which was formulated some time in the mid-1950's, was rapidly being implemented.

(3) (U) If the Soviet leadership today believes that directed-energy weapons can be developed to operate in both defensive (for example, ABM) and offensive roles and that they can best be deployed in space, then it is prudent to assume that the possibility of a new military doctrine is already being studied. This decision would be made by the Soviets' Defense Council, which is headed by the Party Secretary. If the decision were made that this new weapon and the spacecraft that carried it would be the decisive weapon in event of a future war, doctrine would be changed or modified accordingly and with the greatest possible secrecy. Almost certainly, the doctrine would not be announced before

TABLE II-1

(U) MAJOR MILITARY DOCTRINES AND RELATED FACTORS

DOCTRINE	FORCE PROJECTION WEAPON		WAR FIGHTING CAPABILITIES		
	FORCE ELEMENT	DEPLOYMENT PLATFORM	SURPRISE	DEEP OPERATIONS	SCOPE
(1920's) War would be fought with forces capable of breaking through enemy lines and penetrating deeply to destroy reserves and supplies.	High explosive warhead	Tank	Yes	Yes	Yes
(1960's) War in the future would take the form of a nuclear rocket war.	Nuclear warhead	ICBM IRBM SLBM GLCM ALCM	Yes	Yes	Yes
(Future) War in the future would include the use of directed energy weapons.	Directed energy	Spacecraft Aircraft Tank Ships	Yes	Yes	Yes
			Decisively significant only if optimally deployed		

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its initial implementation or prior to any effort by the US in the same field. It would probably be announced at a later date to make sure the new doctrine was known by all echelons. Undoubtedly the announcement would say, in part, that their doctrine was in response to war-like initiatives by the "imperialist aggressors."

1.c. Soviet Space Policy (U)

(S) The space policy of the Soviets can be inferred, to a certain extent, from what they are known to be doing. However, that inference would have included speculation because not all they do can be observed. Certainly, two policies that impact their space program include requirements to incorporate space assets into Soviet military art and to use these assets to support the General Staff (GS) and the GRU. It is also speculated that it is Soviet policy to ensure that, when space is used for weapons deployment, the USSR will achieve preeminence.

1.c.(1) Incorporate Space Assets Into Military Art (U)

(S) Strategy involves all the joint services of the Armed Forces applying their operational art and tactics to achieve a single objective in a TVD. To accomplish this objective, the services have various military assets that can be used. For example, naval, air, and ground forces can use aircraft in their operational art. Likewise, spacecraft can be also used if appropriate. However, since there is no Soviet Space Force at the present time, all military-related spacecraft can be considered as used by either the Armed Services to further their operational art or by other governmental organizations, chiefly the Main Intelligence Directorate of the General Staff (GRU), to support their functions.

[redacted]

(U) Soviet operational art refers to operational formations of the Armed Services, while tactics apply to combat operations of specific Services. Thus, operational art and tactics cannot be directly related to spacecraft use because, as already noted, there is no Soviet Space Force. Instead, spacecraft are used by the various Armed Services as part of their operational art and possibly in their tactics.

1.c.(2) Achieve Preeminence in Space (U)

(S) Interpretation of observed data and events suggest that the Soviets might take one or all of the following avenues to implement the hypothetical policy stated above:

- Deny the US the use of space for weapons deployment by treaty.
- Deny the US the use of space for weapons deployment through disinformation and propaganda.
- Pursue hardware development projects that will result in superior Soviet spaceborne weapons.

Each of these is discussed below.

(1) By Treaty (U)

(U) The Soviet objectives in signing a treaty with the US would be to preclude, terminate, or at least slow US development, production, or introduction of weapons into space while, at the same time, not seriously limiting their own efforts. Several proposals and negotiations have transpired over the past 25 years regarding spaceborne weapons.

(U) In August 1957, the first proposal to preclude the introduction of weapons into space was introduced by the West as part of a partial disarmament suggestion. The USSR, however, did not accept those proposals because it was about to orbit its first satellite. Perhaps the Soviets had not yet clarified their policy on space at that time, or the Soviets did not want to have treaties hindering the development of their own space program.

(S) In 1963 Foreign Minister Gromyko told the General Assembly of the United Nations that the Soviet Union wished to conclude an agreement prohibiting any objects which carried nuclear weapons from space. That same year, US Ambassador to the UN Adlai Stevenson stated that the US had no intention of orbiting weapons of mass destruction. However, the USSR had their fractional orbit bombardment system (FOBS) in development at that time. In 1967 the Outer Space Treaty, signed by almost 90 countries including the US and USSR, prohibited the orbiting of nuclear or any other weapons of mass destruction. Possibly, in the Soviet view, the FOBS did not violate the 1967 treaty because FOBS would not be stored in orbit nor would it carry a nuclear warhead while undergoing test in orbit. The West did not formally protest the FOBS development program as a violation of the treaty.

(S) More importantly, the Outer Space Treaty did not address the development or testing of antisatellite (ASAT) spacecraft. Although Soviet ASAT subsystem tests had occurred in 1963 and 1964 under the guise of the Polyot-series R&D program, the ASAT spacecraft itself was not tested until 27 October 1967, 17 days after the US ratified the Outer Space Treaty. Possibly, the Soviets did not want to complicate the treaty by conducting an ASAT test during the negotiations.

(S) The next set of negotiations involving space were held in 1978-1979, and concerned ASAT. Nothing substantial emerged from the three sets of talks which primarily attempted to define activities performed by spacecraft that were either "unlawful" or "hostile." These talks took place while the US began development of the Miniature Homing Vehicle (MHV) and the USSR was working on a new acquisition sensor for their ASAT. In these talks the Soviets wanted to include the US Space Transportation System (STS) as a possible ASAT weapon with the hope of eliminating or delaying US development efforts of that system.

(U) In 1981 the Soviets made a proposal to the UN to ban the introduction of weapons into space. The Soviets' proposal at that time probably reflected their awareness of growing support within the US for space weapons and Soviet determination to slow US efforts by treaty.

(U) In August 1983, General Secretary Andropov proposed the banning of any test, deployment, or use of space-based weapons intended to hit targets on the Earth, in the atmosphere, or in space. That proposal would ban the United States' MHV currently in developmental testing and would impact unfavorably on President Reagan's Space Defense Initiative which was announced in March of that year. In August 1984, the Soviets submitted another treaty to the UN; it would ban ground-based attacks on space objects, as well as other actions banned by the two earlier treaties.

(2) Propaganda (U)

(U) An important Soviet objective would be to deny the US use of space weapons by subverting the will of the US citizenry who in turn would force termination of funding for such a project by the US Congress. In a recent example, the effectiveness of Soviet disinformation techniques was demonstrated. In testimony before a House Intelligence Subcommittee, a CIA official related how extensive efforts and some $200 million were expended by the Soviets, mostly during a 10-month period beginning in June 1977, on propaganda and covert campaigns against NATO deployment of enhanced radiation (neutron bomb) weapons (ERW). These actions contributed heavily to cancellation of the ERW program in 1978.

(3) By Hardware Development (U)

[redacted]

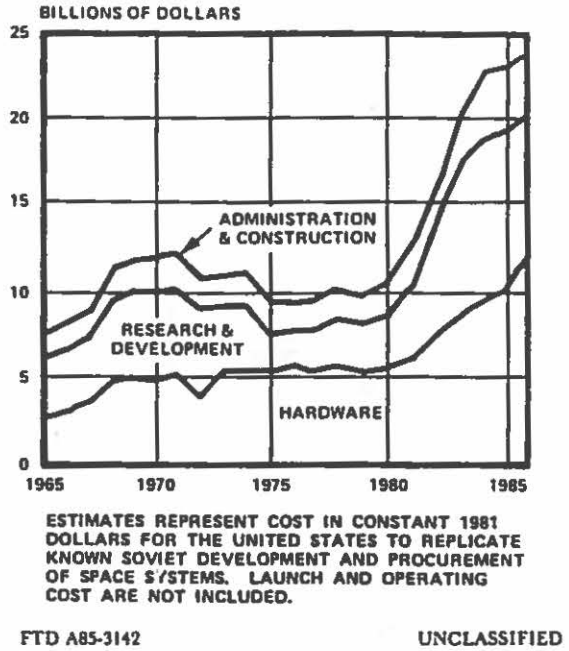

Fig. II-1 (U) Estimated Dollar Costs of the Soviet Space Program

2. Program Evolution (U)

(U) The Soviet space program is believed to be unequivocally oriented towards performing military missions and functions. If data permitted a thorough examination of the amount and specific application of resources spent on the Soviet space program, a good picture of Soviet intentions in space would emerge. An estimated annual dollar cost of the Soviet space program is available (Figure II-1). A sense of the direction of their space program can be obtained by examining resource-related material in relationship to where the Soviets are placing emphasis. These factors should provide a good indication of Soviet military intentions in space.

[redacted]

(U) Another measure of Soviet investment in their space program is the annual number of milltary and civil-related space launch attempts shown by Figure II-3. The figure illustrates that a major portion of resources allocated to launch support, launch vehicles, and spacecraft are military related.

[redacted]

[redacted]

(U) Finally, Soviet military intentions in space can be deduced by examining the military-related milestones of their program. These milestones are presented in Table II-2.

3. Organization (U)

[redacted]

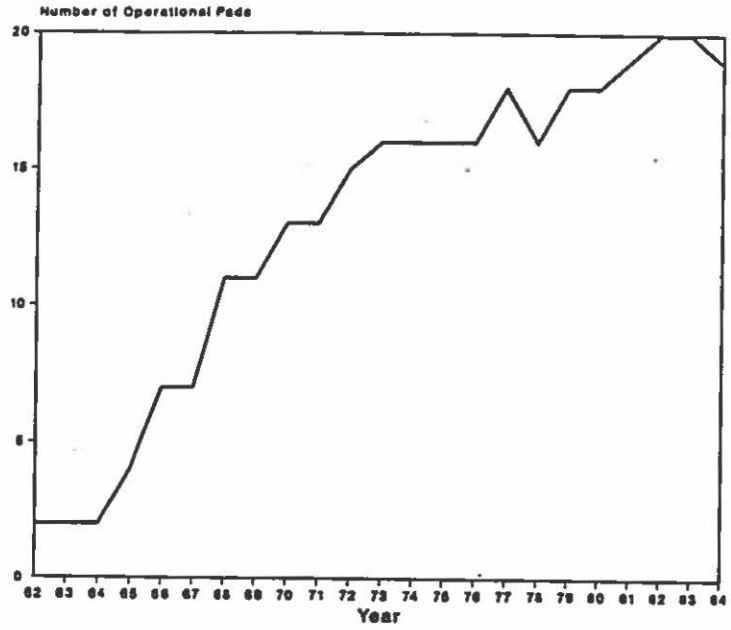

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Fig. II-2 (U) Number of Operational Space Launch Pads

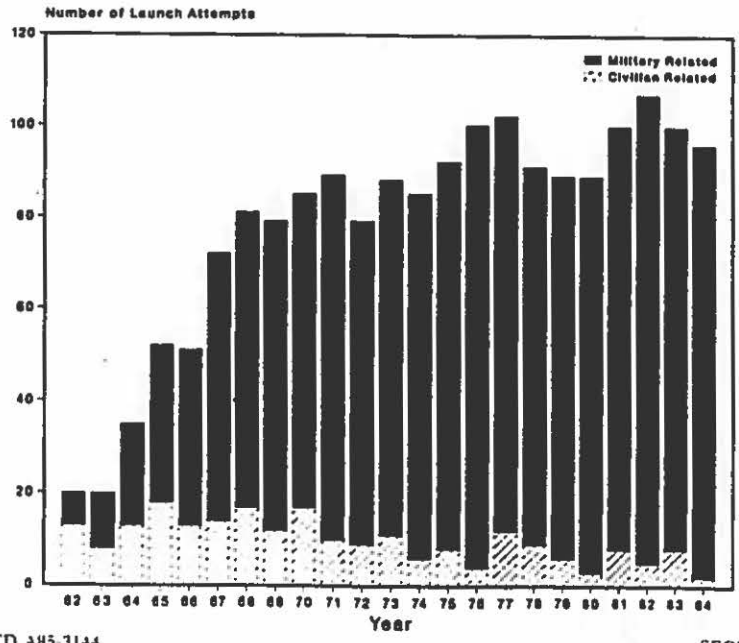

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Fig. II-3 (U) Annual Soviet Space Launch Attempts

