CHAPTER II

SOVIET VIEWS OF SPACE

1. This chapter provides the context of Soviet space programs by describing the main ideas in Soviet thinking about space. In general, the Soviet space program is viewed as an integral part of the political, military, and scientific competition with the United States. It also contributes to Soviet international prestige as a reflection of Soviet scientific and engineering accomplishments and is a potential source of economic benefits. Despite substantial Soviet investments in space, we judge that Soviet leaders assess that the United States leads the USSR technologically in most areas. The Soviets are attempting to restrain US technological improvements that would yield a strategic advantage through diplomacy, arms control, and propaganda campaigns. Within this broad framework of competition in space, military factors dominate Soviet concerns. CIA Statute

Military Factors

2. The Soviet space program serves predominantly military purposes, with approximately 70 percent of Soviet space launches dedicated to missions that provide intelligence collection, reconnaissance, command and control, navigation, target acquisition, and other types of military support. Another 25 percent serve a dual military-civil function. The remaining 5 percent are dedicated to scientific and civilian missions. CIA

3. The Soviets do not consider space to be a demilitarized zone with an international status analogous to that of Antarctica. From the Soviet military perspective, space is viewed as an extension of theaters of operations rather than as a separate arena of conflict. War, in the Soviet view, cannot be waged exclusively in space, and any major conflict on Earth cannot be conducted without involving space systems. Soviet military precepts such as the importance of surprise, the necessity of confusing the enemy, and the use of overwhelming force to secure military objectives, also apply to Soviet military operations in space during a war. Their doctrine calls for attainment of superiority in outer space and maximum space-based military support for Soviet operations on land, at sea, in air, and in space. CIA Statute

4. Military writings indicate that Soviet space systems support a broad range of objectives including supporting strategic nuclear warfare. In the 1960s, space systems mainly supported nuclear warfare programs, with reconnaissance and geodetic satellites providing targeting support, communications satellites facilitating the delivery of early warning messages and orders, and ocean surveillance satellites monitoring nuclear-strike-capable US aircraft carrier battle groups. ASAT operations also were part of early Soviet concerns, with a prototype tested in 1968. Subsequently, Soviet space systems have proved useful in supporting a broader spectrum of military operations during crises and limited conflicts. CIA Statute

5. The Soviets view space systems as an integral part of their overall offensive and defensive force. 25X1

25X1 in conflict, the combat readiness of military assets in space be comparable with that of those forces they are called on to support. Deployment to full strength is to be accomplished before hostilities, and, for crisis deployments, standby spacecraft are to be maintained at launchsites and in space; critical space systems should have ready-to-launch replacements. CIA Statute

6. The Soviets' view of space is in large measure determined by their adversary relationship with the United States. Soviet perception of an overall US lead in space heightens the competition. The Soviets have gone to great lengths to characterize their space program as "peaceful and scientific," in contrast to that of the United States, which they have termed aggressive and militaristic. Indeed, Soviet leaders have consistently shown a preoccupation with potential US space threats. They cite as evidence substantial increases in US spending for military space programs, the establishment of a US Unified Space Command, and a presidential directive for future strategic defense programs. Their concern over US intentions and technological capabilities, an awareness of the limitations of their own space systems, and a desire to

effectively manage their resources for space programs have been the basis for persistent Soviet efforts to negotiate mutual restraints on space activities. CIA

7. Moscow has sought to prohibit or limit the development by the United States of all space-based and antisatellite weapons and to limit potential military uses of the US space shuttle. Moscow launched a major campaign for space arms control in 1983, following the President's announcement of the Strategic Defense Initiative (SDI). Key Soviet arms control moves related to space are summarized in the inset. CIA Statute

8. While seeking to restrain US space programs through international law and arms control negotiations, Moscow will be careful not to propose limits that would affect important Soviet programs. For example, the Soviets have opposed proposals in the United Nations to ban nuclear power in space, because some Soviet satellites are nuclear powered. In some cases, however, the Soviets may be willing to trade off older Soviet systems to preclude deployment of more advanced US systems. The Soviet ASAT orbital interceptor would be a likely candidate for such bargaining. CIA Statute

9. Ultimately, the objective of Soviet diplomatic initiatives and propaganda related to space is to slow down or halt specific US space programs and to prevent US advances in space technology that would yield important strategic advantages. The January 1985 agreement for bilateral talks with the United States, for example, reflected these objectives. As part of the Soviets' political effort to generate domestic and Allied pressure on the United States to refrain from SDI research, they have explicitly linked agreement on strategic arms reductions to a ban on "space strike arms," and claim the US unwillingness to negotiate limits on SDI jeopardizes the prospects for all arms control agreements. Even if the Soviets are unsuccessful in this objective, they derive political benefits from arguing that they are peacemakers whose efforts are blocked by US intransigence. They probably judge that their efforts will, at a minimum, contribute to slowing down US SDI efforts. CIA Statute

Political Factors

10. Accomplishments in space are important to Moscow in terms of both domestic and international politics. Soviet achievements in space are proclaimed by the leadership as symbolic of the Communist Party's commitment to achieving the highest level of

Highlights of the Soviet Space Arms Control Effort, 1983-85

1983

— Proposed a multilateral treaty to ban the threat of force to and from space. This would prohibit attacks by space-based weapons on space-, ground-, and air-based targets, prohibit attacks on space objects from the ground or anywhere else; eliminate existing ASAT systems; and prohibit the testing and use of reusable space vehicles for military purposes.

— Announced a unilateral moratorium on deploying ASAT weapons in outer space, as long as other countries, including the United States, also refrained from doing so.

1984

— Proposed bilateral talks with the United States to establish constraints on space weapons of any kind, including weapons deployed for ASAT or ABM defense regardless of basing mode.

— Proposed reciprocal moratorium on testing and deployment of any kind of space weapons.

1985

— Agreed to enter into talks with the United States "to work out agreements aimed at preventing an arms race in space and at strengthening strategic stability." These talks include the entire spectrum of both offensive and defensive weapons, including space-based systems.

— Proposed a moratorium and ban on the development (including scientific research), testing, and deployment of "space strike weapons." Included would be space-based ABM systems, all antisatellite systems regardless of basing, and space-based weapons intended to strike targets in the Earth's atmosphere or on the Earth's surface.

— Announced that the Soviet Union considered itself free of its 1983 unilateral moratorium not to place ASAT systems in space following the US ASAT test in September 1985.

— Called for a reaffirmation of the 1972 ABM Treaty.

— Proposed an agreement to ban antisatellite weapons and destroy existing systems as a first step toward preventing what was termed an arms race in space.

This information is Unclassified.

scientific and technological progress for Soviet society and, in general, to maintaining a level of scientific achievement commensurate with that of the United States and other Western countries. Soviet accomplishments in space serve as an important symbol of national pride and achievement, and cosmonauts are considered national heros. The political importance of space programs in the USSR, however, also creates expectations that the USSR will continue to make important advances in space. CIA Statute

11. The Soviets have compiled and publicized an impressive array of space records, including the first satellite, the first man to orbit the Earth, the first space walk, the first automatic resupply spacecraft, the first spacecraft refueling, the first woman in space, the first extravehicular activity by a woman, the first space station crew rotation, and the largest total man-days in space. They have also gained substantial international recognition from such projects as unmanned expeditions to Venus; the hosting of cosmonauts from other countries on their Salyut space stations; and the COSPAS satellite, which, in a joint program with the United States, France, and Canada, has located emergency signals from ships and aircraft in distress. CIA

12. If the Soviet Union were able to establish itself as the unquestioned leader in the exploration and use of space, it would significantly enhance its status and influence as a superpower, which currently is almost wholly dependent on its military capabilities. The Soviets desire such a position of leadership and are working toward this goal. One of the motivations of the expensive Soviet manned space program, which includes the nationally declared goal of a large and permanently manned space station, is to regain their reputation of world leadership in space that they lost with the successful US Moon landings and shuttle flights. Accordingly, Moscow is likely to view a US commitment to a reinvigorated space program, including plans for a manned space station, as a challenge to their competitive position. CIA Statute

