transport vehicle of the Soyuz T class in geosynchronous orbit. Manned flights to and from geosynchronous orbit require an upgraded SL-13 Proton vehicle, which we believe the Soviets may be developing. Soyuz-type capsules have been returned from the Moon which is technically equivalent to return from geosynchronous orbit. Operations at geosynchronous orbit would also require increased protection of cosmonauts from the hazards of solar radiation. We believe sufficient research into shielding has been done to provide such protection. [redacted]

Space Transportation System

22. A major national space project called Buran (Snowstorm) is under way with the goal of developing a family of reusable space systems, including a heavy-lift launch vehicle, a space shuttle orbiter, and a space tug. [redacted]

23. The Soviet Space Transportation System (STS) is a near copy of the US orbiter. Major design features of the US orbiter probably were adopted in order to minimize risk, cost, and development time. The major difference between the Soviet and US space shuttle orbiters—the aft fuselage section—is the result of a difference in their respective launch configurations. The US system consists of an orbiter with three main rocket engines, an external fuel tank, and two solid-propellant, strap-on booster rockets. In contrast, the Soviet shuttle system will consist of an orbiter with only small maneuvering engines, a core booster with main rocket engines mounted on its base, and two strap-on booster rockets that will use liquid propellants. [redacted]

24. Development of the Soviet STS probably began in the mid-1970s shortly after the cancellation of their SL-X-15 (TT-5) HLLV program. The SL-X-15 was a Saturn-V–class booster designed to place a space station and lander in lunar orbit. By 1978, the STS program was in the final design phase. Facilities for the manufacture, test, transport, and launch and recovery of the system were all under way by the end of that year. By early 1983, at least one prototype shuttle had been produced, and captive flight-testing of the vehicle was conducted atop a Bison aircraft. Also, the central core of the new HLLV was delivered to the launching facility. The new HLLV is expected to begin flight-testing in 1985 or 1986 and the space shuttle in 1986 or 1987. [redacted]

25. Components of the core vehicle for the HLLV were first observed in imagery of the Ramenskoye Airfield in late 1980, where they were undergoing compatibility tests with the modified Bison air transport system. [redacted]

26. In early 1983 these components were shipped via air to Tyuratam and assembled to form a 59-meter core vehicle. (See figure V-3.) In March they were observed outside the large booster and assembly checkout building that will support launch complexes J and W. The configuration of this assembled section indicates that the LOX tank is positioned above the LH_2 tank and that at least two and probably three engines are positioned across the bottom of the core vehicle. Pod-like objects positioned at the bottom of the vehicle may be part of a recovery system for the reusable LH_2/LOX engines. Most parts of the STS will be recoverable and reusable, according to Soviet sources. It is not clear at this time, however, how the recovery of the engines will be accomplished. [redacted]

27. A prototype of the Soviet space shuttle orbiter was first seen in February 1983 at the Ramenskoye Flight Test Center atop a modified Bison aircraft. The

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CIA Statute [redacted]

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[redacted]

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Soviet space shuttle orbiter prototype is nearly identical to the US shuttle orbiter in size, configuration, and layout details. (See figure V-4.) Subsequent imagery indicates that captive flight-testing of the mated vehicles has taken place. After a landing accident in late March 1983, the orbiter was removed from the Bison, and it was returned to the shuttle assembly facility in Moscow in April 1983. This prototype or another early production orbiter will probably be outfitted for aerodynamic drop tests similar to those conducted with the US shuttle Enterprise from a Boeing 747 in 1977. The capabilities of the US and Soviet Space Transportation Systems are compared in figure V-5. [redacted]

28. The design for the Soviet reusable space system presented in figure V-5 has some unique features. The main engines are on the launch vehicle, which allows testing of the launch vehicle separately from the orbiter vehicles. This enables the launch vehicle to be used for a variety of purposes in addition to launching the shuttle orbiter. Also, the launch system can be developed into a family of heavy-lift space launchers by adding an upper stage (or stages) and additional (or different size) strap-ons. We believe that another version, with three or four strap-ons and a liquid hydrogen upper stage, could place up to 150,000 kg in low Earth orbit. This type of vehicle could be used to launch large components of a permanent space base as [redacted]ory missions to the Moon and planets. [redacted]