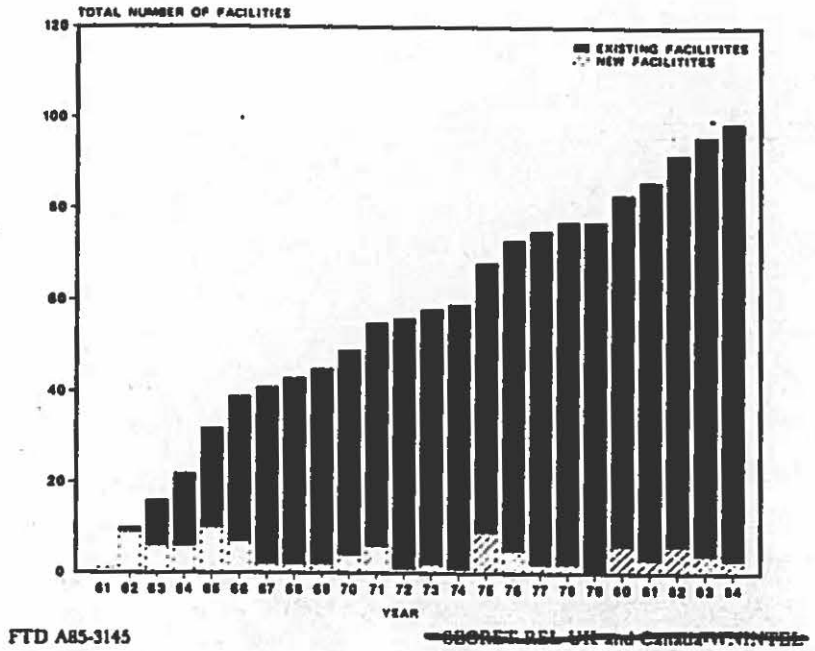


Fig. II-4 (U) Soviet Command Site Deployment

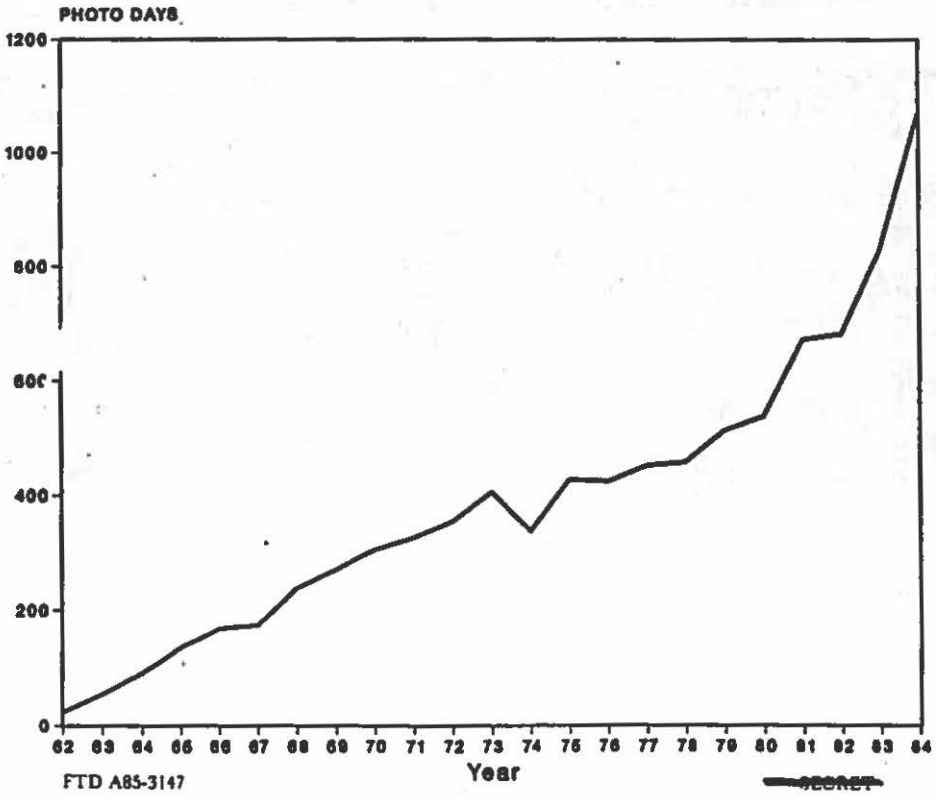


Fig. II-5 (U) Total Annual Satellite Photo-Days

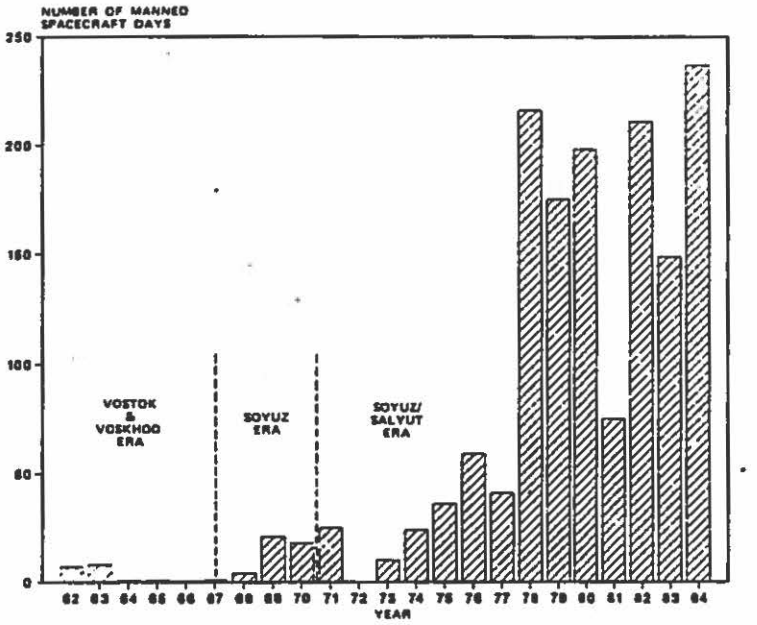


Fig. II-6 (U) Number of Days in Each Year that Soviets had a Man in Orbit

(U) Overall control of the Soviet space program is exercised by the Communist Party through its Central Committee and ruling Politburo. The degree of personal involvement of the top decision makers depends on their interests and discretion. As an example, Nikita Khrushchev was a space enthusiast and involved himself intimately with the space program; and the Soviet newspaper *Red Star* reported Leonid Brezhnev's presence at the first Sputnik launch.

[redacted]

3.a. National Authorities and the Space Program (U)

(U) The Communist Party of the Soviet Union (CPSU) leads and directs Soviet society; the Soviet government implements the directives of the CPSU. At the head of the CPSU is the Politburo of the Central Committee, and at the head of the governmental side is the Presidium of a parliamentary body called the Supreme Soviet. Party members hold key posts in both bodies and also hold a majority of the other posts within the government. This allows complete Party control of the government. During peacetime, the governmental structure is more visible than that of the Party; but during wartime, the Party assumes preeminence.

[redacted]

3.b. Organization During War (U)

[redacted]

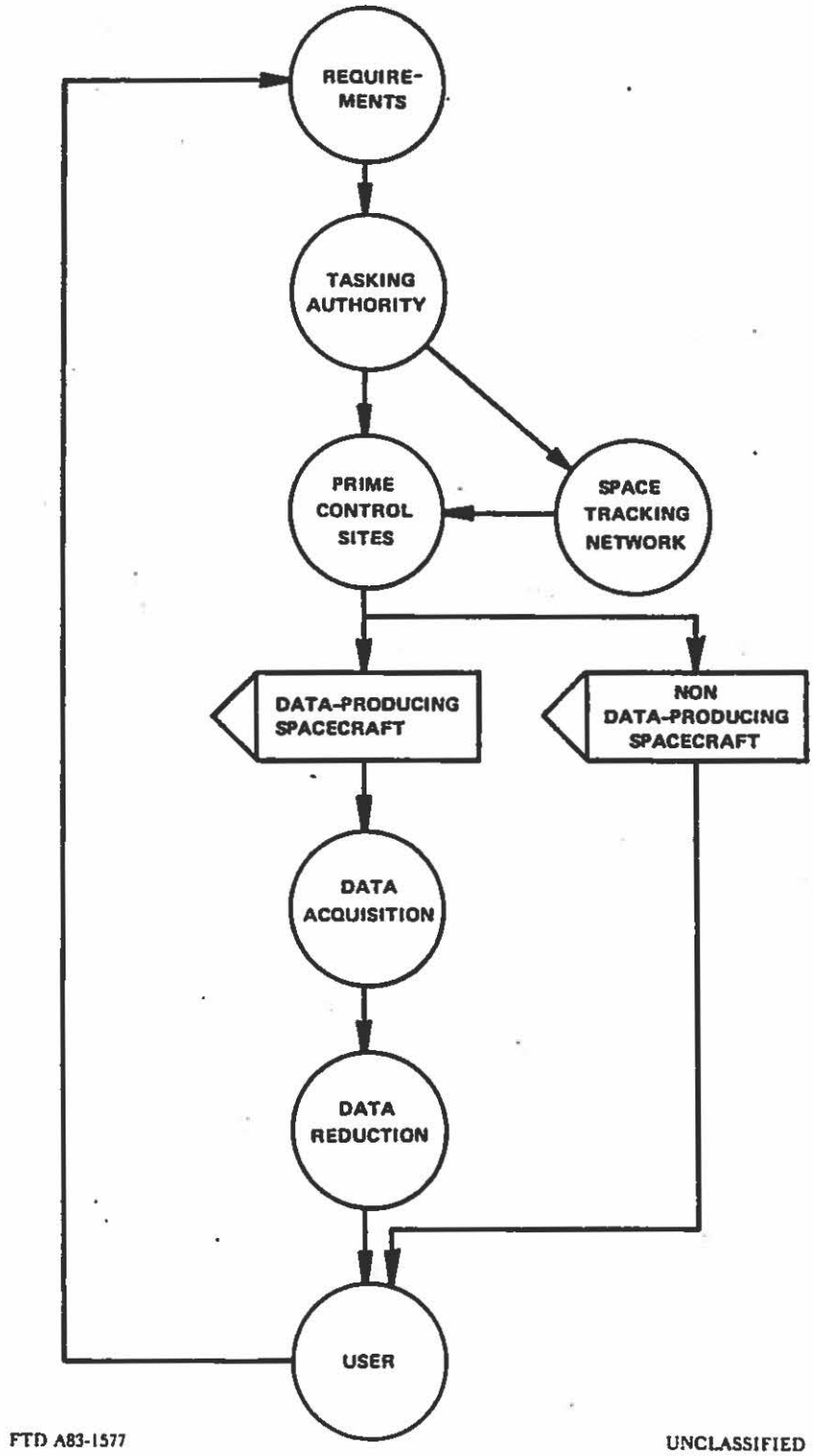


Fig. II-9 (U) Satellite Data Flow

SECTION III

SOVIET SPACE SYSTEM MILITARY EMPLOYMENT (U)

(U) This section discusses how the Soviets employ space assets for the missions of force application; reconnaissance and targeting; indications and warning; command, control, and communications (C^3); and support. The material of this section is organized by mission area. The major focus of this section is how space assets support the various elements of the Soviet politico-military establishment, from the leadership to the lowest level in the military hierarchy.

(U) To aid the reader in following the organization of this section, a set of letters in parentheses follows all paragraph headings; for example, (FA:AD). The letters that precede the colon indicate the mission area to which the subsequent material pertains; the letters that follow indicate the requiring, tasking, or using organization. Thus, FA:AD means "force application in relation to Air Defense Forces." It means that the material in the following paragraph(s) primarily pertains to force application by Air Defense Forces. The abbreviations of mission areas are as follows:

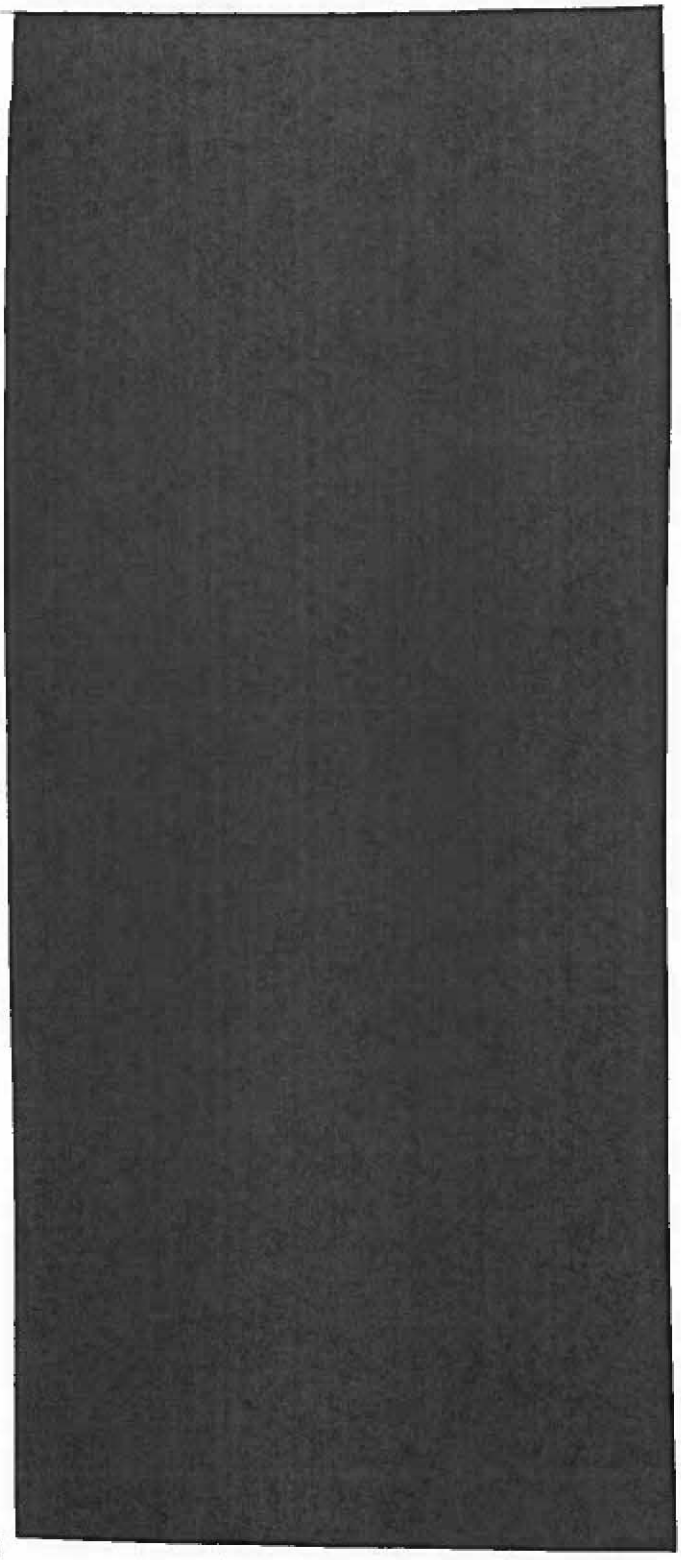
FA = Force Application
RT = Reconnaissance and Targeting
IW = Indications and Warning
C^3 = Command, Control, and Communications
MS = Military Support

(U) The complete names of requirers, taskers, and users are as follows:

L = Leadership/Supreme High Command
GS = Ministry of Defense/General Staff/ Main Intelligence Directorate of the General Staff
AD = Air Defense Forces
SRF = Strategic Rocket Forces
TF = Theater/Front Forces
AF = Air Force
NF = Naval Forces

1. Force Application (FA) (U)

(U) Force application is the ability and intent to apply physical force against an adversary. The Soviet coorbital ASAT is the main Soviet space system that is capable of physically attacking an enemy's space resources. The GALOSH ABM is the only other Soviet system assessed as possibly able to attack satellites at the present time. However, the following material focuses exclusively on the coorbital ASAT.



[redacted]

1.c. Air Defense Forces (FA:AD) (U)

[redacted]

(U) The function of the PKO, according to a 1965 Soviet Dictionary of Basic Military Terms, is described as ". . .a component part of Air Defense. The main purpose of antispace defense is to destroy space systems used by the enemy for military purposes, in their orbits. The principal means of antispace defense are special spacecraft and vehicles that may be controlled either from the ground or by special crews."