13. International law is a major focus of Soviet diplomacy on space issues and is seen by the Soviets as a way to protect their freedom to explore and exploit space. International law is also seen as a way to restrict US activities that threaten the USSR's strict control of its resources, activities, and populace. Soviet officials acknowledge the right of free passage through space that was established by the 1967 Outer Space Treaty. However, they claim certain space activities are illegal and reserve the right to take appropriate actions. Illegal activities, in the Soviets' assertions, include space-based intelligence gathering that is for other than treaty verification, as well as direct-broadcast satellites that could interfere with their control of the flow of information to their populace. They have expressed the view that a state has the right to use any means to counteract such activities not only within its own territory, but also in outer space. CIA Statute

14. In addition, since 1972 the Soviet Union has sought to define outer space as beginning at 100 to 110 kilometers above sea level. Although we are unsure of their motivations, the proposal may reflect the Soviets' concerns about US manned spacecraft, in particular the shuttle, that they claim could carry weapons into space and could pass through Soviet national airspace on its way to and from space. The Soviets maintain that the definition of outer space should preclude claims made by some equatorial states to control space over their territories, including key geostationary orbit positions. CIA Statute

15. The Soviets continue to claim that other nonweapon space activities conducted by the United States are a threat to their physical and political security. At the 1978-79 US-USSR antisatellite talks, the Soviets expressed their concern about possible hostile actions that could be taken against the Soviet Union by means of satellites. Their definition of hostile activities includes direct-broadcast television satellites and space systems that violate Soviet airspace or territory, damage the environment, or violate Soviet sovereignty. The Soviets have also expressed concern about the maneuverability of the US space shuttle because of some inherent ability to make close approaches to Soviet satellites and space stations for inspection, interference, or retrieval purposes. CIA

16. The Soviets have attempted to prevent the release to third parties of imagery collected from space-based remote sensing systems. Moscow has proposed a set of international legal principles to govern the dissemination of remote-sensing data that could affect the US Government's ability to share strategic information with allies. Similarly, the ability of the US private sector to profit from the sale of remote-sensing data also could be adversely affected. CIA Statute

Economic Factors

17. The Soviet space program has yielded some important benefits to the Soviet economy and has aided in the development and control of vast regions in the USSR. In particular, communications satellites have permitted remote areas to be interconnected

without the difficulty, time, and expense of laying cables through difficult terrain. Telephone and television services have been expanded to cover most of the country. Another important economic benefit is the acquisition of agricultural and geological information that can assist in the development of Soviet agriculture and extraction of natural resources. However, despite these economic benefits, large transfers of technology to the civil sector have not yet occurred, due in part to military priorities and the secretive nature of the Soviet space program. CIA Statute

18. Some economic intelligence on foreign harvest prospects and natural resource developments probably has been derived from space systems. This information could provide Moscow with some advance knowledge of international market trends. 25X1 25X1 In addition to using information derived from space, telecommunications and space launch services are being marketed by Moscow, often at prices below Western competitors. These efforts have been largely unsuccessful to date, although changes in the structure of international markets for space services may provide important opportunities for the Soviets in the future. Another possible economic benefit could be realized from manufacturing and materials processing in the gravity-free environment of space. (See chapter IX for more detailed discussion.) CIA Statute

CHAPTER III

SPACE SUPPORT INFRASTRUCTURE

1. This chapter forecasts important developments in the organizations and facilities that design, produce, launch, and control Soviet spacecraft. Of particular importance is Soviet progess in developing two new launch vehicles, the medium-lift SL-X-16, and the heavy-lift SL-W, along with their associated launch facilities. CIA Statute

Design Bureaus

2. Soviet space systems are developed within the context of a leadership commitment that is supported by a long-range planning process and a management style that places a premium on both adherence to schedules and an incremental approach to follow-on improvements. As a result, the design bureaus are continually working on new and modernized space systems in different stages of development. Projects are assigned to design bureaus as soon as the basic and applied research and feasibility tests are completed. Competition is seldom involved, and most of the developmental space systems are eventually produced. This process, instituted about 1960, tends to simplify the early stages of development, but it probably tends to inhibit the introduction of new technologies. CIA

3. The development and production of Soviet space systems is carried out at six main design bureaus, several of which have undergone significant expansion since the early 1970s (see figure III-1). 25X1
25X1
CIA Statute

Space Launch Vehicles

4. Currently, eight space launch vehicles (SLVs) are used to support Soviet launch requirements (see figure III-2). Six of the eight are derivatives of intermediate-range ballistic missile (IRBM) or intercontinental ballistic missile (ICBM) boosters.[3] The first boosters designed exclusively for a space launch role were the Proton (SL-12/13) family of boosters, introduced in 1967. The medium- and heavy-lift launch vehicles now in development are also designed specifically as SLVs. The overall reliability of Soviet SLVs is high. 25X1
25X1
We expect the Soviets to maintain this high level of reliability as they introduce new SLVs. CIA Statute

5. About 10 to 15 Proton boosters are produced each year in two versions: the SL-12 four-stage and the SL-13 three-stage launch vehicles. Two launchpads are currently available for use, and two others are being refurbished and should be available within the next year or two. The Proton probably will continue to be used to launch most of the new communications satellites into geosynchronous orbit, some planetary probes, and space station modules. Also, Protons are being offered for commercial launch services to foreign customers. The fact that TV footage of the Venus/Halley's Comet launch in December 1984 was released may indicate a new Soviet willingness to be more forthcoming with data on the Proton launch vehicle—a requirement for commercial launch services (see figure III-3). CIA Statute

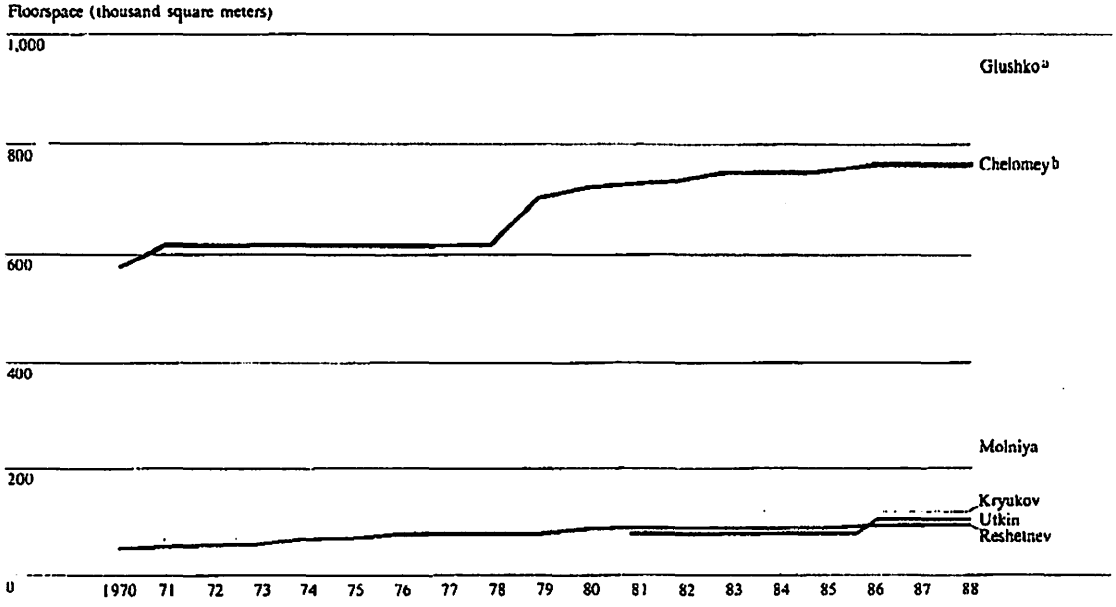
6. Normally the SL-12 is used to place satellites into high-altitude orbits. 25X1
25X1
25X1 CIA Statute

7. Two new space launch vehicles are expected to become operational in the next several years (see

[3] We assess that the SL-3 booster has been phased out of the active inventory, but it could be used in a reserve role. CIA Statute

[2] For the purposes of this Estimate, design bureaus are referred to by the name of their director, except for the Scientific Production Organization Molniya, whose director is not known, and the Chelomey design bureau. 25X1
25X1 CIA Statute

Figure III-1
Growth of Major Soviet Space Design and Production Facilities



[a]Includes Plant 1 in Kuybyshev.
[b]Includes design bureau and production facilities in Reutovo and Fili.