Space Tug

29. A space tug would provide access to higher orbits, such as geostationary or planetary escape, and would complement the Soviet space shuttle. One mission identified for a space tug is the gathering of separately launched space station elements and assembling them. According to Soviet articles, the use of an interorbital space tug with a shuttle vehicle would greatly expand the shuttle's utility. The shuttle would boost space vehicles into a base orbit, and the tug would place them in their final orbit. The combination would extend satellite service life; practically eliminate unsuccessful launches; make it possible to build refueling, repair, and a space base with orbital launch complexes. The shipment of goods between the Earth and the Moon also would be more practical [redacted] combination of launch and transport vehicles. [redacted]

30. The most basic configuration for a space tug would be a propulsion package with a manipulator arm for catching or placing satellites. Simple missions such as launch to a higher orbit or shuttling between two space stations or between a Moon base and a space station could be done with a completely automated space tug. Repair missions probably would be manned because a man might be able to repair a satellite on orbit. This would be less expensive because unmanned retrievals would require [redacted] two round trips for each repair job. [redacted]

31. It is not clear if the Soviet tug will be launched in the shuttle payload bay or by a booster like the new HLLV or the SL-X-16. The tug, however, will be a reusable system and could be maintained in orbit for reuse, in which case, on-orbit propellant operations would be called for or the tug may be returned to Earth in the shuttle bay. We do not expect the space tug will be operational until the late 1980s or early 1990s when the [redacted]le system is expected to be operational. [redacted]

Military Space Plane

32. In 1962, about the same time scientists in the United States were considering a space bomber, noted Soviet aircraft designer Artem Mikoyan publicly proclaimed the need for a *kosmolyot* (space plane) so that the Soviet Air Force could have an operational capability in space. Classified Soviet military articles also have expressed the need for an "orbital aircraft" capable of inspecting hostile spacecraft and conducting antisatellite operations. These classified writings also address other missions, such as targeting of strategic weapons, poststrike assessment, retargeting, and even orbital bombardment. [redacted]

33. A program to develop a military orbital aircraft began in 1969. The vehicle was to be produced by the Mikoyan Design Bureau with assistance from the Berezniyak Design Bureau. The operational vehicle reportedly would weigh about 12,000 to 18,000 kg, carry a one-man crew, be launched by an expendable launch vehicle, and be used for reconnaissance and inspection missions. Large orbital plane changes would be accomplished through a combination of aerodynamic and propulsive forces (synergetic). The program apparently was motivated in part by the US X-20

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Figure V-4
Comparison of US and Soviet Shuttle Orbiters

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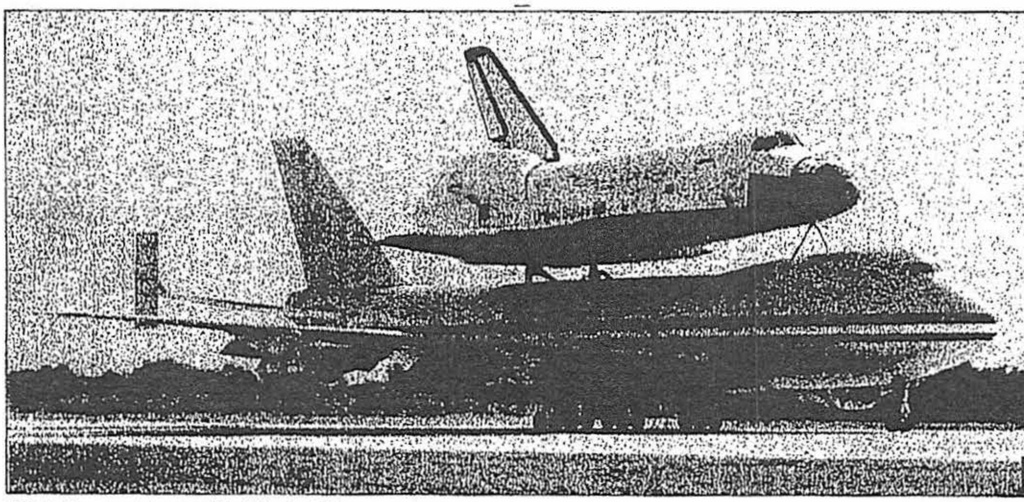