[redacted]

1.c.(1) Mission Elements (FA:AD) (U)

1.c.(1)(a) Space Surveillance (FA:AD) (U)

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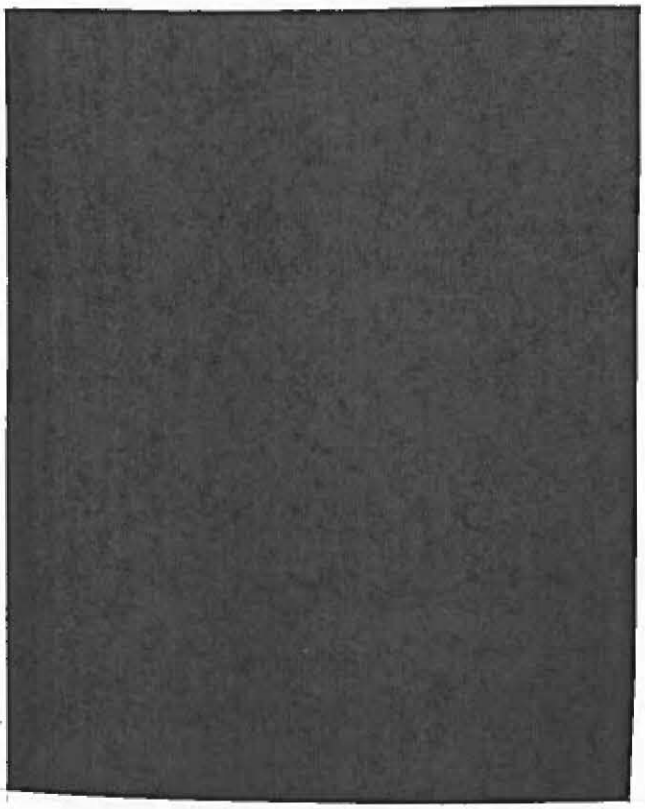
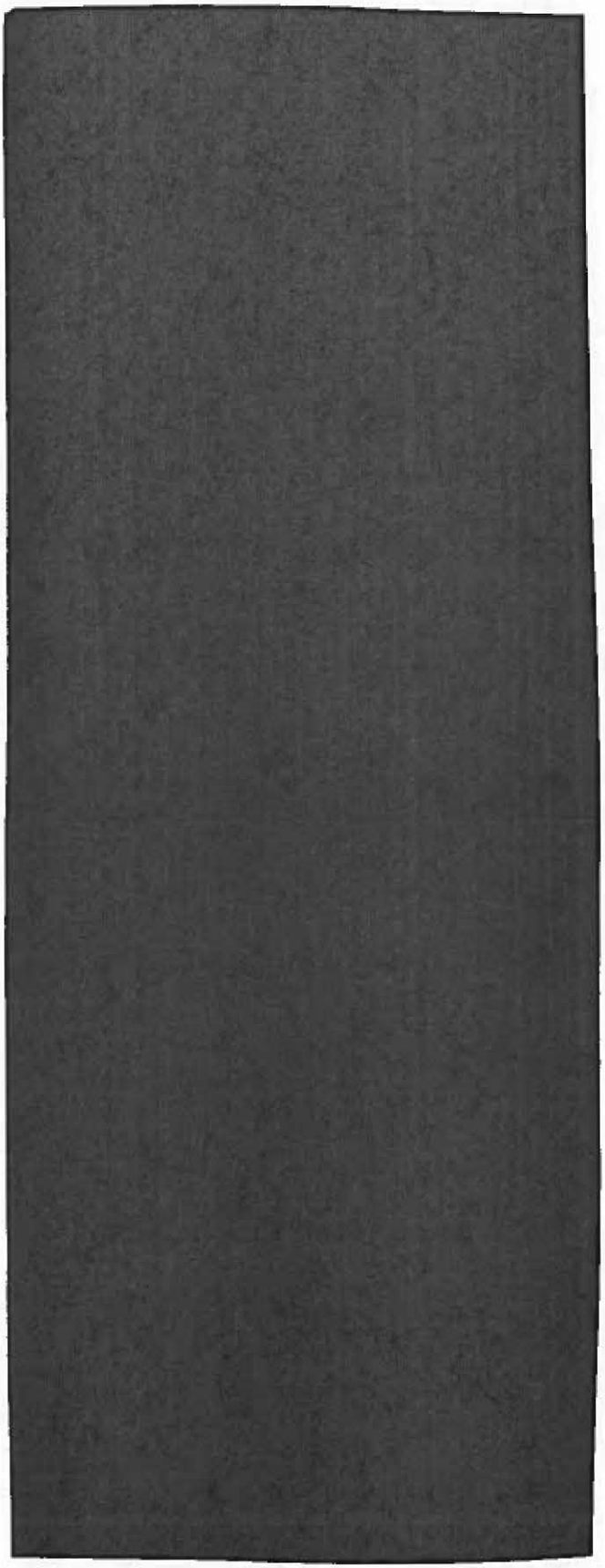




2. Reconnaissance and Targeting (U)

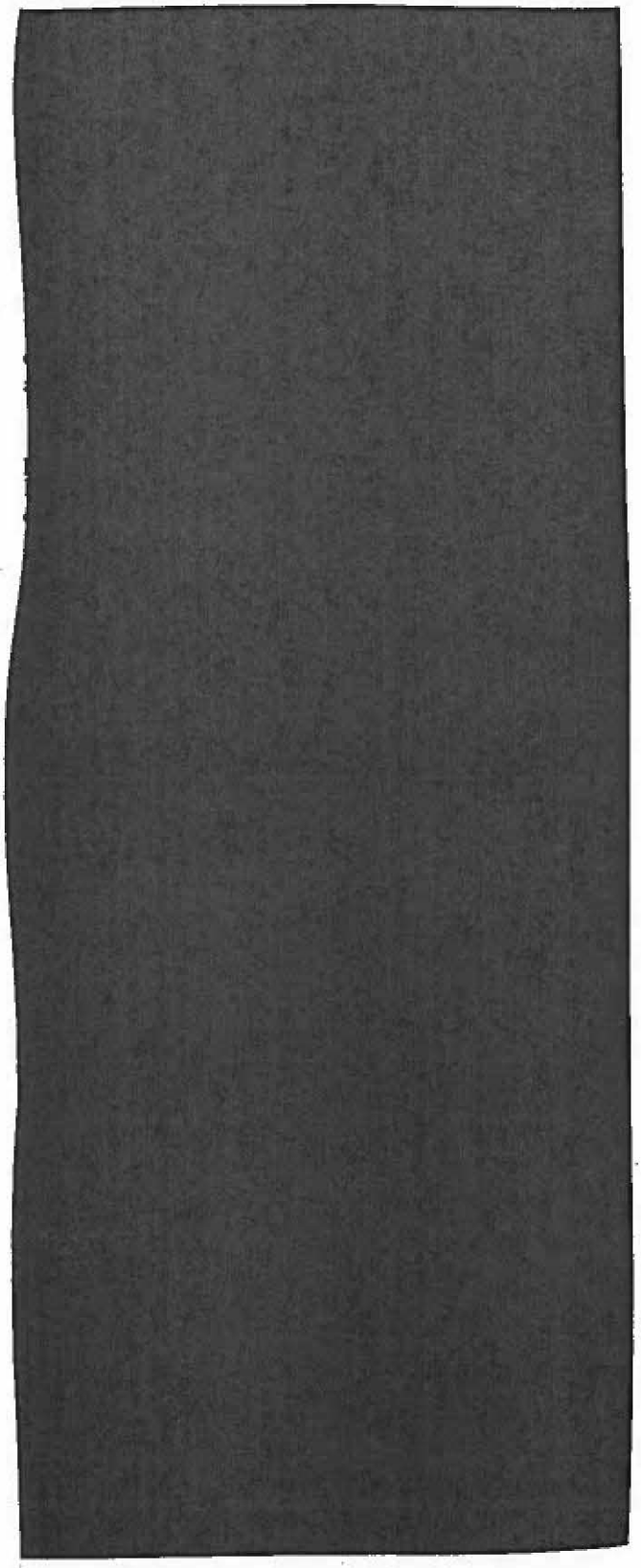
(U) Reconnaissance is the capability to gather information, by visual observation or other detection means, from which intelligence on an adversary is obtained. Targeting is the ability to gather and provide locations of an adversary's resources and then to select the weapon to be used against the resources. For the purposes of this study, imagery, electronic intelligence (ELINT), and ocean reconnaissance satellites are the primary systems included in the reconnaissance and targeting category.

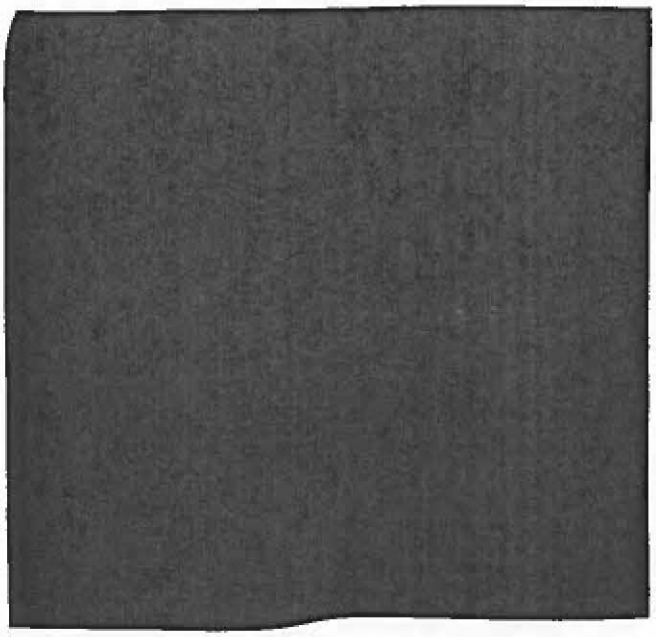
(U) As shown in Figure S-1, the reconnaissance and targeting roles of spacecraft support different forces and organizations. The following paragraphs document the widespread utility of space systems for reconnaissance and targeting (RT) by all levels within the Soviet politico-military establishment.

2.a. Leadership/Supreme High Command (RT:L) (U)

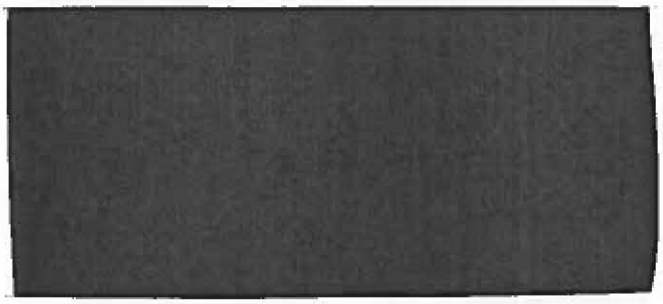
2.a.(1) Photoreconnaissance (RT:L) (U)

2.b.(1)(b)3. Users (RT:GS) (U)

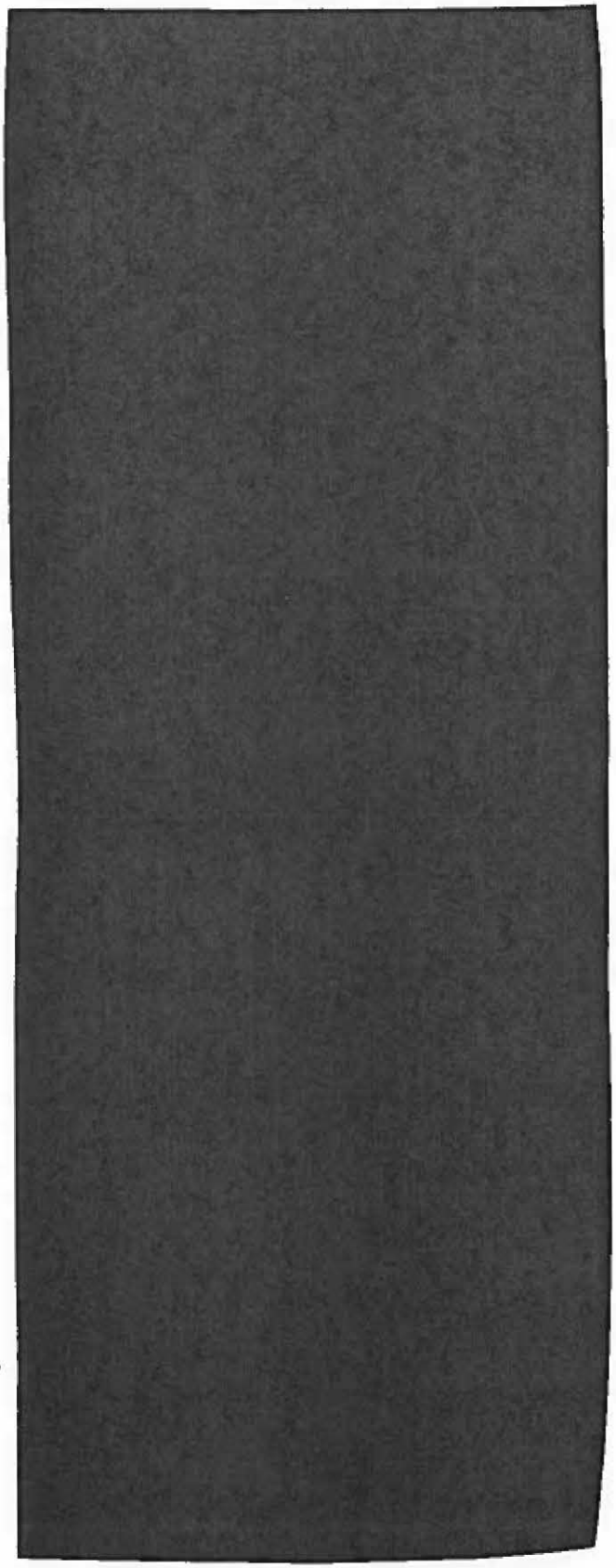




(U) The next day's coverage is similar to the first, except that all ground traces typically are displaced 2-3 degrees to the west. This westward displacement of the ground traces, caused by orbital precession, puts every point of the CONUS into coverage after about 6 to 10 days. The exact figure depends upon orbital characteristics, camera field-of-view, and roll capability.



(U) The ability to cover the same target again during the same mission, called the revisit capability, is determined by orbital parameters, field-of-view, and roll capability. Table III-3 shows revisit capability for several photoreconnaissance vehicles.



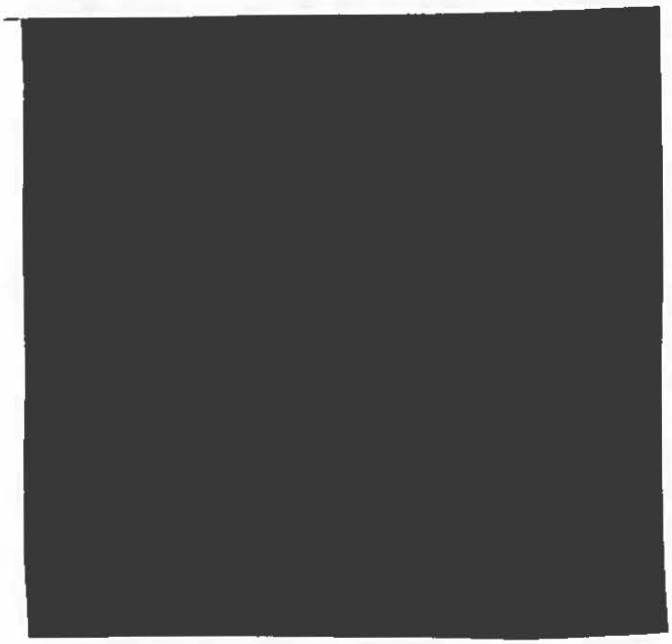
2.g. Naval Forces (RT:NF) (U)

2.g.(1) Introduction (RT:NF) (U)

(U) The writings by Sergei G. Gorshkov, Admiral of the Fleet of the Soviet Union, and an examination of the buildup of Soviet naval forces since the late 1950's indicate the primary wartime missions of the Soviet Navy: (1) to conduct strategic missile strikes against the enemy shore, (2) to destroy the naval strategic nuclear systems of the enemy, and (3) to protect stategic missile platforms from enemy naval strikes. Other naval missions include interdiction of enemy sea lines of communication (SLOC), support of ground forces, and projection of power.

(U) Development of Soviet naval forces since the 1950's is consistent with these missions. The first mission capability that the Soviets developed was to counter the strategic threat that US aircraft carriers posed. Installation of cruise missiles on the J, E-I, E-II, and C-class submarines and BADGER and BLINDER bombers comprised the Soviets' initial response to the carrier threat. The KIEV class aircraft carrier, the KIROV class cruiser, and the BACKFIRE bombers are the most recent Soviet responses to the US carriers.