CIA Statute

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figure III-4). The medium-lift SL-X-16, formerly referred to as the SL-Y, is a two-stage liquid-propellant vehicle having a lift capability between that of the SL-4 and the SL-12/13 (that is, a capability to place about 16,000 kg into low-Earth orbit). Payloads could include a full-scale version of the spaceplane and new, heavier reconnaissance satellites. The SL-X-16 could have a quick-reaction capability. (See chapter VII for more details.) CIA Statute

8. 25X1
25X1
25X1 Therefore, the Soviet shuttle program and its payloads and the SL-W and its payloads, are all dependent upon successful test and development of this launch vehicle. For this reason, the SL-X-16 first stage is critical to the future of the Soviet space program. We now estimate that the SL-X-16 will become fully operational in 1986. Although previously we had estimated that the SL-X-16 would be operational by 1984 25X1
25X1
25X1 but perhaps this is because of technical difficulties or extreme measures taken to reduce the risk of failure. CIA Statute

9. We expect the SL-W heavy-lift launch vehicle to be flight-tested for the first time in 1986. If early tests are successful, we estimate the SL-W would be flight-tested with a shuttle orbiter in 1987, when construction of a suitable launchpad is completed. Any serious delays in this program would adversely affect several future space systems. 25X1
25X1
25X1 CIA
CIA Statute

10. The SL-W and shuttle orbiter closely resemble the US Space Transportation System, except that the

Table III-1
Soviet Design Bureaus for Major Space Systems [a]

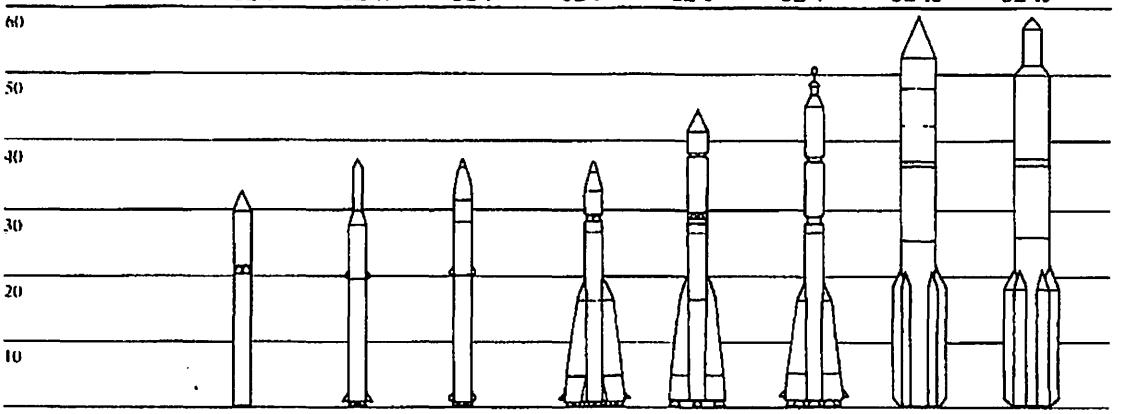
Design Bureau	Current Space Systems	Developmental Space Systems
Chelomey	ASAT orbital interceptor ASAT target vehicle [b] ELINT ocean reconnaissance satellite Radar ocean reconnaissance satellite SL-12/13 Proton launch vehicle	Improved radar ocean reconnaissance satellite Improved Proton launch vehicle
Glushko	Photoreconnaissance satellite Photogeophysical satellite Earth resources photographic satellite Salyut space station 25X1 Biological satellite SL-3, SL-4, and SL-6 launch vehicles SL-12 fourth-stage booster	Heavy-lift launch vehicle (SL-W) Space tug Space-based laser ASAT Imaging reconnaissance satellite (IMSAT) 25X1
Kryukov	Lunar missions Prognoz/Intershock Launch detection satellite	Geosynchronous launch detection satellite Lunar polar orbiter [c] Lunar far side sample return module [c] Jupiter probe [c] 25X1
Reshetnev	MPCS communications satellite SPCS communications satellite Molniya communications satellite Gorizont communications satellite Ekran communications satellite Raduga communications satellite ELINT reconnaissance satellite [b] Radar support satellite [b] Calibration satellite [b] Naval support satellite Geodetic satellite 25X1	Potok data transmission satellite Satellite data relay systems Hybrid military comsat Hybrid civil comsat GLONASS 25X1
Utkin	Scientific satellites SL-8 launch vehicle SL-11, SL-14 launch vehicles Meteorological satellite 25X1	Geosynchronous meteorological satellite (GOMS) [b] 25X1
Molniya	None	Shuttle orbiter Spaceplane [b]

[a] In addition to those programs listed, projects to modify current systems also may be under way.

25X1

CIA Statute

Figure III-2
Current Soviet Space Launch Vehicles



	SL-8[a]	SL-11[b]	SL-14[b]	SL-3[c]	SL-6[c]	SL-4[c]	SL-12	SL-13
Maximum payload weight (kg) to 185-km orbit	1,800	4,000	5,600	5,900	7,500	7,500	19,000	19,600
Payload weight (kg) to geosynchronous orbit	NA	NA	NA	NA	NA	NA	2,700	NA
Payloads	25X1 Naval support Geodetic ELINT-2 Radar support ASAT target Scientific 25X1	ASAT RORSAT EORSAT	ELINT-3 Scientific Meteorological Ocean research	ELINT 3 Meteorological	Molniya Prognoz Launch detection	Soyuz Progress Photorecon	Ekran Gorizont Raduga Venera Mars Luna Astron 25X1	Salyut Space station module
Launches in 1985[e]	18	5	20	1	15	37	10	1
Launchsites								
Kapustin Yar 7C[f]	●							
Plesetsk 1[f]				●	●	●		
2				●	●	●		
3				●	●	●		
9	●							
10[f]	●							
27[f]			●					
Tyuratam A-1				●	●	●		
B-1				●	●	●		
G-1A/B		●						
G-3/4							○	○
U-1/2							●	●

[a] Derived from SS-5 IRBM
[b] Derived from SS-9 ICBM
[c] Derived from SS-6 ICBM
25X1
[e] As of 15 December 1985
[f] These sites have two launchpads
● Operational launchsite
○ Under refurbishment

CIA Statute

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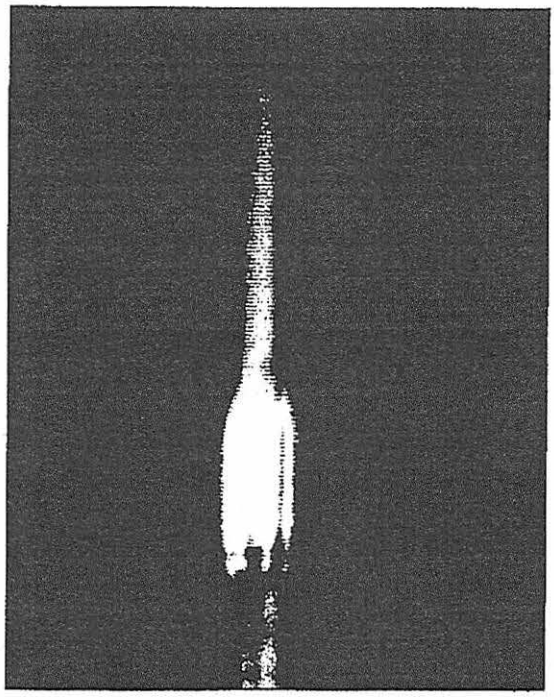
Figure III-3
Proton Launch of Venus/Halley's Comet Probe



Unclassified
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main engines are attached to the core component, not to the shuttle orbiter, and the Soviet booster will utilize four strap-on boosters rather than two on the US version. 25X1