US shuttle mounted on modified Boeing 747

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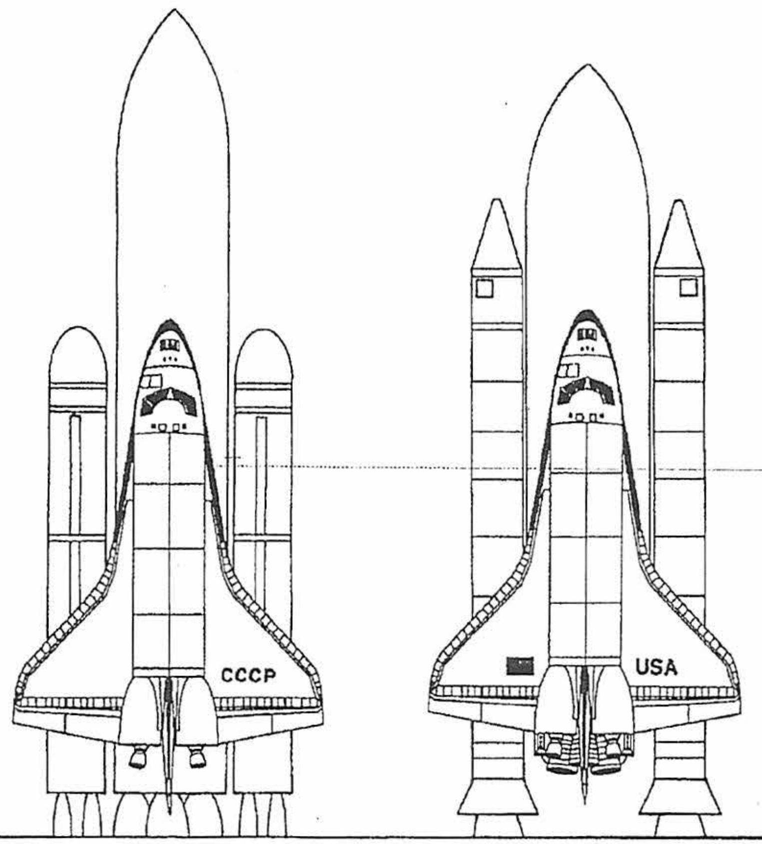
CIA Statute [redacted]

Figure V-5
US and Soviet Space Transportation Systems



	Soviet Reusable Space System	US Space Transportation System
Height (m)	59	56
Lift-off weight (kg)	1,700,000	2,026,000
Lift-off thrust (kN)	26,450	30,500
In-orbit weight (kg)	75,400	97,700

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CIA Statute [redacted]

Dyna Soar program and may actually have employed classified Dyna Soar documents in the development process. CIA Statute [redacted]

34. In the 1976-78 period we observed a delta-wing vehicle incorporating a lifting-body design at a flight test center in the southwestern USSR. On several occasions the vehicle was observed under the wing of a TU-95 bomber and was probably dropped in tests reportedly conducted in 1977. We believe this vehicle was a research version of a military orbital aircraft designed to test subsonic flight characteristics. CIA [redacted]

35. In December 1980 an unmanned space vehicle was launched with an SL-8 into a suborbital test trajectory with possible recovery in the Saryshagan Test Range area. In June 1982 a similar test was performed, but the unmanned spacecraft (Cosmos 1374) was placed into low Earth orbit, performed a deorbit burn on the first orbit, and was recovered in the Indian Ocean. In March 1983 the one orbit test was repeated with Cosmos 1445. (See figure V-6.) We believe this vehicle could be a scale model, perhaps one-third or one-fourth scale, of the space plane. CIA [redacted]