(U) The second mission capability that the Soviets developed was the ability to launch strategic missiles against the enemy shore. During the late 1960's and early 1970's the Soviets began to deploy the Y-class and, subsequently, the D-class SSBNs. These provided a potent, survivable force that could attack the enemy homelands.



[redacted]

[redacted]

3.d. Air Defense Forces (IW:AD) (U)

(U) The National Air Defense Forces (Voyska PVO) are a separate service to provide antiaircraft, antimissile, and antispace defenses for the Soviet Union. Its general mission is to repel enemy attack from air and space.

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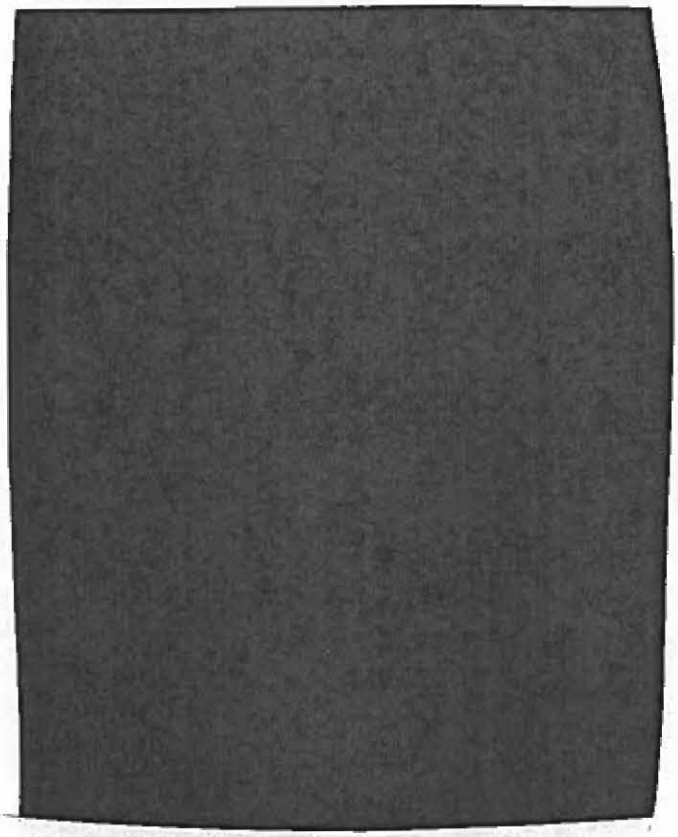
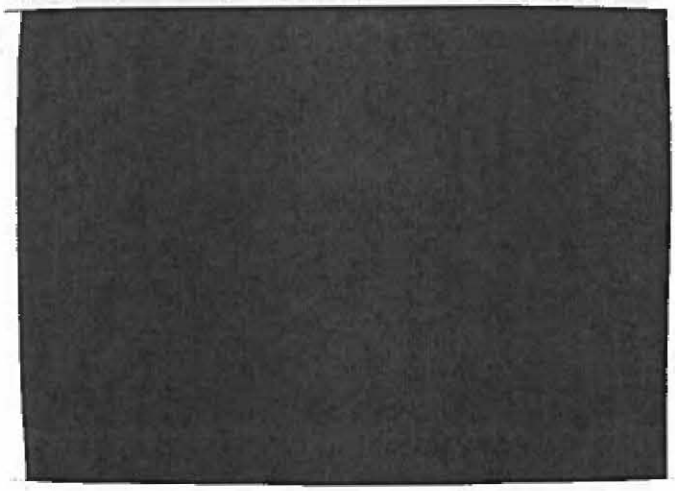


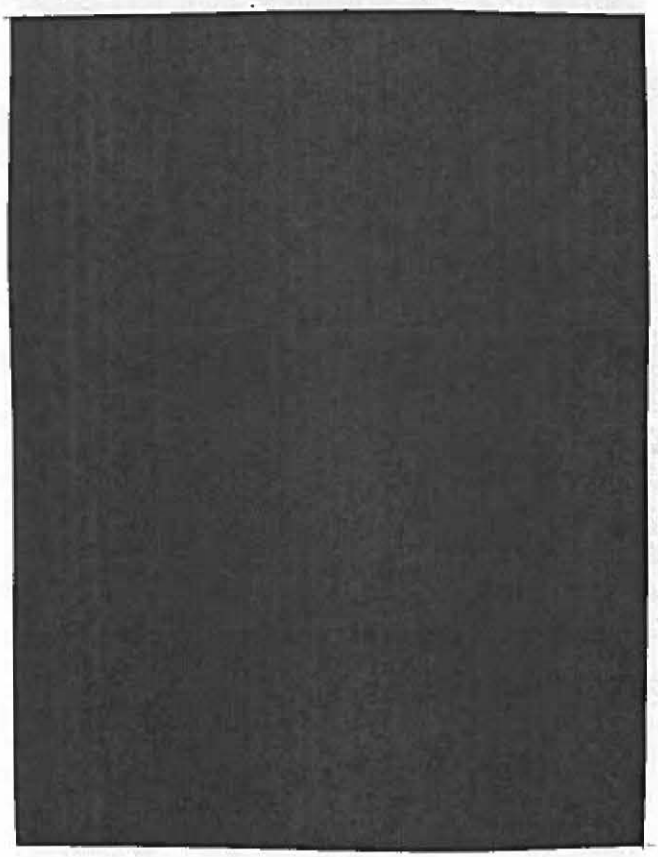
3.e. Air Force (IW:AF) (U)

(U) The Soviet Air Force has three distinct components and missions. Strategic Aviation, formerly known as Long Range Aviation, is charged with conducting nuclear or conventional strikes against targets on the periphery of the Soviet Union and on other continents, using medium- and long-range bombers. Frontal Aviation provides counterair, interdiction, and ground attack support to ground forces. Military Transport Aviation (VTA) supports airborne and airlift operations. Space systems can support each of these components.



3.f. Naval Forces (IW:NF) (U)

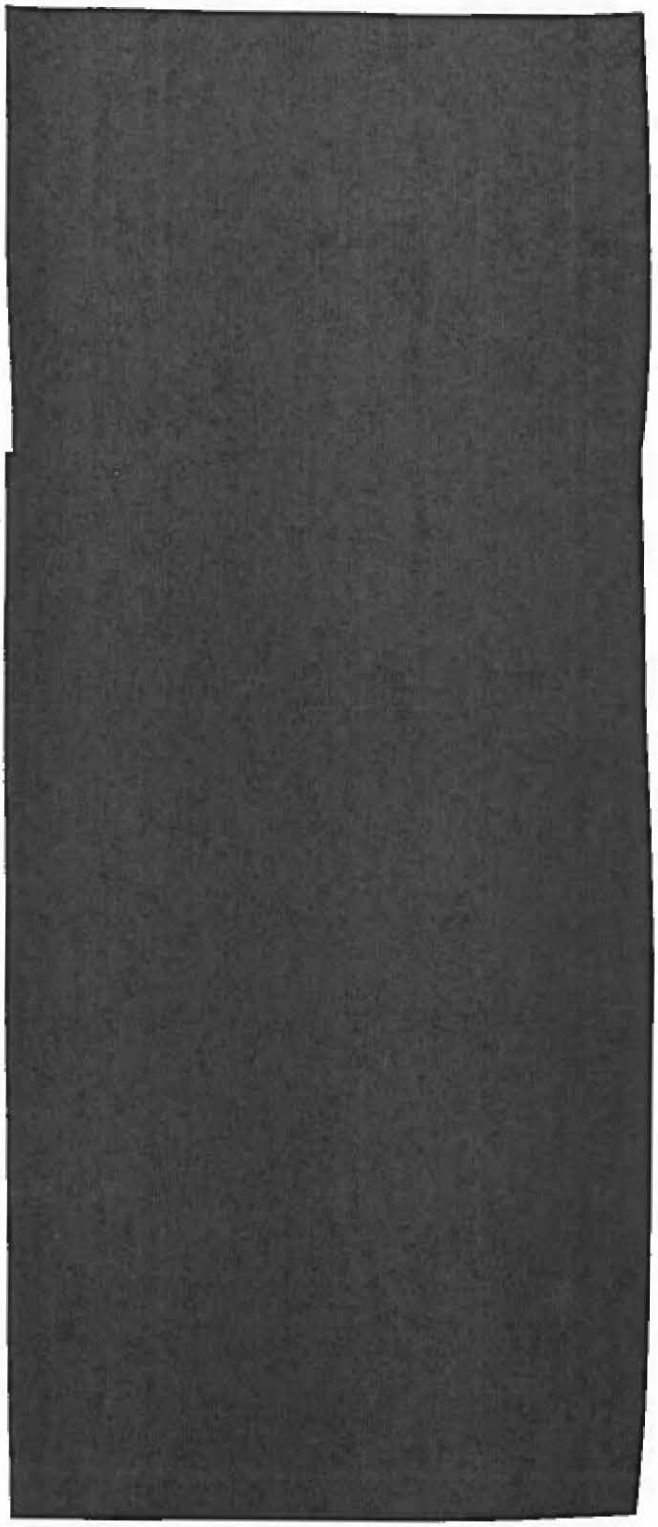
(U) Soviet Navy missions include strategic offense, maritime security, interdiction of enemy SLOC, and support of ground forces. The Navy's offensive mission involves the use of SLBMs and cruise missiles against enemy targets at sea and ashore.

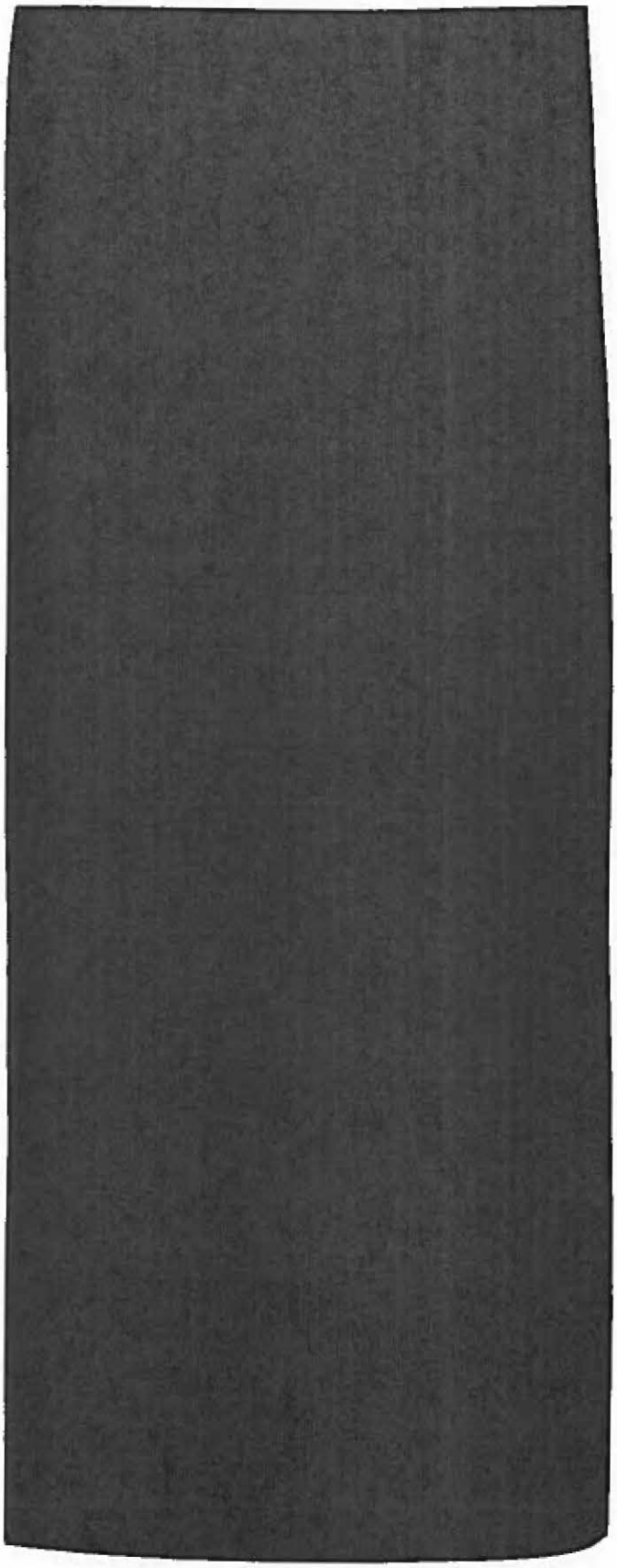


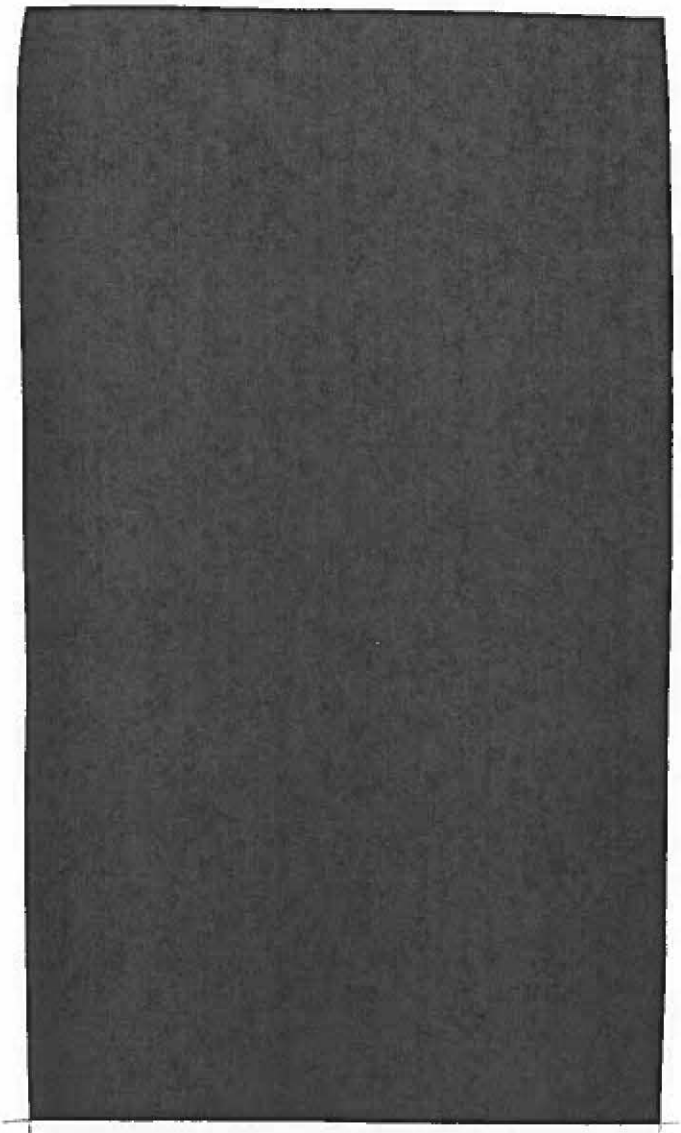
4. Command, Control, and Communications (C^3) (U)

(U) C^3 is an hierarchical, structured set of decision makers and systems that interact according to predefined doctrines, strategies, and constraints. Its function is to enable appropriate management of military forces to achieve specific political and military goals. The physical means to accomplish command and

control of various echelons, to manage interchanges of essential information, and to receive feedback of the results of military actions is an associated communications system. Soviet communication satellite systems contribute significantly to the Soviet C^3 network.