25X1

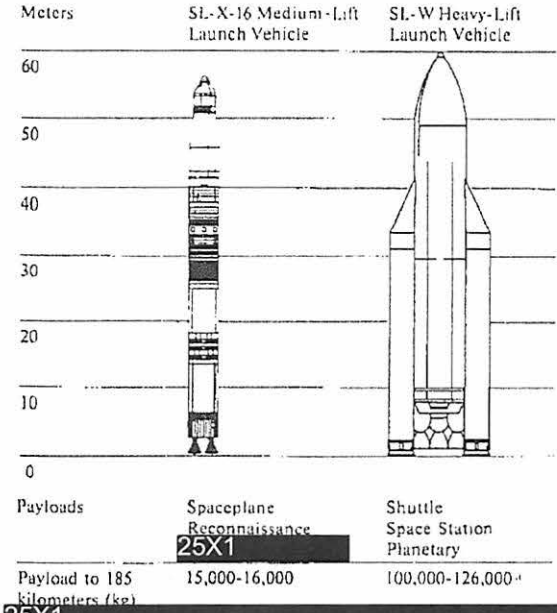
25X1

CIA
CIA Statute

11. 25X1

25X1 Such a configuration could carry large payloads (about

Figure III-4
Soviet Space Launch Vehicles in Development



25X1

CIA Statute

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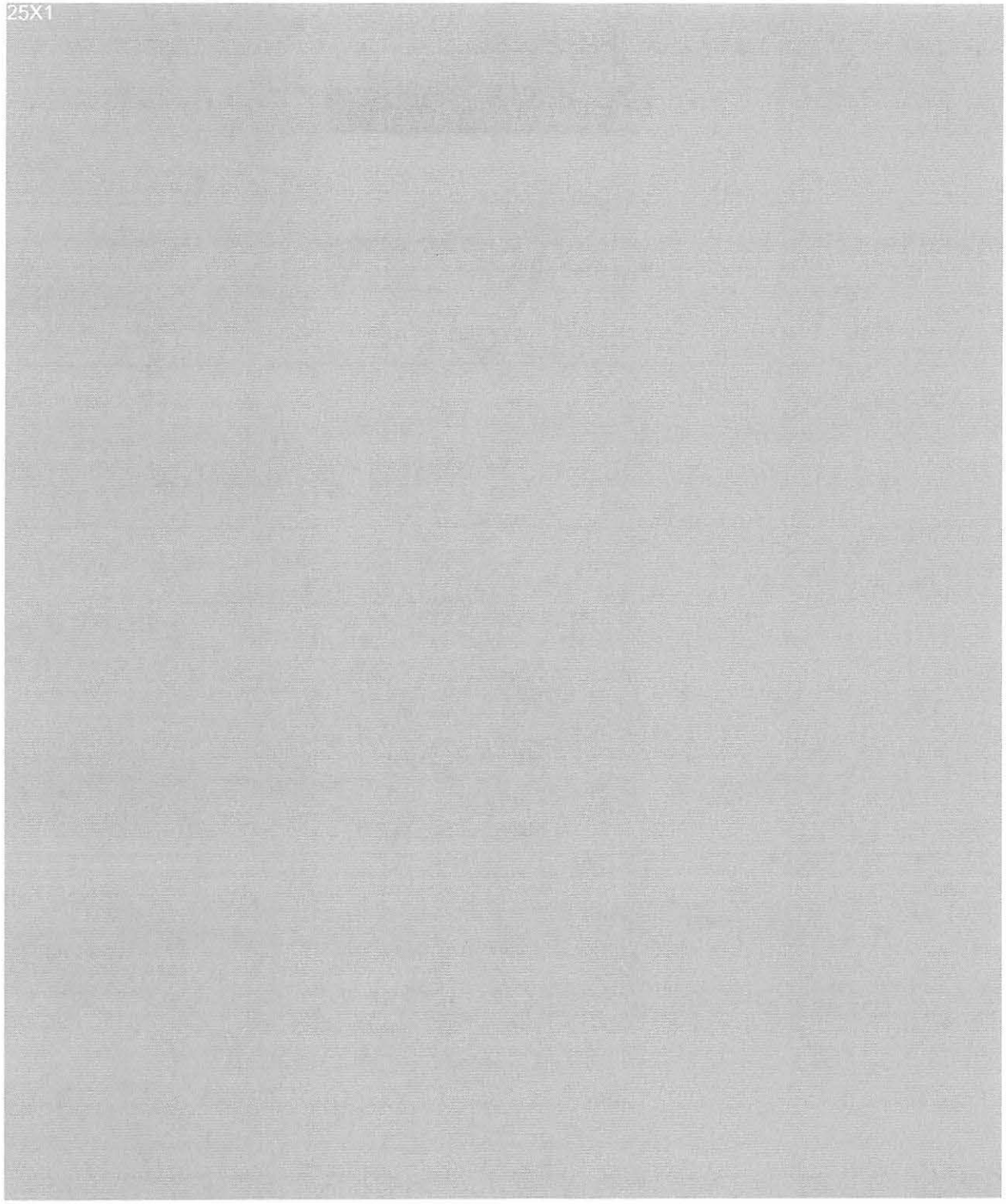
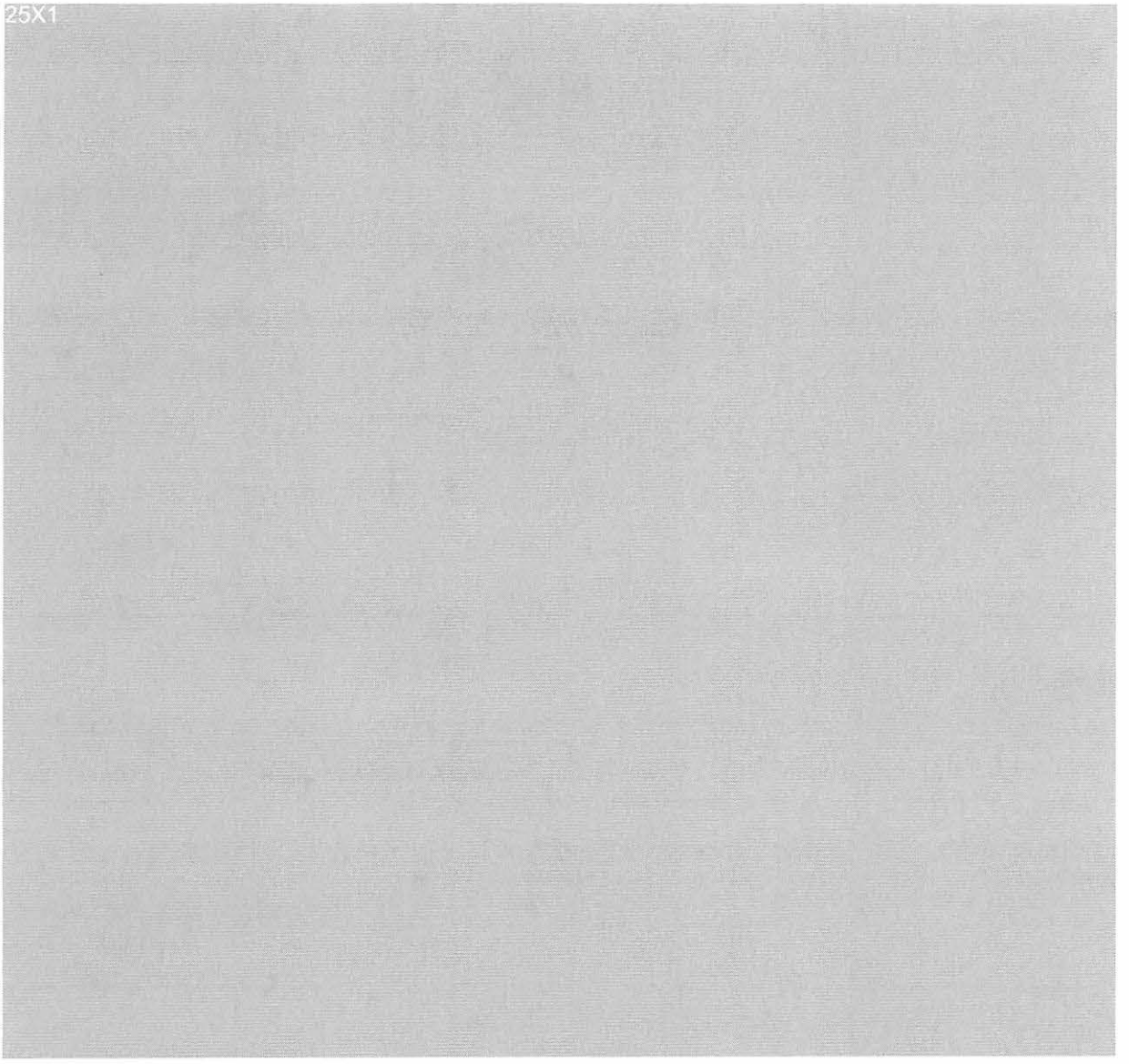
100,000 to 126,000 kg, like the US Saturn V–class booster) to low-Earth orbit or include a package with a separate engine to boost payloads into geosynchronous orbit. This type of vehicle could be used to launch payloads such as large components of a space station and to launch lunar or interplanetary missions. A heavy-lift capability would also be a prerequisite to Soviet deployments of directed-energy weapons in space for ballistic missile defense purposes. CIA Statute