36. The configuration of the Soviet space plane bears a strong similarity to the US Air Force X-23A. (See figure V-6.) The X-23A project followed the X-20 Dyna Soar program and was designed to assess the performance of a lifting body during hypersonic reentry, including aerodynamic maneuverability, and the integrity of structure and heat protection systems. CIA [redacted]

37. We believe a full-scale space plane will be flight-tested in 1984-85. Candidate launch vehicles are the SL-13 Proton and the new SL-X-16 launch vehicle. The first of two new launchpads at Tyuratam Complex Y is considered ready for use. On the basis of the design features of this pad, we estimate the SL-X-16 will have the characteristics shown in figure V-7 and will be capable of placing about 15,000 kg into low Earth orbit. On the basis of program timing and estimated payload, we believe the SL-X-16 is the best candidate for the space plane launch vehicle. CIA [redacted]

38. A small manned space plane has several advantages over the shuttle orbiter. It would have a shorter turnaround time, would be much lower in cost, would be more maneuverable, and could be launched quickly. We do not know what the final configuration of the space plane will be because at least two versions have been developed to date. Its mission is likely to include reconnaissance and satellite inspection roles. The research program could be designed to determine the utility of a space plane to perform a variety of other functions, including: ASAT weapons platform, orbital bombardment, poststrike assessment and targeting, and crew transfer. We postulate the space plane might be launched from the ground or be docked to a permanently orbiting space station, using the station as home port between reconnaissance missions. If launched from the ground, careful choice of orbital parameters would permit such a vehicle to overfly a given target twice within about two hours. This would be particularly valuable in crisis or wartime situations. In whatever role, the flights would be relatively short in duration, probably no longer than 24 hours. CIA [redacted]

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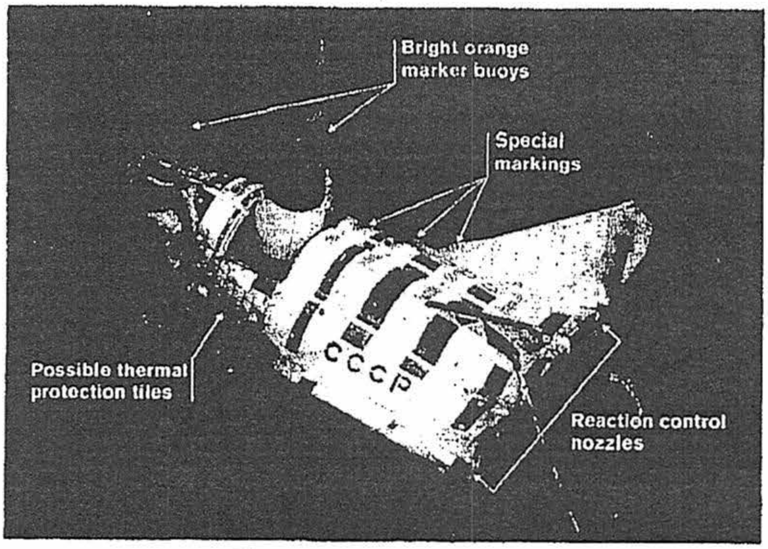
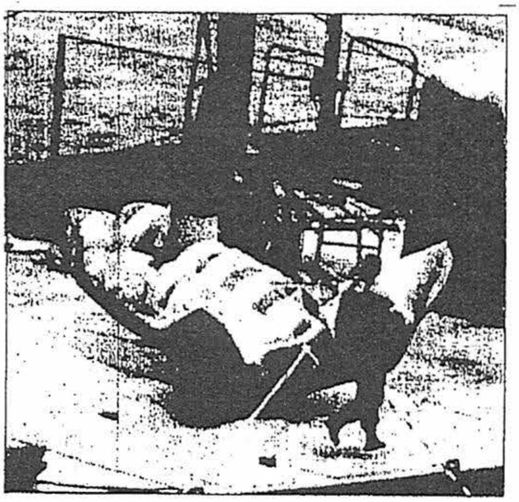
CIA Statute [redacted]