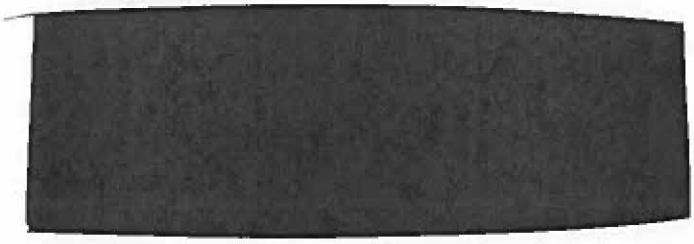


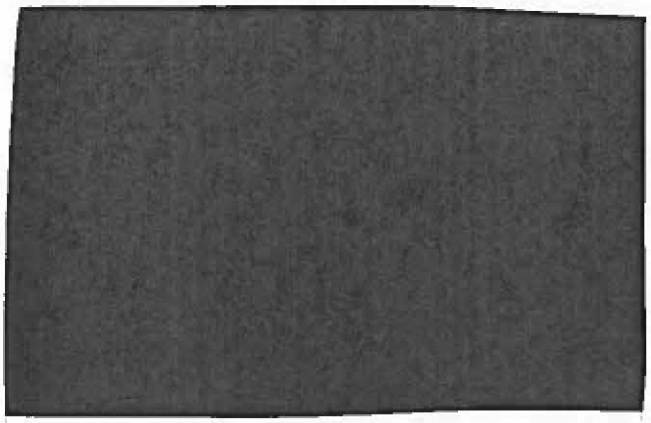


5. Military Support (MS) (U)

(U) Support is defined as the action that aids, complements, or provides assistance to accomplish a military mission in accordance with directives. The space systems in this category include radar calibration, navigation, weather, and geodetic satellites.

5.a. Leadership/Supreme High Command (MS:L) (U)





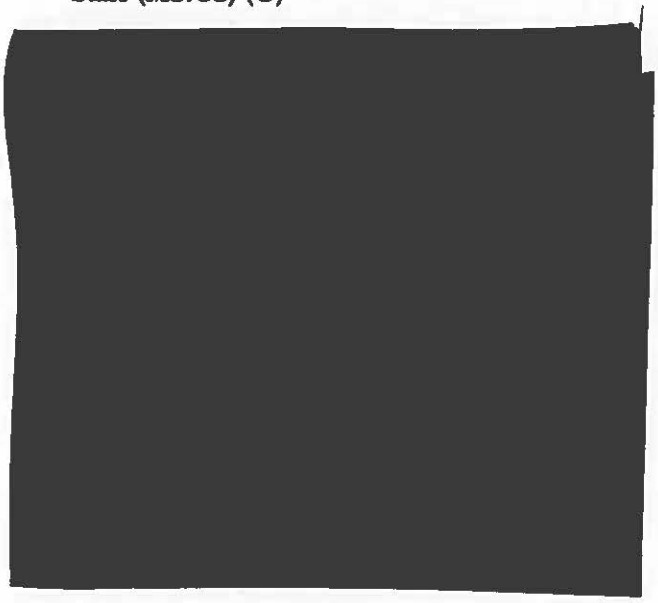
5.a.(3) Meteor Priroda (MS:L) (U)

(U) The Meteor Priroda is extremely important to the USSR. Its data is a substantial input to forestry, agriculture, geology, hydrology, and ocean research. Meteor Priroda also supplements Meteor 2 in its meteorological mission. The Soviets have stated that the Earth resources program, of which Meteor Priroda is one part, has saved the nation millions of rubles.

5.a.(4) Oceanographic Research (OCEAN) (MS:L) (U)

(U) The Soviet leadership derives some utility from the data that these satellites obtain. The satellites provide information on hazardous ice formation at northern latitudes. In addition, data on ocean currents can provide savings of fuel and transportation costs.

5.b. Ministry of Defense/General Staff/Main Intelligence Directorate of the General Staff (MS:GS) (U)



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5.c.(4) Meteor Priroda (MS:SRF) (U)

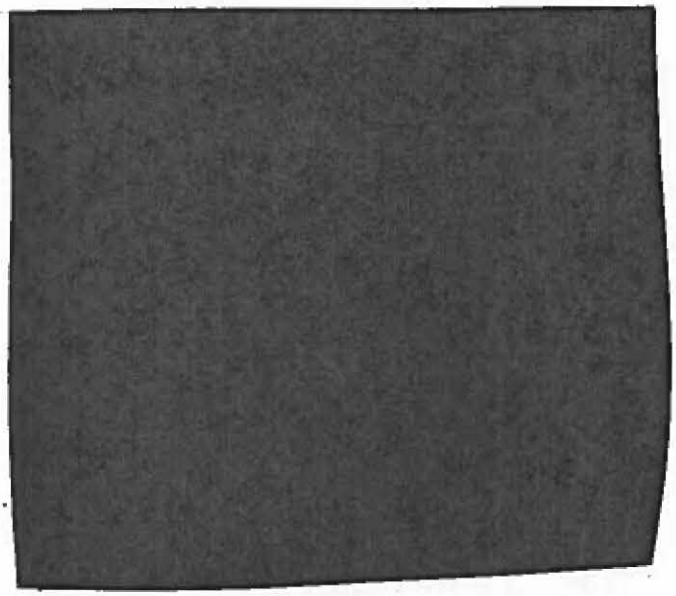
(U) Imagery from Meteor Priroda probably supplements Meteor 2 imagery.

5.c.(5) Oceanographic Research (OCEAN) (MS:SRF) (U)

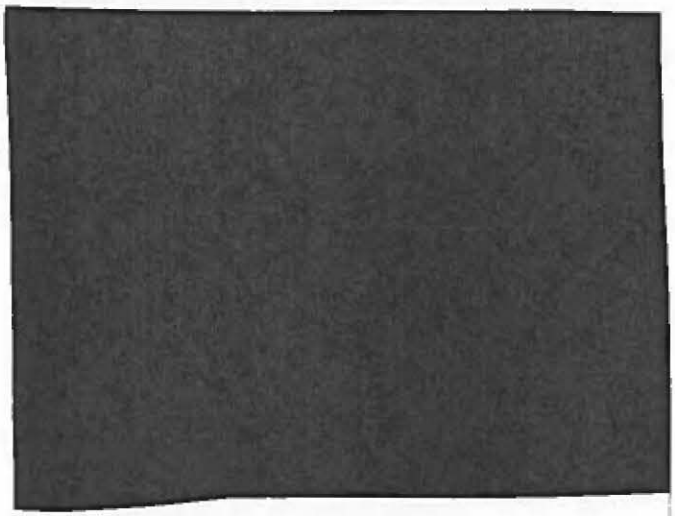
(U) Whether the OCEAN satellites provide support to the SRF is unknown. The command and control facilities for OCEAN satellites are located at SRF sites.

5.d. Air Defense Forces (MS:AD) (U)

[redacted]



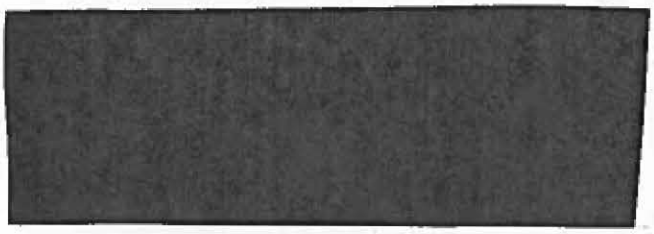
5.e. Air Force (MS:AF) (U)



5.e.(2) Meteor Priroda (MS:AF) (U)

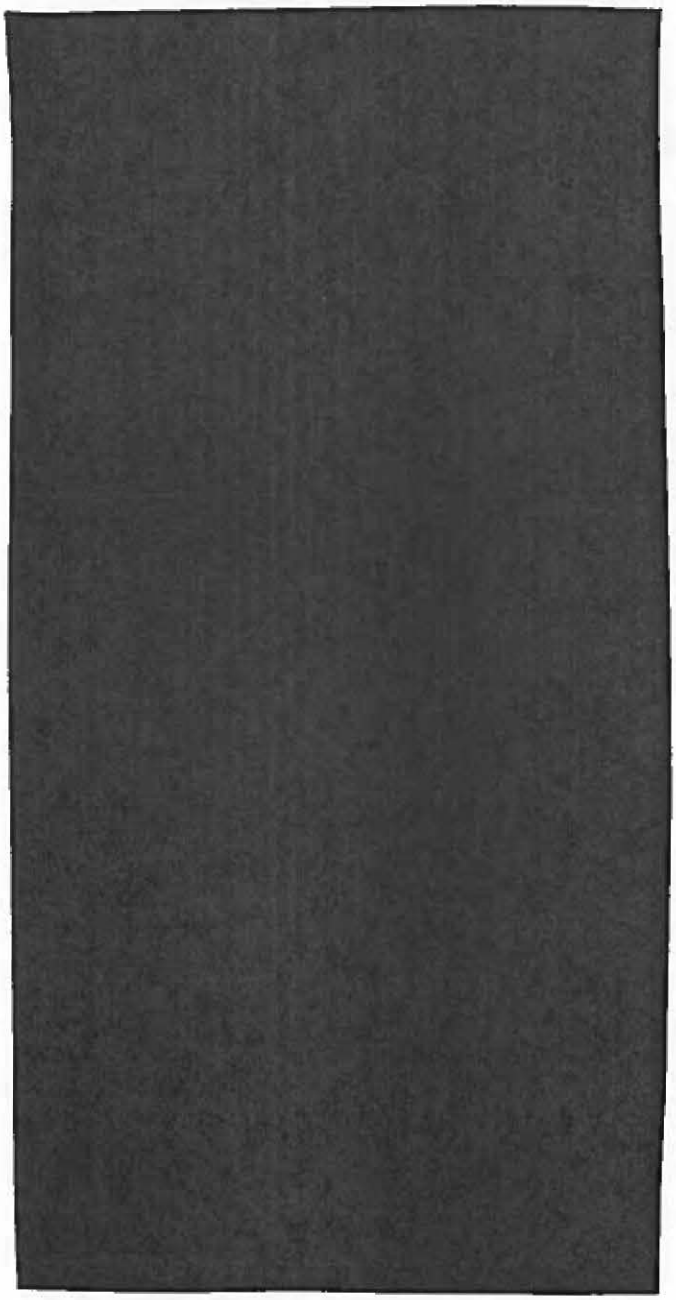
(U) Meteor Priroda imagery probably supplements Meteor 2 imagery.

5.f. Theater Front Forces (MS:TF) (U)



5.f.(2) Meteor Priroda (MS:TF) (U)

(U) Meteor Priroda imagery probably supplements Meteor 2 imagery.



5.g.(6) Oceanographic Research (OCEAN) (MS:NF) (U)

(U) OCEAN satellites provide the Soviet Navy with sea ice maps derived from radar imagery. Ice maps are important to Soviet surface ships and submarines that operate in the Arctic. Ice maps show surface ships where they can safely navigate and where submarines can break through to launch SLBM missiles.

SECTION IV

ILLUSTRATIVE EXERCISES AND CRISES (U)

[redacted]

[redacted]

1. Falkland Islands Crisis—1982 (U)

1.a. Scenario (U)

(U) On 2 April 1982, as a result of a dispute with the United Kingdom over the ownership of the islands, Argentina invaded and captured the Falkland Islands in the South Atlantic Ocean. In response, the British assembled an amphibious invasion force centered around the HMS *Hermes*, set sail for the Falkland Islands, and invaded the main islands on 21 May. On 15 June 1982 British Prime Minister Margaret Thatcher announced to Parliament that hostilities had ceased.

[redacted]

[redacted]

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1.f. Summary (U)

(U) The launch vehicle turnaround times are summarized in Table V-1.

[redacted]

SECTION VI

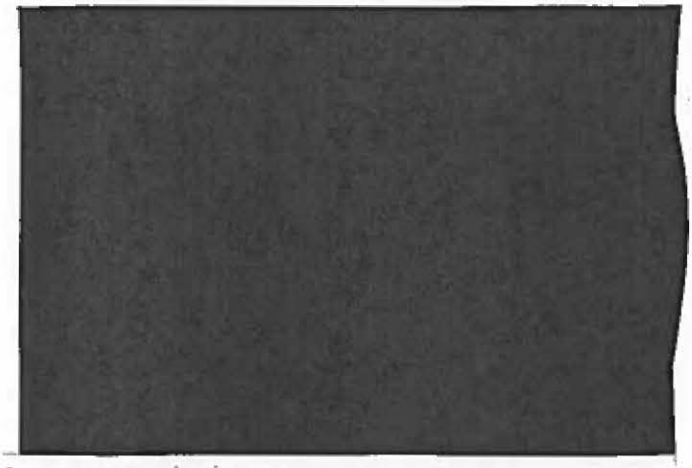
FUTURE SOVIET SPACE SYSTEMS MILITARY EMPLOYMENT (U)

1. Illustrative Scenario (U)

(U) The following hypothetical scenario illustrates some additional space systems capabilities that the Soviets are projected to possess in 1995. It must be emphasized that this scenario serves only as an illustrative example of how the Soviets might use their space resources in a wartime environment.

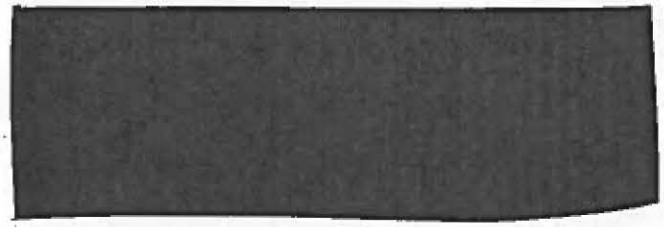
(U) This scenario starts with a world situation that has deteriorated for a variety of reasons. The Soviets have severely criticized US policies on strategic defense and the use of space stations, and they have called for the removal of US nuclear weapons from Europe. The Soviet Union has declared a general mobilization, as have the Warsaw Pact countries. The US is on military alert.

Conflict Level—High Tension

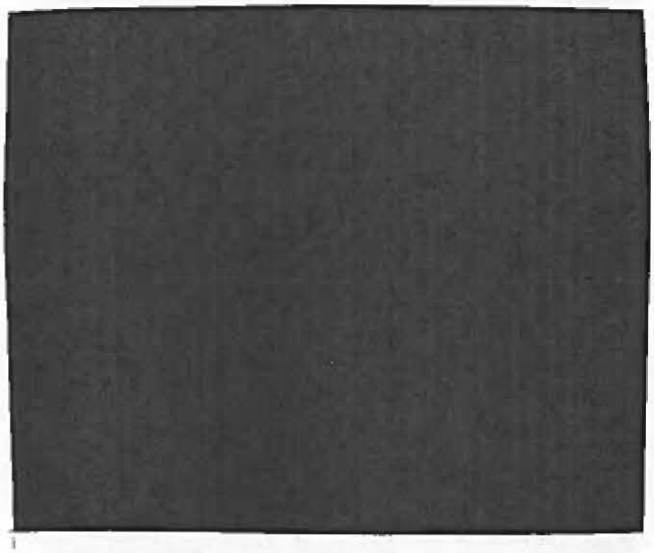


(U) Mobile and man-portable COMSAT terminals deploy to front and fleet headquarters. The deployments expand C^3 capabilities.