12. In addition to the SL-X-16 and SL-W, other space launch vehicle developments should be noted. The use of the SL-14 launch vehicle is expected to

25X1



25X1



increase in the future, mainly to orbit ELINT-3 and meteorological payloads, eventually replacing the SL-3 for these missions. We do not expect the Soviets to phase out any of their SLVs before 1990, despite the fact that most of their designs are over 25 years old. CIA

Space Launch Facilities

13. Soviet space launch facilities will soon be expanded with the completion of three launchpads under construction. This will bring to 24 the total number of space launch positions at the three major launch centers—Tyuratam, Plesetsk, and Kapustin Yar. Currently about 100 space launches are conducted from these facilities per year. All of the launch centers are operated by the Soviet Strategic Rocket Forces (SRF). CIA Statute

14. Extensive construction continues at Tyuratam. 25X1

and the second should be completed by 1987. The SL-W will be launched from Tyuratam Site W, which was completed in late 1984. In addition, Site J-2 also is

being converted for the SL-W, and Site J-1 (severely damaged in an accident in 1969, 25X1
25X1
25X1 Redundant sites also ensure that critical programs will be less affected if one site is damaged by an on-pad accident. A runway at Tyuratam for shuttle orbiter recovery was completed in 1983, 25X1
25X1 Another similar runway has been completed in the Far East, 25X1 (near Vladivostok), 25X1
25X1 Large new buildings are also nearing completion at Tyuratam for servicing of the Soviet shuttle orbiter and for payload handling. CIA Statute

15. About 70 percent of Soviet space launches take place at Plesetsk. To date, only the smaller series of boosters (SL-4, SL-6, SL-8, and SL-14) have been launched from Plesetsk. Larger payloads and geosynchronous comsats are launched from Tyuratam, and, to date, all manned launches have occurred from there. It is unlikely that Plesetsk will be used to launch the new series of SLVs within the next 10 years because no launch facilities for them exist 25X1
25X1 CIA Statute

16. Kapustin Yar, with only two space launchpads for the SL-8, will continue to play a limited role, providing only about 1 to 3 percent of the space launches. Should the USSR become more actively involved in providing space launch services to foreign customers, Kapustin Yar would be a logical location. The Soviets have in the past launched small payloads for foreign customers, and the SL-8 is the only space booster launched from that area. However, heavier payloads beyond the capability of the SL-8 cannot currently be launched from Kapustin Yar. CIA Statute

Space Mission Control Network

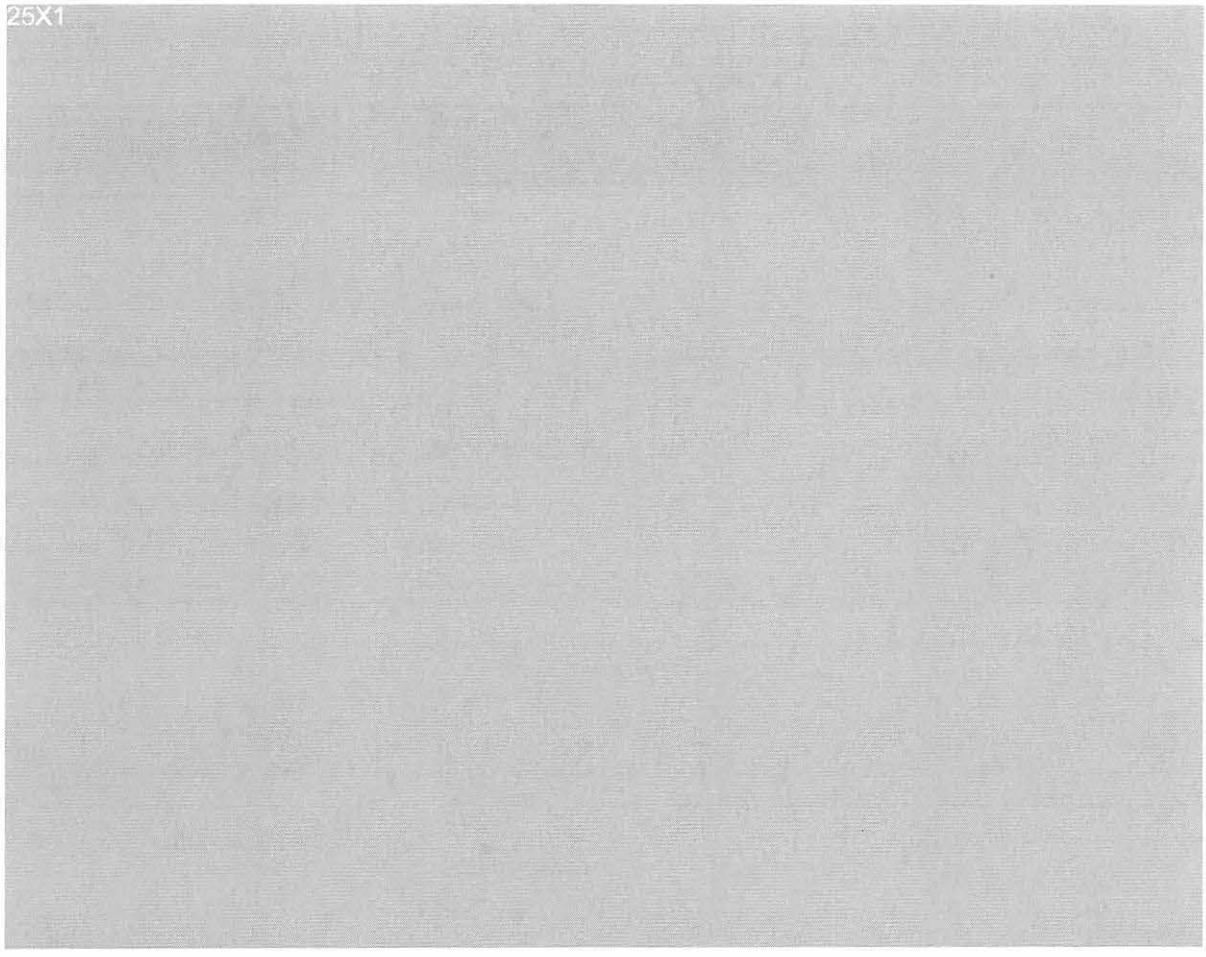
17. 25X1
25X1
25X1 25X1
25X1

25X1

Space Nuclear Power Systems

21. There continues to be a great deal of Soviet interest in nuclear energy for space applications. The

25X1



RORSAT, a military satellite for radar surveillance of ships, is the only Soviet space system known to use a nuclear reactor power supply. Using a reactor power source instead of solar cells provides independence from the sun's position and inherent radiation hardness. When a RORSAT reactor was involved in an embarrassing reentry mishap in 1978, which scattered radioactive debris in Canada, the system was not abandoned, but modified so that the chances that debris would reach the Earth's surface would be reduced should any similar occurrences happen in the future. The Soviets have apparently remained committed to reactors in space, and a program for further development of space reactors may be under way.

CIA Statute

22. There are a number of other applications for which the Soviets might find a reactor in the RORSAT class useful. These include power supplies for either a powerful space radar for detection of aircraft and cruise missiles or a military communications satellite capable of operating in the adverse electromagnetic environment following a nuclear detonation. Other missions might include power for a large manned space station, a manned lunar base, or an unmanned deep-space probe.

25X1

25X1 the Soviets may be involved in a thermionics reactor program. Such reactors might be able to produce up to a few hundred kilowatts (electric), as compared with the current RORSAT reactor estimated at about 2 KWe.