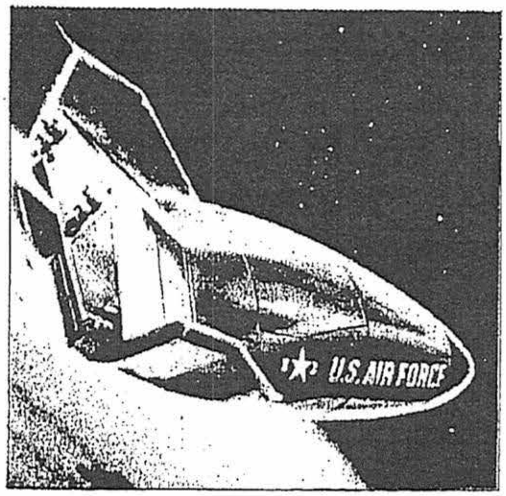
Figure V-6
Comparison of Possible Soviet Space Plane Prototype and US Reentry Test Vehicle



Cosmos 1445 after parachute landing in Indian Ocean, March 1983



Cosmos 1445 on deck of recovery ship Yamal



US X-23A reentry test vehicle (1966-67)

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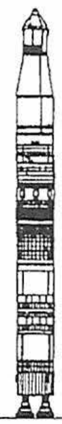
Figure V-7
SL-X-16 Launch Vehicle, Postulated for the Soviet Space Plane



Height (m)	55
Diameter (kg)	3.8
Weight (kg)	390,000
Lift-off thrust (lbs)	1,000,000
Payload to 185-km orbit (kg)	15,000

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CHAPTER VI

LUNAR AND PLANETARY EXPLORATION

1. There are two types of Soviet lunar and interplanetary programs: the manned exploration program that is under the direction of the Soviet Air Force and Strategic Rocket Forces; and the unmanned programs that are directed by the Academy of Sciences. Overall, Soviet lunar and planetary activity dropped rather sharply in the mid-1970s. During the past seven years, there have been only four Soviet scientific missions, all exploring Venus. But this trend of reduced activity may be changing. More than a dozen new missions are being contemplated and additional space launch vehicles will be available as SL-12 production increases. In addition, many new planetary missions will be possible because of international cooperation, greater launch capability by the late 1980s, and the availability of new technologies. (See tables VI-1 and VI-2.) [redacted]

2. Soviet exploration of deep space provides a scientific return but also enhances the Soviets' desired image as a peaceful and technologically advanced nation. Hence, one factor in planning Soviet exploration programs has been to achieve prominent "space firsts." For example, they took the first far-side lunar pictures in 1959, the first pictures from the lunar surface in 1966, and used the first lunar surface roving vehicle (Lunakhod 1) in 1970. But the successes of the United States in manned lunar expeditions probably caused Soviet interest in lunar exploration to decline. Both Soviet manned and unmanned lunar exploration activities ceased after 1976. Similarly, Soviet Mars missions were discontinued after 1973. Recently, however, there has been renewed Soviet interest in lunar exploration, possibly for the purpose of establishing a manned lunar base. The hiatus since 1976 also may reflect a redirection and redesign in Soviet lunar programs. A new series of lunar missions is being planned beginning in about 1990 with an unmanned launch of a lunar polar orbiter. New planetary missions will take place within the next year or two. [redacted]

3. Most of the identified lunar and planetary missions are already technologically feasible or soon will be. Figure VI-1 summarizes Soviet plans for lunar and