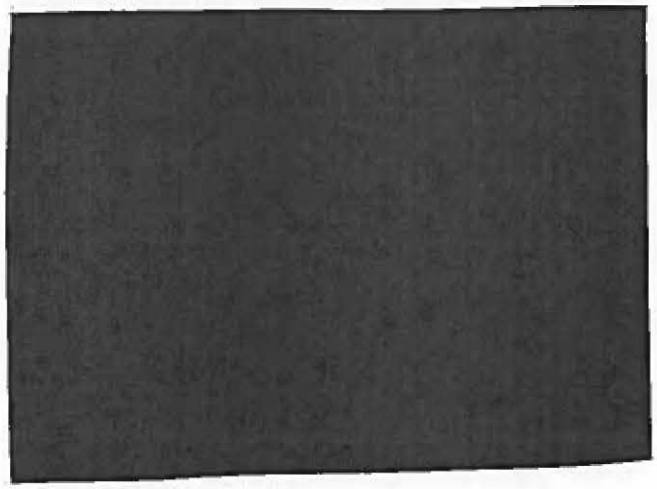
(U) US DSCS III and MILSTAR begins ECCM to avoid jamming from countries friendly to the Soviet Union. Other US satellites experience interference.



(U) A US Carrier Battle Group steams toward the Arabian Sea after countries friendly to the Soviet Union cut off oil and natural gas supplies to NATO countries.



(U) NATO and the US declare war on the USSR.



[redacted]

Conflict Level—Tactical Nuclear

(U) Nuclear strikes intensify against NATO nuclear weapon bunkers and nuclear forces.

[redacted]

(U) NATO delivers tactical nuclear strikes into the Western USSR. The attacks disrupt HF/UHF communications, and some land lines are broken.

[redacted]

Conflict Level—Strategic Nuclear

(U) The Soviets launch strategic missiles against US and NATO countries.

(U) The US launches its ICBMs based on strategic warning.

[redacted]

[redacted]

(U) EMP effects disrupt operations of near-earth satellites that do not have EMP shielding. Atmospheric disturbances subside after a number of days.

(U) The US/USSR Hotline resumes operation via Gorizont and Intelsat satellites, and surrender terms are discussed.

2. Soviet Future Systems Operational Characteristics (U)

2.a. Laser Antisatellite (U)

2.a.(1) Operational Concept (U)

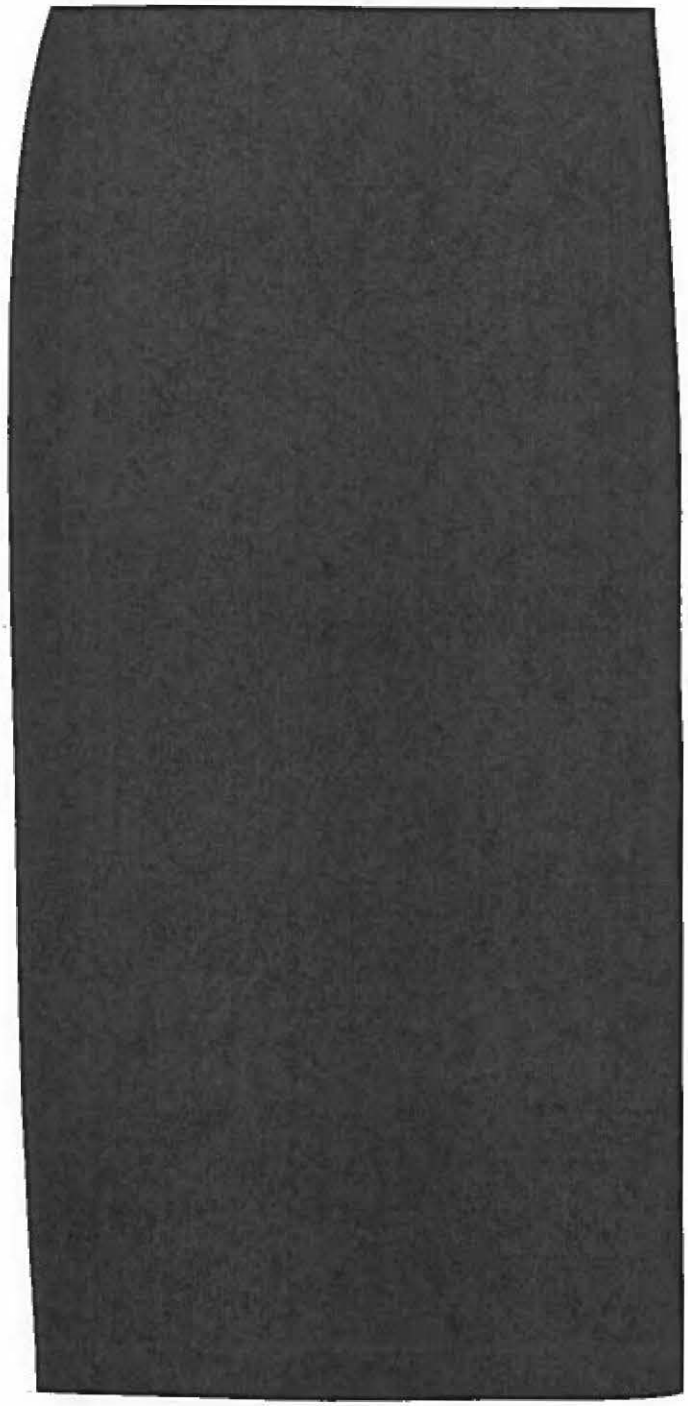
[redacted]

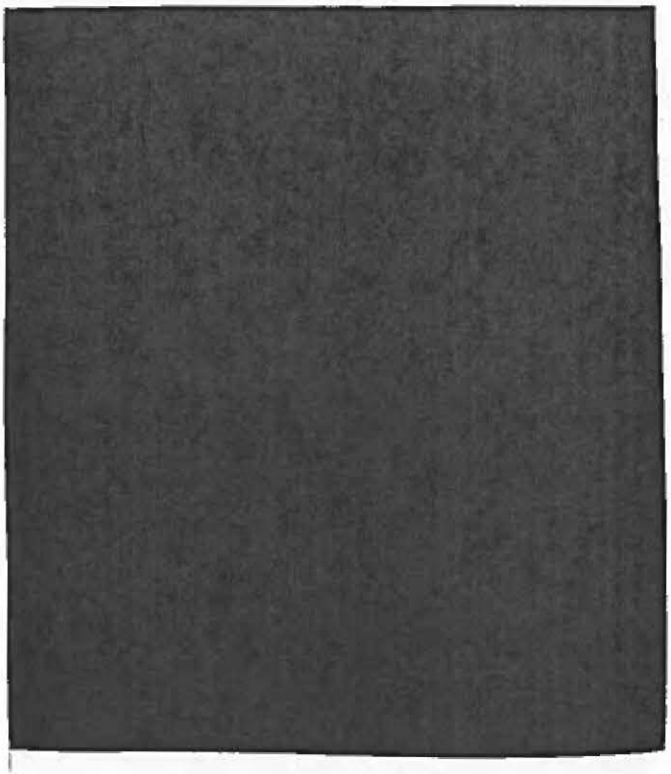
2.b.(5) Orbital Parameters—Constellation Configuration (U)

(U) The orbital parameters for the RTIS are summarized in Table VI-2.

TABLE VI-2

(U) REAL-TIME IMAGING SATELLITE ORBITAL CONFIGURATION

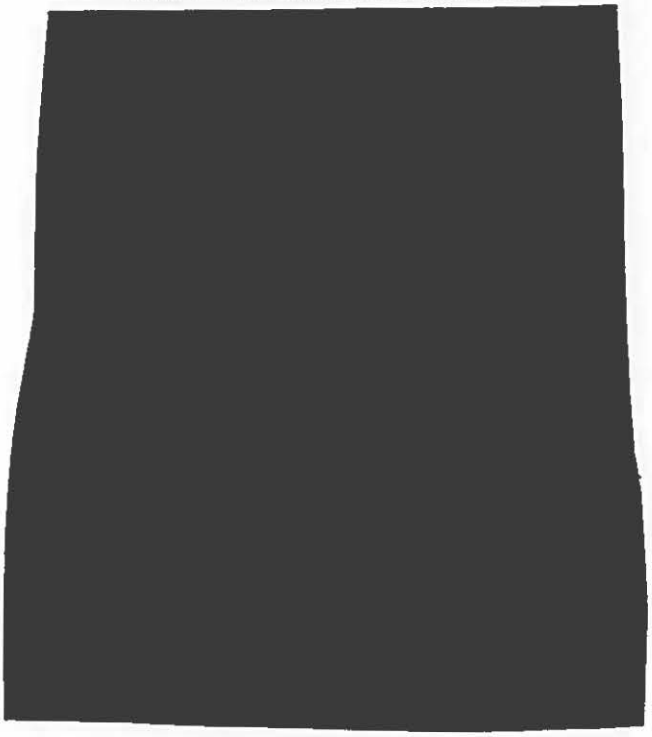




(U) The system performance for the SAR satellite is shown in Table VI-3.

TABLE VI-3

(U) SYNTHETIC APERTURE RADAR SATELLITE CHARACTERISTICS



[redacted]

[redacted]

2.c.(5) Orbital Parameters—Constellation Configuration (U)

(U) The SAR satellite's orbital parameters and constellation configuration are shown in Table VI-4.

TABLE VI-4

(U) SYNTHETIC APERTURE RADAR SATELLITE ORBITAL CONFIGURATION

[redacted]

[redacted]

(U) Table VI-5 shows the projected performance of the Follow-on ELINT.

TABLE VI-5

(U) FOLLOW-ON ELINT SATELLITE CHARACTERISTICS

[redacted]

[redacted]

2.e.(5) Orbital Parameters—Constellation Configuration (U)

(U) The orbital parameters for the Follow-on ELINT system are shown in Table VI-6.

TABLE VI-6

(U) FOLLOW-ON ELINT SATELLITE ORBITAL CONFIGURATION

[redacted]

[redacted]

[redacted]

(U) The projected performance for the GEO-LDS is shown in Table VI-8.

2.g.(3) Mission Control (U)

[redacted]

TABLE VI-9

(U) PROJECTED SDRN FREQUENCY ALLOCATIONS*

	FREQUENCY (GHz)	BANDWIDTH (MHz)
SDRN satellite to ground site	13.41-13.99	579
	10.7-10.94	239
	11.2-11.44	239
SDRN satellite to near-earth satellite	13.4-13.64	239
Ground site to SDRN satellite	14.5-14.74	239
Near-earth satellite to SDRN	14.76-15.34	579

*Based on IFRB filings.

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[redacted]

2.h.(5) Orbital Parameters—Constellation Configuration (U)

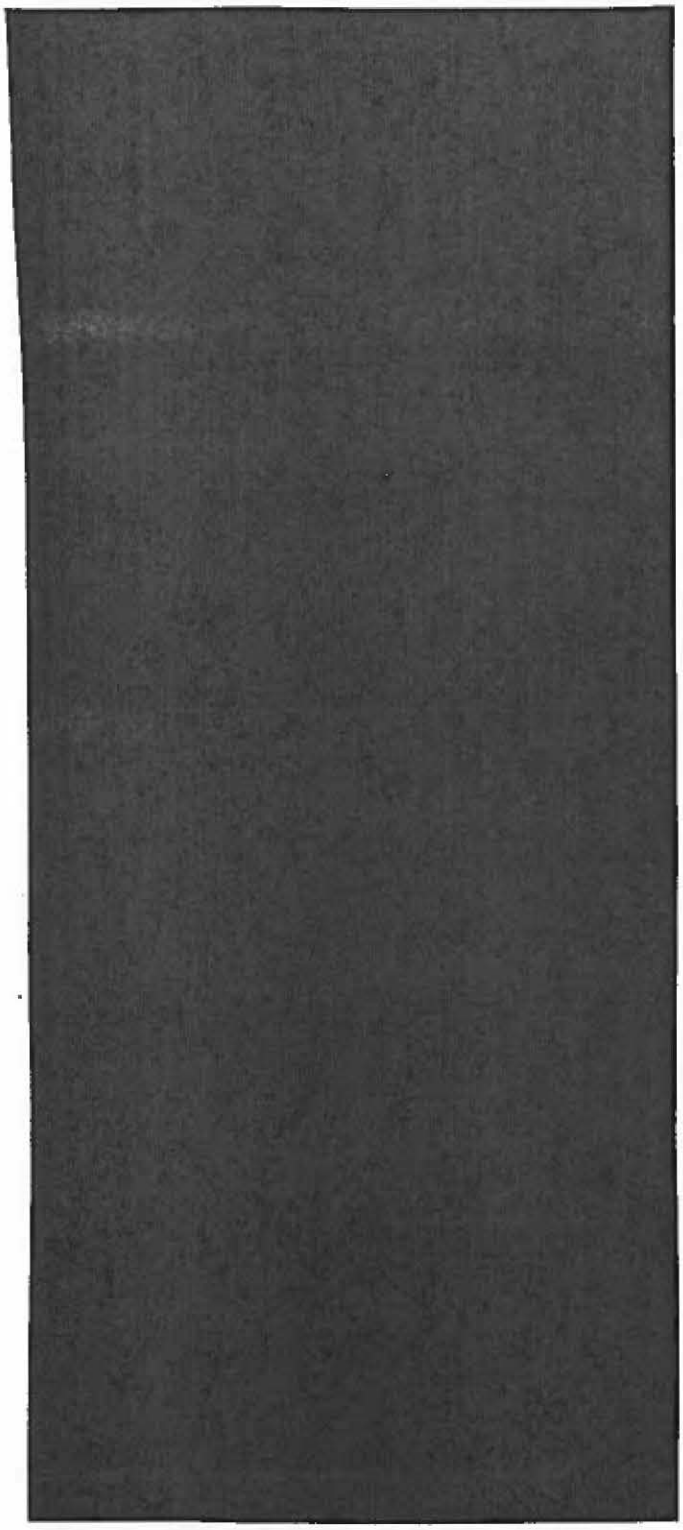
(U) Three geostationary satellites: 160° W, 16° W, and 95° E.

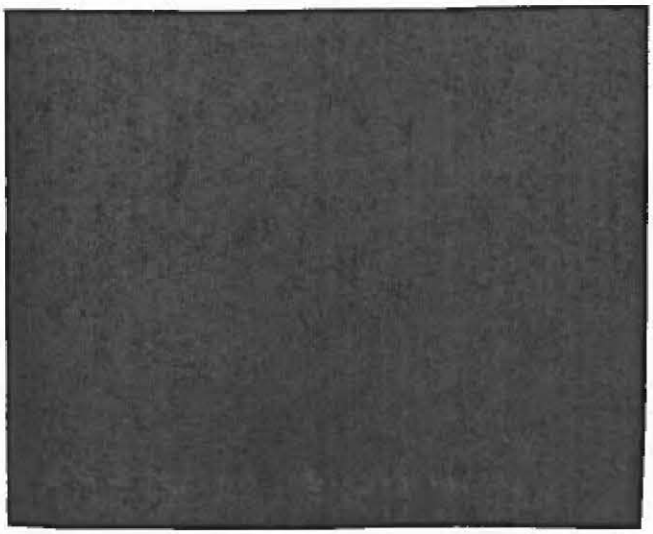
[redacted]

[redacted]

2.i.(5) Orbital Parameters—Constellation Configuration (U)

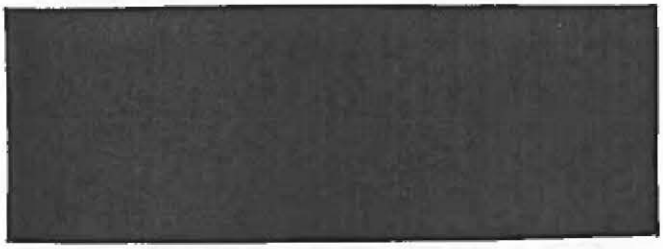
(U) Three geostationary satellites: 13.5° W, 80° E, and 168° W.