CIA Statute

23. Recent open-source information reveals that the Soviets may be developing a 400-watt (electric) radioisotope thermoelectric generator (RTG). If used for powering a spacecraft, this would represent the first Soviet use of an RTG since 1965. RTG power sources were used in the successful US Pioneer, Viking, and

Voyager interplanetary missions. Soviet planetary missions to date have relied on solar cells and batteries for electric power. However, solar power systems are unsuitable at significant distances from the sun. The Soviets may plan to use an RTG to power their unmanned Mars-Phobos mission scheduled for 1988. CIA Statute

24. ***Reactor-Driven Space Weapons.*** One major application for space nuclear power would be to generate the high levels of power needed for space-based advanced technology weapons. Nuclear reactors are among the most promising means of generating megawatt levels of electric power that weapons such as neutral particle beam accelerators or electromagnetic railguns require. Production of power of this magnitude is not possible with the current generation of Soviet reactor technology and will require a different form of power conversion. Soviet research programs for future generations of reactors have long been under way. The Soviets have expressed an interest in using reactors as a direct pumping source for lasers. These also may have some application to the development of a space weapon system. However, because of technological constraints, we do not anticipate the initial testing of a nuclear reactor for Soviet space-based weapons within the next 10 years. CIA Statute

25. ***Nuclear Energy for Space Propulsion.*** There are two general concepts for using nuclear energy for space propulsion: a nuclear electric power source driving an ion-thruster engine and direct heating of a working fluid such as in a conventional chemical rocket. The Soviets are already using small ion thrusters driven by conventional electric power sources, and a small engine using a RORSAT-class nuclear reactor is probably within their near-term capabilities. CIA Statute

26. If the Soviets are developing a nuclear propulsion system for near-term employment, possible applications include a "space tug" for orbital transfer or a high-endurance engine to shorten interplanetary missions. However, future applications will require far more difficult technologies than have been demonstrated to date. 25X1

25X1

25X1 CIA Statute

CHAPTER IV

SPACE SYSTEMS FOR MILITARY AND CIVIL SUPPORT

1. Soviet space systems support both military and civil functions, and clear distinctions between Soviet military and civil space systems are not always possible because some systems perform both military and nonmilitary functions. In figure IV-1 all of the currently operational Soviet space systems are categorized according to their mission and function. Those space systems that perform a purely military function have accounted for about 70 percent of the annual launches over the last five years. The number of missions fulfilling a dual military-civil function has grown since the 1970s and now accounts for about 25 percent of annual launches—those of a strictly civil nature, about 5 percent CIA Statute

2. The USSR currently maintains about 140 to 150 active satellites in orbit, 30 to 40 more than were active in 1983 25X1
25X1
25X1
Figure IV-2 illustrates the distribution of satellites for both the United States and the USSR in nine major categories, both in terms of satellites launched and satellites in orbit. CIA

3. There are several reasons for the large difference between the annual launch rates of the United States and the USSR:

- Soviet satellites are relatively short lived, with most having lifetimes of less than two years due in part to design and technology limitations, while US satellites routinely reach lifetimes of seven years or more.
- The Soviets have relied on networks of satellites in other than geosynchronous orbits 25X1
25 This, coupled with the short lifetime, results in most of the annual launches being for replenishment of these networks.
- Almost one-third of all Soviet launches are photographic reconnaissance missions, which are of short duration (13 to 59 days). CIA Statute

Imagery Collection

4. Photoreconnaissance satellites are the most frequently launched satellites in the Soviet space program, accounting for about one-third of all Soviet spacecraft launched each year. We anticipate that an average of about 25 to 30 photoreconnaissance satellite launches will be required annually for the next five years to maintain a nearly continuous photoreconnaissance capability. This launch rate is not expected to decrease substantially despite increases in satellite lifetime and the introduction of the new electro-optical, near-real-time imaging reconnaissance (IMSAT) system. We expect the IMSAT system initially to complement rather than replace the present film-return photoreconnaissance systems by taking on an increasing share of the time-urgent missions; by 1995, however, an IMSAT-type system would probably replace some of the present film-return systems. CIA Statute

25X1

5. A major feature of the Soviet photoreconnaissance satellite program is the ability to replace failed satellites quickly and to surge to meet crisis requirements. 25X1
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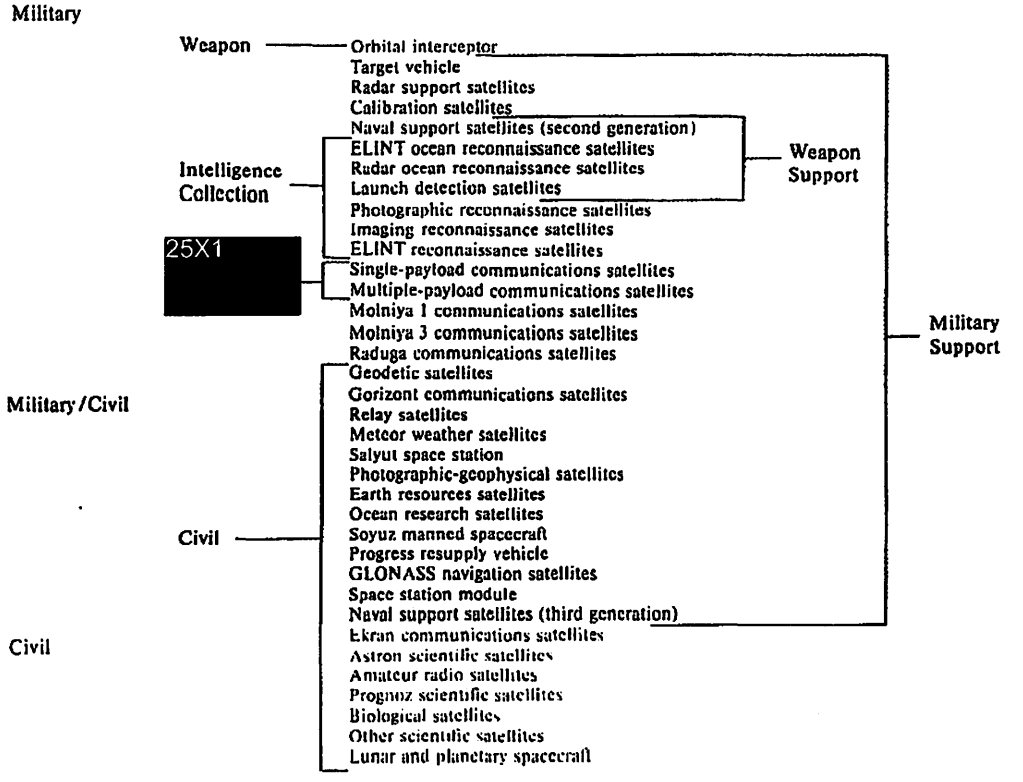
Chapter VII further describes Soviet photoreconnaissance satellite operations. CIA Statute

Figure IV-1
Categories of Operational Soviet Spacecraft



CIA Statute

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6. 25X1

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25X1 CIA Statute

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25X1

25X1 Evidently the requirement for technical intelligence is filled by other collection means, 25X1