2.j.(5) Orbital Parameters (U)

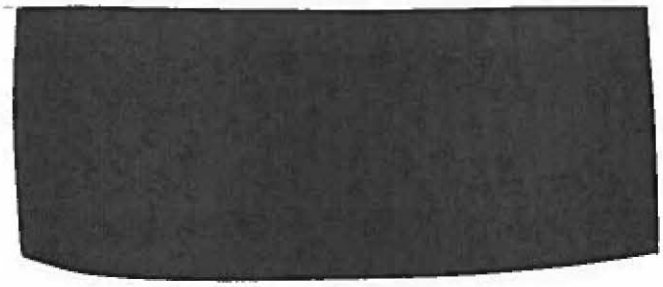
(U) The COMSAT systems will all be in geostationary orbits at the following subpoints: 6 Gals—35, 45, 85, 130, 190, and 336.5° E; 4 Luch-P—45, 85, 190, and 335° E; 8 Volna—45, 58, 85, 90, 140, 190, 335, and 346° E; 4 Luch—55.5, 90, 130, and 346° E.



2.k. Geostationary Operational Meteorological Satellite (GOMS) (U)

2.k.(1) Operational Concept (U)

(U) The GOMS is a future satellite designed to provide the Soviets with synoptic coverage of the Eurasian and Soviet landmass. The meteorological data will be transmitted from the satellite to a central ground station in the Soviet Union for processing, analysis, and dissemination. The data will be used primarily by weather forecasters to develop long range, wide area forecasts in support of a variety of military and civil needs.



SECTION VII

UTILITY AND DEPENDENCY (U)

1. Introduction (U)

(U) This section presents a preliminary, subjective assessment of the utility of Soviet space systems to users, as well as the dependency of users upon those space systems. Considerable research remains to be done in the area of utility and dependency (U&D), particularly to devise analytical tools necessary to evaluate the U&D of space systems, and to develop a data base that supports reliable U&D assessments.

(S) It should be stressed that the assessments of U&D presented in this section pertain to the actual systems performance and use of systems currently in the Soviet inventory. They are not assessments of potential or ultimate U&D that the Soviets could derive from the current or future use of space systems.

2. Definitions (U)

(U) Utility is "the degree of political leverage or military capability that a given space system provides to a political or military entity for accomplishment of political or military goals."

(U) Dependency is "the degree to which a political or military entity depends upon a given space system for accomplishment of political or military goals" and relates directly to the level of redundancy in accomplishing the mission by using other (not necessarily space) systems.

3. Discussion (U)

(U) Strictly speaking, utility and dependency are mutually exclusive terms that have no overlap of meaning. Nevertheless, confusion can arise in the usage of the terms. Ideally, what is meant by utility is the degree of usefulness of a given system to accomplish a specific task, irrespective of the existence of alternatives to accomplish the task. In contrast, dependency pertains to the degree to which there are no satisfactory alternatives to a given system for the accomplishment of that task. The confusion between utility and dependency arises in the comparison of one system to another for the evaluation of utility. This can inadvertently cause any assessment of utility to become biased by the existence, or lack, of alternative systems. There are analogous difficulties in assessing dependency. Therefore, care must be exercised to assure understanding and correct application of the two terms.

(S) U&D of a space system are functions of at least three variables—user, mission area, and level of conflict. (See Table VII-1.) Consider the hypothetical employment of the orbital ASAT by the Soviet leadership (user) prior to a nuclear attack (level of conflict) in order to negate an enemy's space system (force application mission area). In this situation, the utility of, and dependency on, the ASAT are both likely to be high: Utility is high because the orbital ASAT is a relatively effective means to destroy an enemy's space asset. Dependency is high because the Soviets probably have no other system to negate a satellite. In a lower state of

TABLE VII-1

(U) LIST OF U&D VARIABLES

MISSION AREAS	USERS	LEVELS OF CONFLICT
Force application	Leadership/Supreme High Command	Peace
Reconnaissance and targeting	MOD/GS/GRU	Crisis
Indications and warning	Theater/Front Forces	Theater conventional
C^3	Strategic Rocket Forces	Theater nuclear
Support	Air Defense Forces	Strategic nuclear
	Air Forces	
	Naval Forces	

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tension, however, the Soviet leadership would regard the ASAT as having low utility—certainly no more than medium—because it would not want to provoke unnecessary escalation of conflict. A different user, such as the Air Defense Forces, might urge use of the ASAT at a lower level of conflict. Finally, the ASAT can support only the force application mission area. It has no known function in support of any other mission area. The ASAT example strongly suggests, therefore, that the U&D of space systems are functions of user, level of conflict, and mission area.

(S) For purposes of simplicity in this initial presentation, the two variables of level of conflict and mission area are removed from explicit consideration. Level of conflict is a significant variable; however, its precise impact upon U&D of a given space system is difficult to assess at the present time. Mission area, likewise, is a significant variable. However, mission area is usually implicit in the use of a space system. For example, the ASAT supports only force application, photoreconnaissance satellites support only R&T and I&W, ELINT satellites primarily support I&W, and so on. In general, further research will be necessary to determine precisely the impact of mission area and level of conflict upon the U&D of a space system.

(U) The tables and discussion that follow, therefore, express the U&D of a space system as a function only of user. Nevertheless, an attempt was made to consider also the impact of level of conflict and mission area in forming the assessment of a space system's U&D.

4. Space Systems Utility and Dependency (U)

(U) Table S-1 of the Summary contains the matrix that forms the basis for Tables VII-2 and VII-3. The rows and columns of the tables correspond to the seven users and eight space systems, respectively.

4.a. Utility of Space Systems (U)

(U) This section provides a summary of rationale for the entries of Table VII-2. The possible levels of utility are low (LOW), medium (MED), and high (HIGH).

4.a.(1) Weapons (U)

(S) The utility of weapons to the leadership is medium, rather than high, because the leadership is unlikely to order use of the orbital ASAT except in extreme circumstances such as the start of nuclear war. Because of this restriction, the utility of the ASAT to the Air Defense Forces, which operates the ASAT, is also medium.

[redacted]

[redacted]

[redacted]

4.b. Dependency on Space Systems (U)

(U) The following is a rationale for the entries of Table VII-3. Alternatives to space systems are briefly discussed. Possible values of dependency are low (LOW), medium (MED), and high (HIGH).

[redacted]

APPENDIX A

CURRENT SOVIET SPACECRAFT OPERATIONAL CAPABILITIES (U)

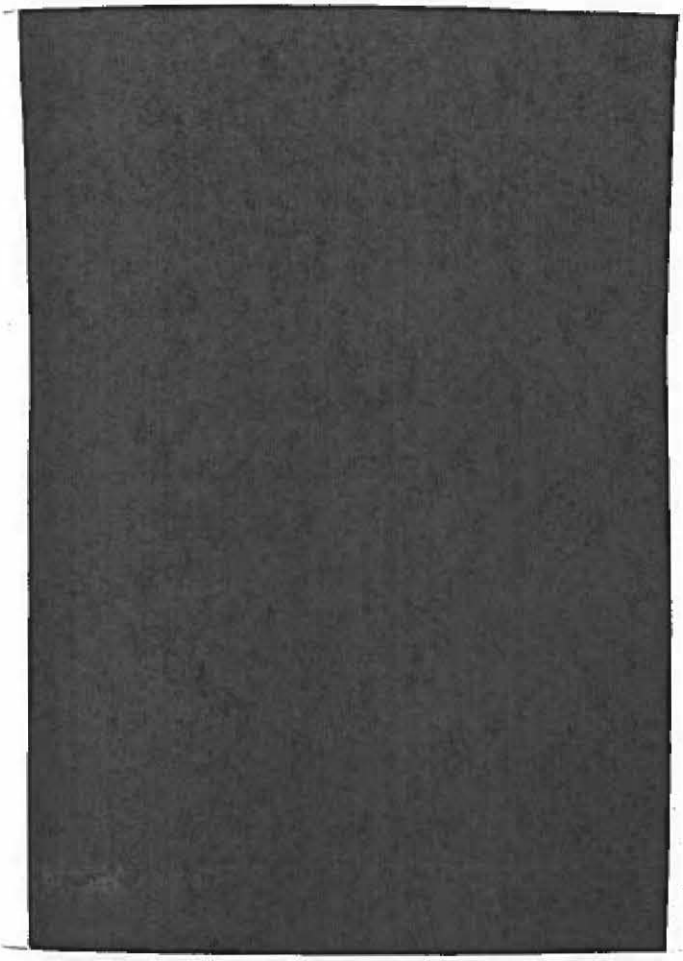
(U) This section provides a brief reference on current Soviet spacecraft capabilities. Included are those systems that either are or could be employed to support Soviet military requirements. More detailed information can be found in DST-1400H-252-84, "Space Systems Handbook—Eurasian Communist Countries (U)".

1. Weapons (U)

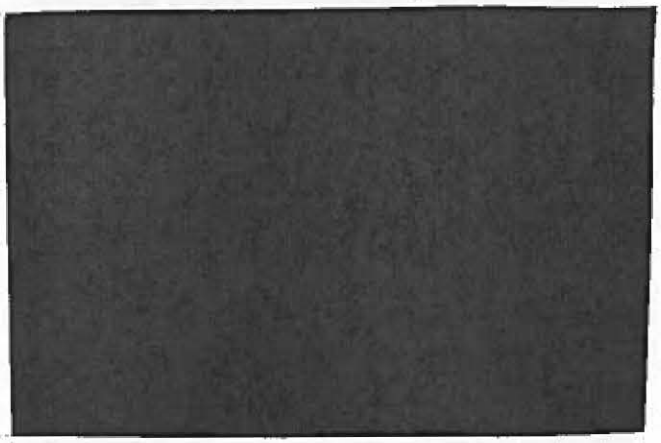
1.a. Coorbital Interceptor (ASAT) (U)

[redacted]

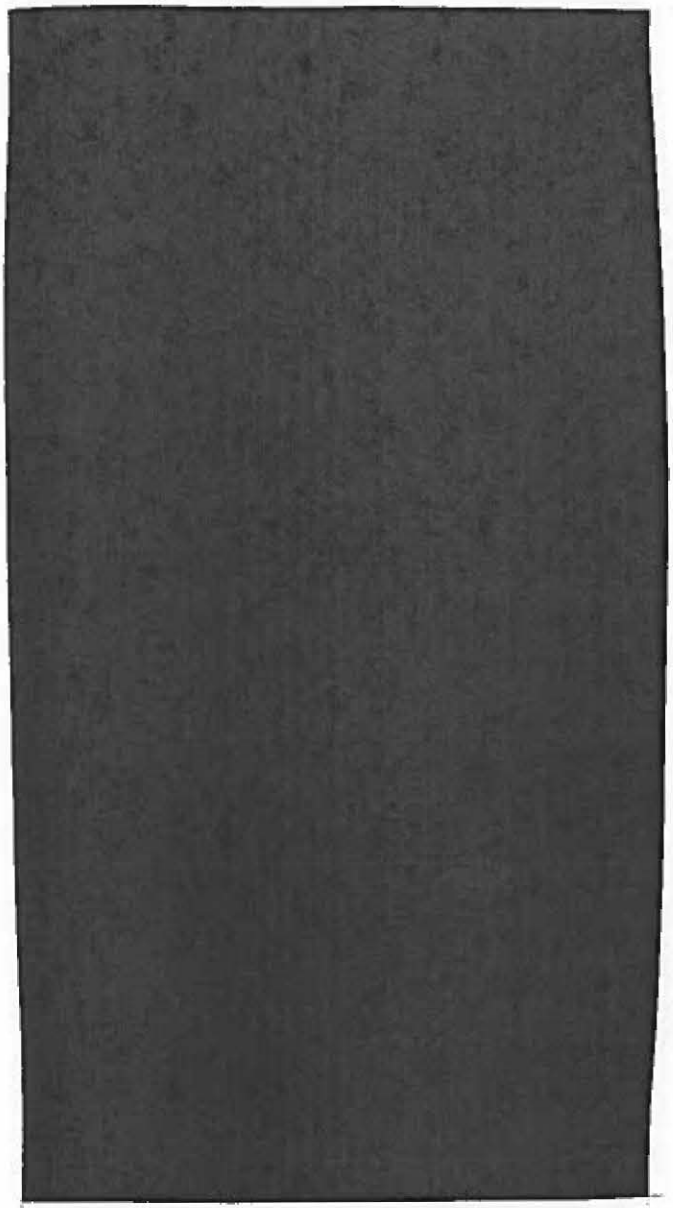
[redacted]



6.b. Molniya 3 COMSAT System (U)

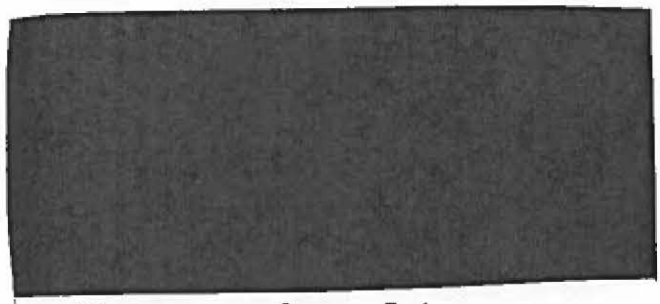


(U) Performance—Molniya 3 orbital characteristics are similar to those of Molniya 1 and, therefore, produce similar capabilities.

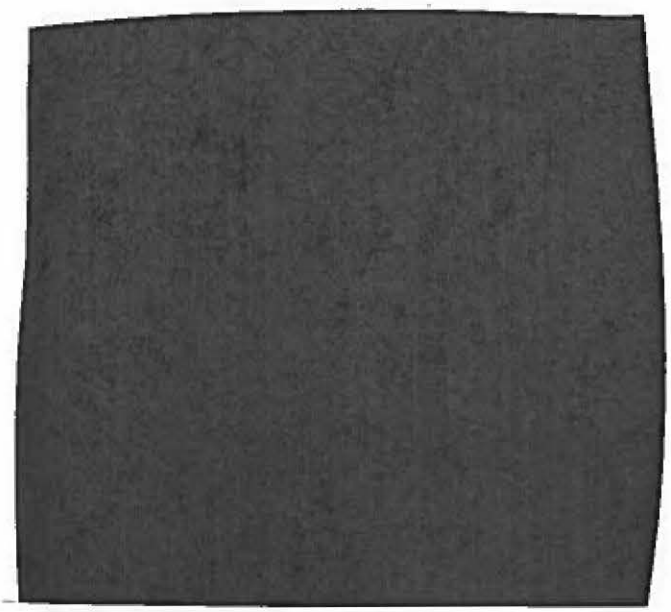


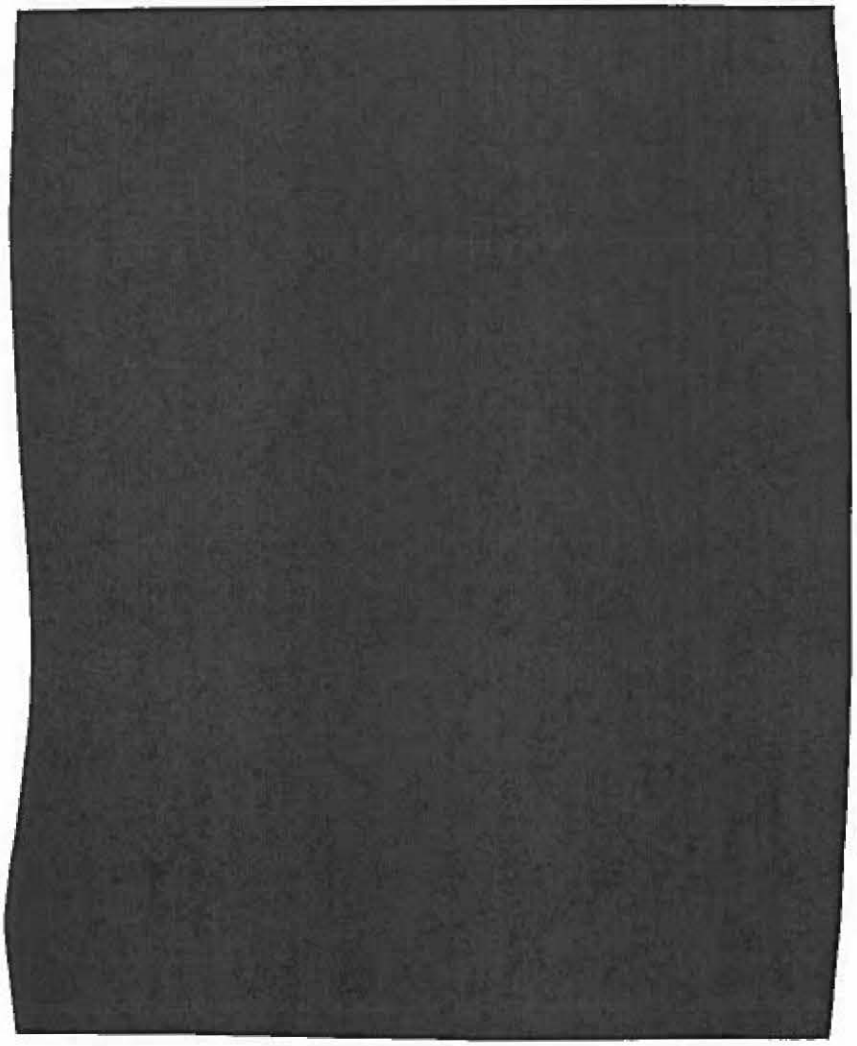
6.d. Gorizont COMSAT System (U)

(U) Users—The MOC operates the Gorizont COMSAT system to support international, and domestic military and civil communications relay throughout the USSR.



(U) Assessment—Same as Raduga.





[redacted]

(U) Orbit and Network—Geostationary.

[redacted]

[redacted]

7.b. Cosmos 929 Space Station Module (U)

[redacted]

(U) Users—The system tasking and data distribution are probably controlled by the SRF. Additional military organizations as well as possible civilian users are expected to provide tasking and receive data for their particular portion of the payload.

[redacted]

7.c. Spaceplane (U)

[redacted]

(U) Users—Unknown.

[redacted]

(U) Control—Unknown

[redacted]

[redacted]

(U) Performance—Unknown.

[redacted]

8. Military Support (U)

[redacted]

8.b. GLONASS (U)

(U) Mission—Provide air, land, and sea users with instantaneous, worldwide position and velocity fixes by accessing signals from at least three GLONASS

satellites simultaneously. Users requiring a three-dimensional fix, such as those on board aircraft, would have to supplement the satellite data by other means, such as an altimeter, or atomic clock.

[redacted]

8.c. Meteorological Satellites (U)

(U) Mission—To provide cloud imagery and data on atmospheric parameters, ocean conditions, and natural resources to both military and civil customers.

(U) System—Meteor 2 (primarily meteorology-oriented); Meteor-Priroda (primarily Earth-resources-oriented).

[redacted]

(U) Orbit and Network:

(U) Meteor 2—900-km circular orbit 83-degree inclination. Three to four active satellites separated in right ascension by approximately 90-120 degrees, depending on the number of planes.

(U) Meteor-Priroda—650-km circular orbit 98-degree inclination at sun-synchronous altitude. Usually two active satellites, either coplanar or separated by 180 degrees in right ascension.

(U) Performance:

(U) Meteor 2—Primary sensors are a high resolution scanner, an IR sounder, and a temperature sounder.

(U) Meteor-Priroda—Primary imaging sensors are several different kinds of multi-spectral optical mechanical scanners and an electro-optical scanner.

[redacted]

[redacted]

[redacted]

8.f. Oceanographic Research Satellites (U)

(U) Mission—Real-time monitoring of ocean parameters on a global scale for oceanographic research, natural resource investigations, charting of ocean characteristics, and possible anti-submarine warfare.

(U) Users—Primary users appear to be the Marine Hydrophysics Institute of the Ukrainian Academy of Sciences at Sevastopol and the Soviet Hydrometeorological Service. Controllers and additional users appear to be the military. The Administration of the Merchant Fleet is probably responsible for tasking of radar imaging.

[redacted]

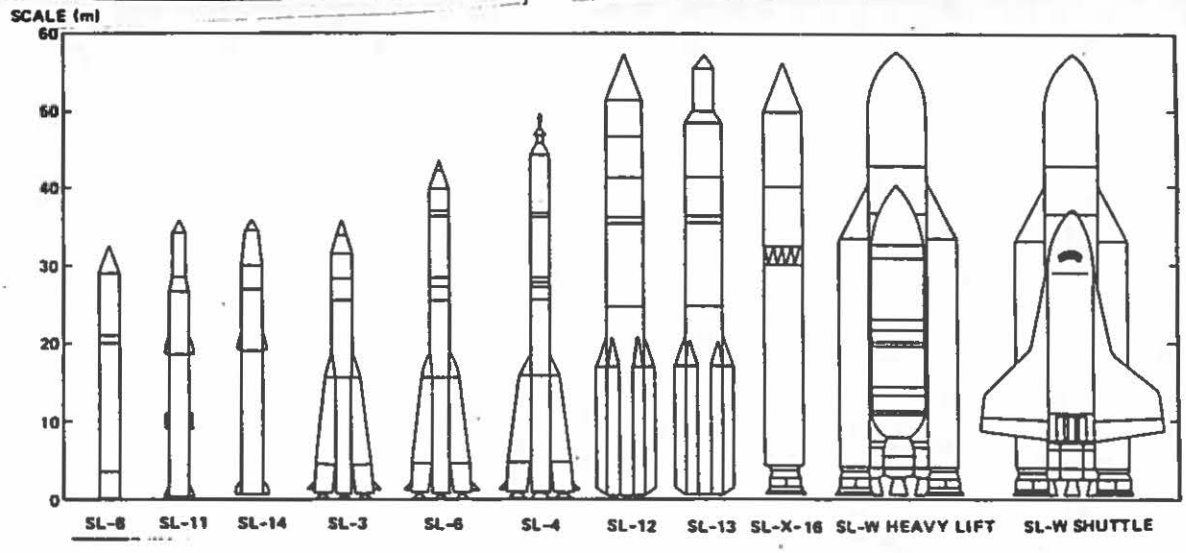
APPENDIX B

SOVIET SPACE LAUNCH VEHICLE OPERATIONAL CAPABILITIES (U)

(U) This Appendix is a brief summary of current and future Soviet space launch vehicle operations. Figure B-1 shows the launch vehicles in size perspective. Appended data on the figure summarizes their launch capabilities. Table B-1 presents the space launch system/launch facility association.

[redacted]

[redacted]



VEHICLE	SL-8	SL-11	SL-14	SL-3	SL-6	SL-4	SL-12	SL-13	SL-X-16[3]	SL-W[3] HEAVY LIFT	SL-W[3] SHUTTLE
PAYLOAD, kg (185 km)*	1775	3950	5600	6300	2100 (1)	7500	(2)	19,600	15,900	100,000	30,000 - 40,000
PAYLOAD, kg (GEOSTATIONARY)	——	——	——	——	——	——	2700	——	——	20,000	6,000 - 8,000
PAYLOAD, kg (EARTH ESCAPE)	——	——	——	700	1200	——	5000	——	——	40,000	12,000 - 16,000

* – 45° INCLINATION ORBIT

1. NOT USED FOR LOW-EARTH ORBIT. CAPABILITY TO 63° INCLINED 12 HR HIGHLY ELLIPTICAL ORBIT.
2. NOT USED FOR LOW-EARTH ORBIT.
3. IN DEVELOPMENT

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Fig. B-1 (U) Soviet Launch System

1(S) [redacted]

~~NOT RELEASABLE TO FOREIGN NATIONALS~~

~~WARNING NOTICE—INTELLIGENCE SOURCES AND METHODS INVOLVED~~

~~Classified By: DST-1400H-252-84~~
~~DECL: OADR~~

LIST OF ACRONYMS

AA/VGK	Air Army of the Supreme High Command (Strategic Aviation) (U)
ABNCP	Airborne National Command Post (U)
ABM	Anti-Ballistic Missile (U)
AGI	Auxiliary Vessel, Miscellaneous Type, Intelligence (U)
ASAT	Antisatellite (U)
ASUW	Antisurface Warfare (U)
ASW	Antisubmarine Warfare (U)
AWACS	Airborne Warning and Control System (U)
AWS	Artillery Weather Service (U)
BDA	Battle Damage Assessment (U)
BIOSAT	Biosatellite (U)
BMD	Ballistic Missile Defense (U)
CBG	Carrier Battle Group (U)
CCD	Charge-Coupled Device (U)
CEP	Circular Error Probable (U)
CIA	Central Intelligence Agency (U)
COMSAT	Communications Satellite (U)
CONUS	Continental United States (U)
CPSU	Communist Party of the Soviet Union (U)
CW	Continuous Wave (U)
C^2	Command and Control (U)
C^3	Command, Control, and Communications (U)
DE	Directed Energy (U)
DF	Direction Finding (U)
DMSP	Defense Meteorological Satellite Program (U)
DSCS	Defense Satellite Communication System (U)
DSP	Defense Support Program (U)
DSP-E	DSP-East Satellite (S)

ECCM	Electromagnetic Counter-Countermeasures (U)
EDL	Electric Discharge Laser (U)
EEI	Essential Elements of Information (U)
EHF	Extremely High Frequency (U)
ELINT	Electronic Intelligence (U)
[redacted]	
EMCON	(Electromagnetic) Emanation Control (U)
EMP	Electromagnetic Pulse (U)
EOB	Electronic Order-of-Battle (U)
EORSAT	ELINT Ocean Reconnaissance Satellite (S)
[redacted]	
ERW	Enhanced Radiation Weapon (U)
EW	Electronic Warfare (U)
FA	Frontal Aviation (U)
FCC	Flight Control Center (U)
FOBS	Fractional Orbital Bombardment System (U)
FOC	Full Operational Capability (U)
FOV	Field of View (U)
GCI	Ground-Controlled Intercept (U)
GEO-LDS	Geostationary LDS (S)
GEOSAT	Geodetic Satellite (S)
G-I-UK	Greenland, Iceland, United Kingdom (U)
GKO	Defense Council (U)
GLCM	Ground-Launched Cruise Missile (U)
GLONASS	Global Navigation Satellite System (U)
GOI	State Optical Institute (U)
GOMS	Geostationary Operational Meteorological Satellite (U)
GOSKOMGIDROMET	USSR State Committee for Hydrometeorology and Control of the Natural Environment (U)
GPS	Global Positioning System (U)

GRU	Main Intelligence Directorate of the General Staff (U)
GS	General Staff (U)
GUGK	Main Directorate for Geodesy and Cartography (U)
HEL	High Energy Laser (U)
HF	High Frequency (U)
[redacted]	
HQ	Headquarters (U)
HUMINT	Human Intelligence (U)
HYDROMET	Civil Hydrometeorological Service (U)
IMBP	Institute of Biomedical Problems (U)
ICBM	Intercontinental Ballistic Missile (U)
IFRB	International Frequency Registration Board (U)
IIKI	Institute for the Study of the Cosmic Emissions (U)
[redacted]	
INTELSAT	International Telecommunications Satellite Organization (U)
IOC	Initial Operational Capability (U)
IR	Infrared (U)
IRBM	Intermediate Range Ballistic Missile (U)
I&W	Indications and Warning (U)
KGB	Committee for State Security (U)
KVTs	Coordinating and Computing Center (U)
KYMTC	Kapustin Yar Missile Test Center (U)
LAN	Longitude of Ascending Node (U)
LANDSAT	Land Satellite (NASA) (U)
[redacted]	
LPI	Low Probability of Intercept (U)
LRA	Long-Range Aviation (U)
LWIR	Long-Wavelength Infrared (U)
MAG	1. Marine Amphibious Group (US) (U) 2. Military Advisory Group (USSR) (U)

MD	Military District (U)
[redacted]	
METSAT	Meteorological Satellite (U)
MHV	Miniature Homing Vehicle (U)
MIRV	Multiple Independently-Targeted Reentry Vehicle (U)
MOC	Ministry of Communication (U)
MOD	Ministry of Defense (U)
MOM	Ministry of General Machine Building (U)
MPCS	Multiple Payload Communications Satellite (S)
MRBM	Medium-Range Ballistic Missile (U)
MX	Missile-X (US ICBM) (U)
NATO	North Atlantic Treaty Organization (U)
[redacted]	
OCEAN	Oceanographic Research Satellite (U)
OTH	Over-the-Horizon (U)
[redacted]	
PHOTOINT	Photographic Intelligence (U)
PKO	Anti-Space Defense (U)
PMSC	Plesetsk Missile and Space Center (U)
PRO	Anti-Rocket Defense (U)
PVO	National Air Defense (U)
[redacted]	
R&D	Research and Development (U)
[redacted]	
RORSAT	Radar Ocean Reconnaissance Satellite (S)
R&T	Reconnaissance and Targeting (U)
RTIS	Real-Time Imaging Satellite (U)
RV	Reentry Vehicle (U)
SAF	Soviet Air Force (U)

UN	United Nations (U)
UPS	Directorate of Government Communications (U)
VIP	Very Important Person (U)
VNIRO	All-Union Research Institute of Marine Fisheries and Oceanography (U)
VPK	Military Industrial Commission (U)
VTA	Military Transport Aviation (U)
VTU	Military Topographical Directorate (U)
YeASS	Unified Automated Communications System (U)