25X1

7. 25X1

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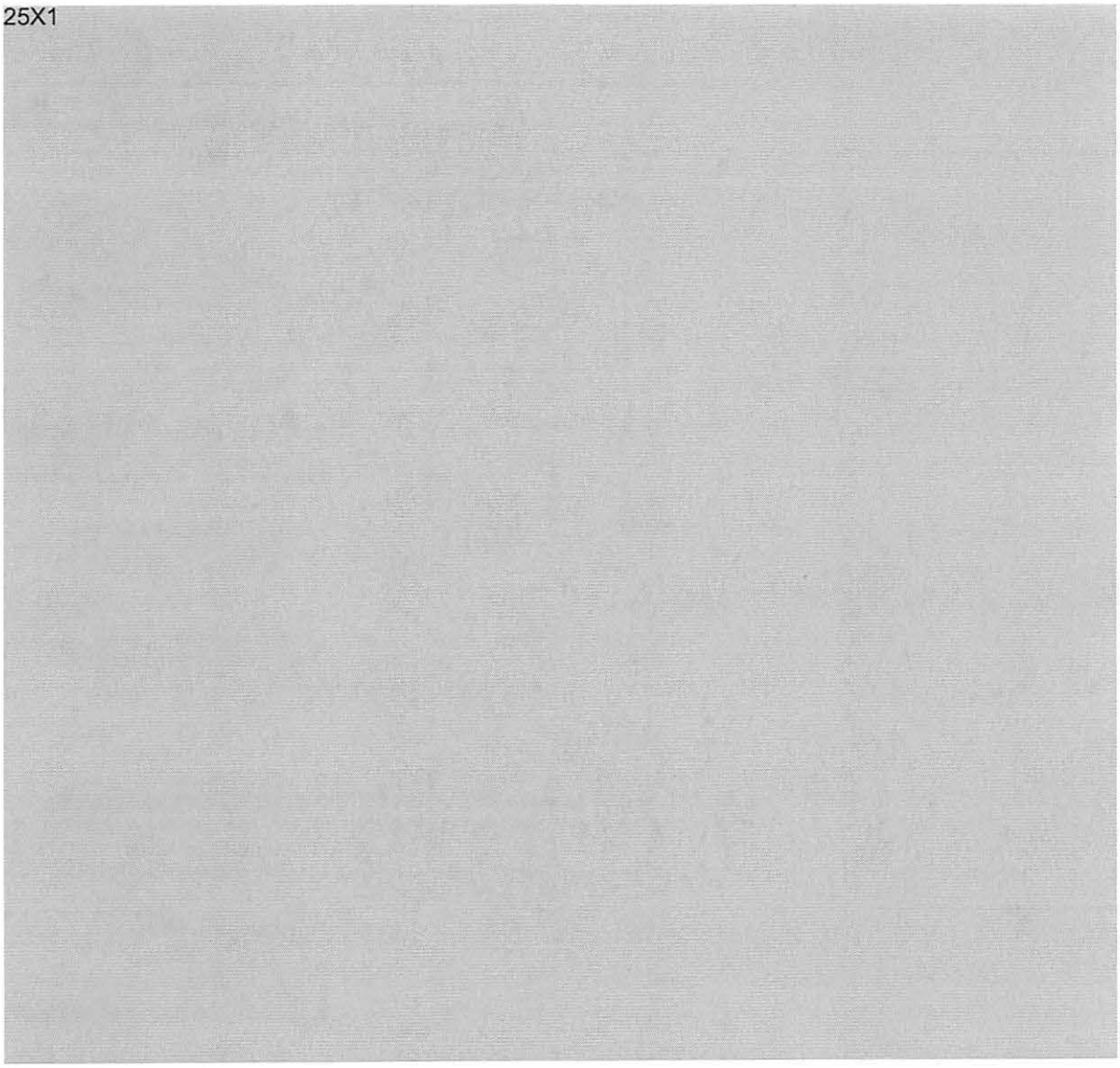
25X1 CIA Statute

Figure IV-2
Comparison of US and Soviet Space Operations

25X1



CIA Statute

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8. 25X1
25X1
25X1 CIA Statute

9. 25X1
25X1
25X1 CIA Statute

10. We expect a network of two to four IMSATs, supported by multiple data relay satellites, to reach full operational capability in about 1988-89. 25X1
25X1 the network size may be increased to eight imaging satellites in the early 1990s.
25X1
25X1 CIA Statute

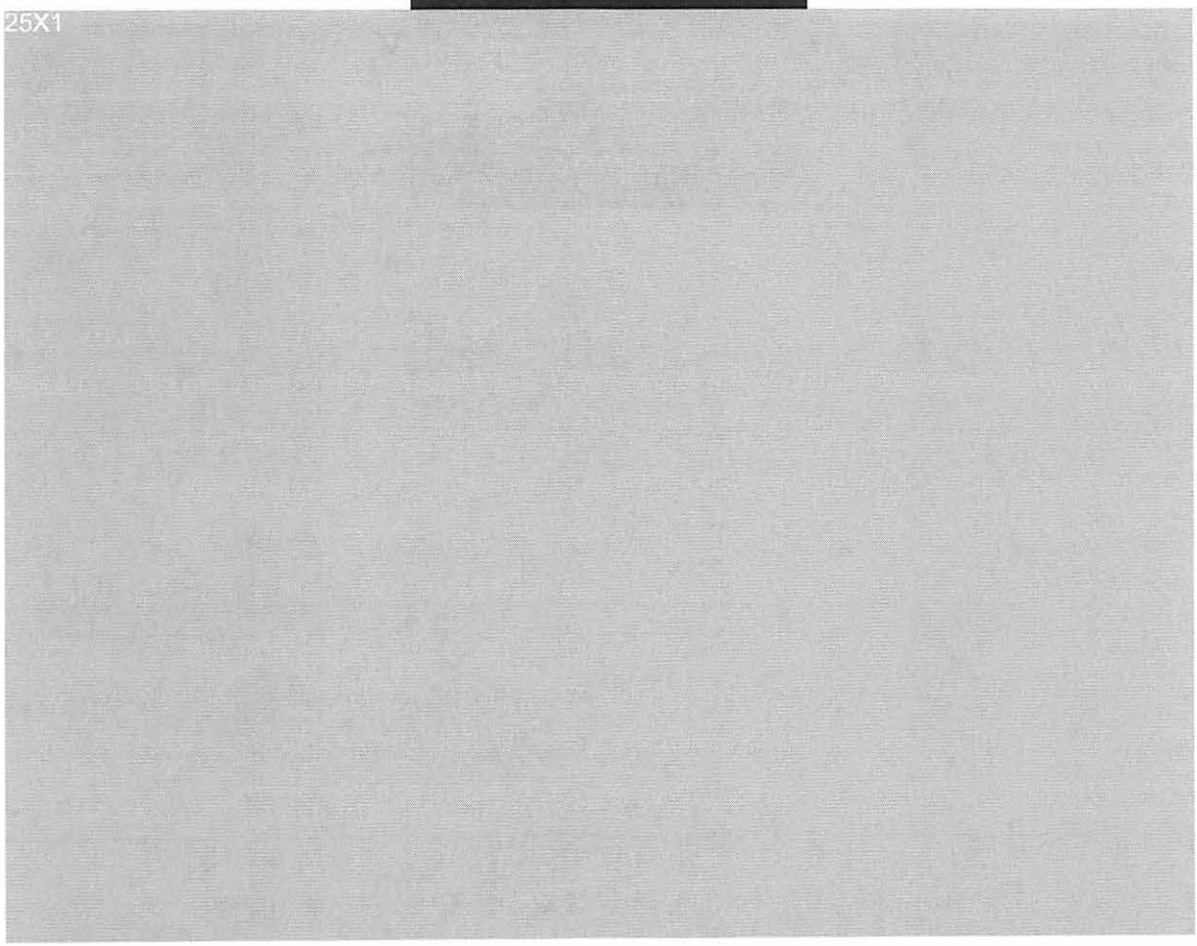
Radar Imaging

11. A radar-imaging system could augment the Soviets' photoreconnaissance satellite systems by obtaining images in all types of weather and lighting conditions. A space-based synthetic aperture radar (SAR) is the most likely means for providing this capability. Test flights of SARs on aircraft have been conducted since 1971 for nonacoustic antisubmarine warfare (ASW) research. 25X1
25X1

25X1
CIA Statute

25X1
25X1 CIA Statute

12. We estimate there is an even chance the Soviets will decide to develop an unmanned space-based radar imaging system with resolution sufficient for intelligence collection purposes. We base the belief on the status of present Soviet programs and a perceived need for this type of data. We estimate the likelihood of orbital flight-testing of a prototype system using ground-based processing by the mid-1990s to be moderate to high. 25X1
25X1
25X1 CIA Statute



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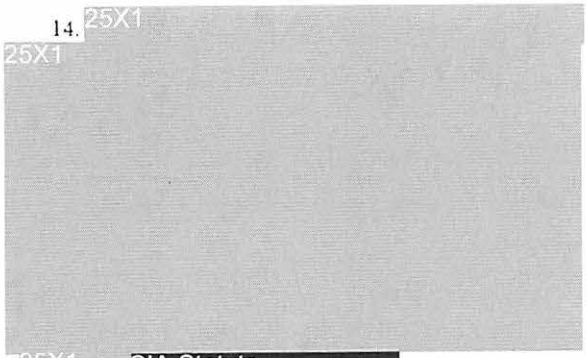
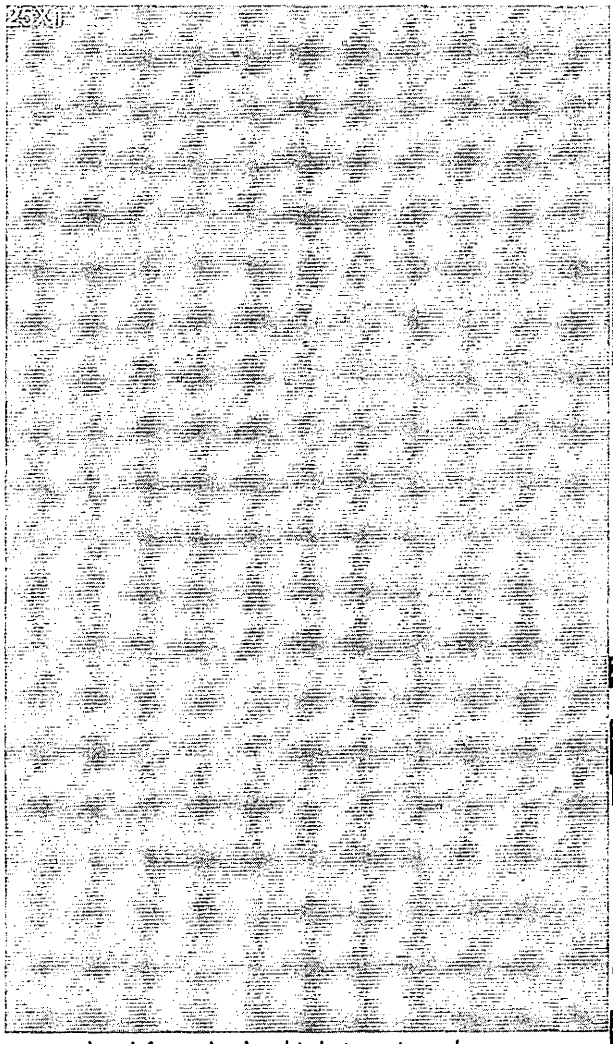
SIGINT Reconnaissance and Surveillance

13. SIGINT systems include electronic intelligence (ELINT) systems that collect emissions from devices such as radars, communications intelligence (COMINT) systems that intercept foreign communications, and foreign instrumentation signals intelligence (FISINT) systems that monitor telemetry and similar data. Currently, the Soviets do not have either COMINT or FISINT satellites. However, they have two types of ELINT reconnaissance satellites—the second-generation and the third-generation ELINT satellites. In addition, there is a third type, an ELINT ocean reconnaissance system (EORSAT), which is used primarily for naval targeting and is discussed separately.

14.



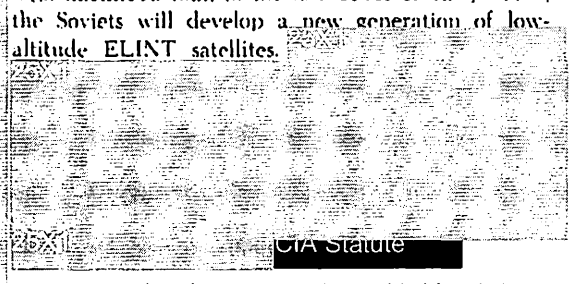
15. With the launch of Cosmos-1633 in March 1985, a fully operational third-generation (ELINT-3) network, consisting of six evenly spaced satellites, was



completed for only the third time since the program began in 1970. CIA Statute

16. 25X1
25X1
25X1 CIA
CIA Statute

17. By the end of this decade, it is probable that evolutionary improvements will be made to the current ELINT systems. These improvements would most probably include continuous coverage, real-time transmission, and tactical land battle support. There is a high likelihood that, in the late 1980s or early 1990s, the Soviets will develop a new generation of low-altitude ELINT satellites.



25X1 CIA Statute

18. We judge there is a moderate likelihood that a high-altitude ELINT system will be operational by 1990. The technology necessary to develop such a system already is available to the USSR. The requirements for such a satellite would most likely include long-duration surveillance of an emitter to determine its technical characteristics. Such coverage is not possible from low-orbiting satellites that quickly pass over targets. 25X1
25X1 A 10-meter-diameter antenna was deployed on Salyut 6. 25X1
25X1 Large high-gain antennas (20- to 30-meter diameter) would be required on high-altitude collection satellites to provide sensitivity for the detection of low-power signals radiated from emitters on the Earth's surface. 25X1
25X1
25X1 CIA

19. 25X1
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25X1 CIA Statute

20. 25X1
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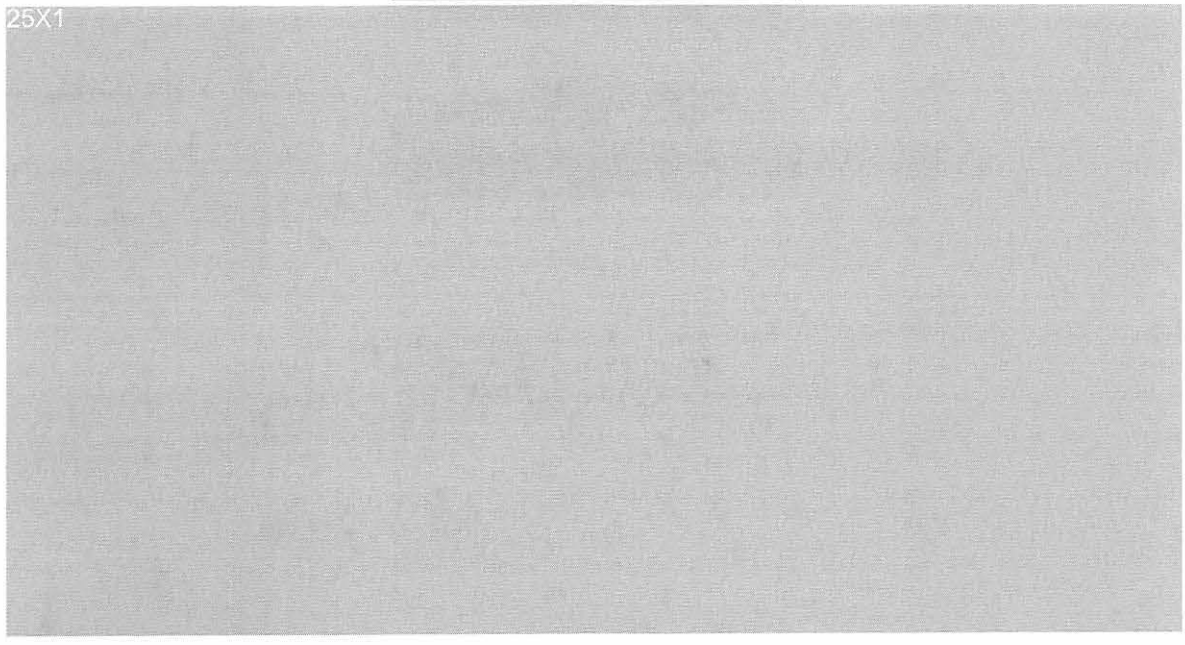
25X1



CIA Statute

25X1

CIA Statute

21. The Soviets might also choose to place COMINT equipment aboard their manned space stations. By the late 1980s the Soviets are projected to have a permanently manned modular station in low-Earth orbit. 25X1

25X1

25X1 In addition, a Soviet manned spaceplane could conduct SIGINT missions against high-priority targets, but in any case it would probably be used primarily during crises and war.

CIA Statute

Naval Targeting and Surveillance

22. The Soviets have two types of satellites in this category, the ELINT ocean reconnaissance satellite (EORSAT) and the radar ocean reconnaissance satellite (RORSAT), both of which can detect and locate surface ships 25X1

25X1

25X1 The Soviets often keep one or two satellites of each type in orbit. The maximum number in orbit has been two RORSATs and three EORSATs, and, on occasion, there have been gaps of several months with no RORSATs or EORSATs in orbit. These two types of satellites are for crisis monitoring or wartime weapon targeting and are designed primarily to provide real-time targeting data and stored position data on aircraft carriers and naval battle groups to Soviet ships and submarines having a long-range anti-ship missile capability. 25X1

25X1 CIA Statute

23. 25X1

25X1 ndicates the Soviets probably will use at least two EORSATs and two RORSATs during a period of crisis preceding hostilities. Should hostilities with the United States become imminent, the Soviets