Table VI-1
Soviet Deep Space Exploration

Mission	Earliest Expected Launch	Likelihood
Lunar		
Lunar polar orbiter	1990	High
Lunar far-side lander, soil sample return	1991	High
Lunar near-side lander	1992	Moderate
Manned lunar base	Late 1990s	Low
Planetary		
Venus radar mapping	1983	High
VEGA (Venus and Halley's Comet flyby)	1984	High
Mars orbiter/lander/rover/ soil sample return	1986	High
Venus balloon mission	1988	Moderate
Titan mission	1988	Moderate
Long-duration Venus lander	Late 1980s	Moderate
Jupiter mission	1989	Moderate
Additional Mars orbiters/ landers	Early 1990s	Moderate
Manned orbital Mars mission	Late 1990s	Moderate

This table is Secret [redacted]

Table VI-2
History of Lunar and Planetary Exploration [a]

	United States	Soviet Union
Total	89	89
Lunar	59 (1973)	42 (1976)
Venus	8 (1978)	31 (1983)
Mercury	1 (1973)	0
Mars	9 (1975)	16 (1973)
Outer planets (beyond Mars)	12 (1977)	0

[a] Total launches between 1958 and 1983; year of last launch in parentheses.

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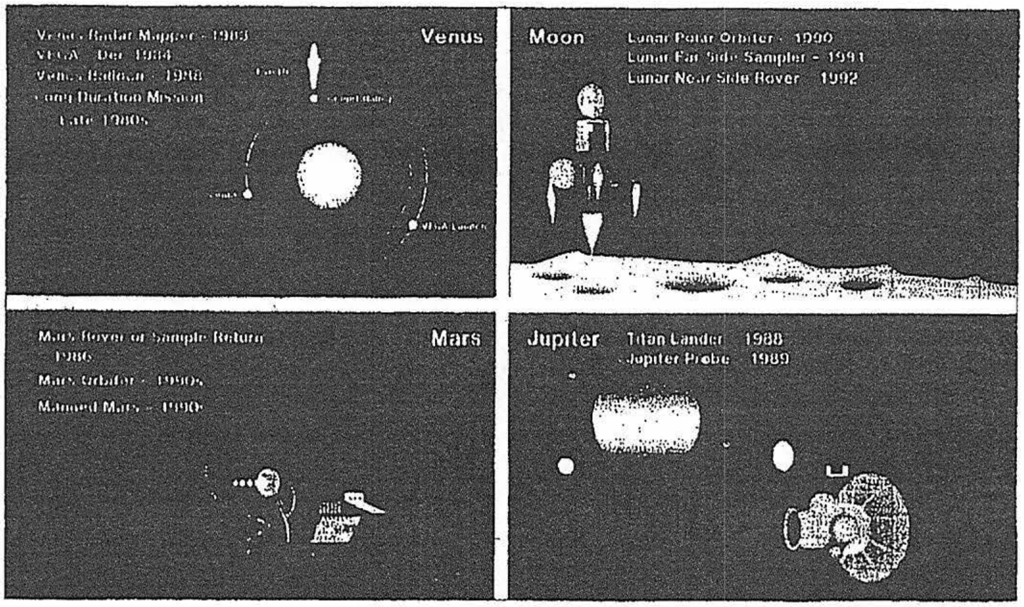
Figure VI-1
Soviet Lunar and Planetary Research Program[a]



[a] Dates indicated are for earliest expected launch.

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planetary missions in the 1990s. For planetary missions, the estimated earliest launch dates, on the basis of planetary proximity, also reflect windows of opportunity. Should these windows be missed, the missions would be delayed a few years until the next launch opportunity. In any event, we do not expect the frequency of launches to increase dramatically and approach the level of effort noted in the 1960s when up to 10 lunar and planetary launches were conducted per year. That period of high launch rates also was characterized by a high rate of failure. About two-thirds of the Soviet lunar and planetary missions up to 1976 ended in failure; about half of these were launch vehicle failures, while the other half had spacecraft malfunctions. It was not until the SL-12 space launch vehicle was introduced in 1969 that the success rate began to improve significantly. Since that time, about 60 percent of the Soviet lunar and planetary missions have achieved at least partial success. [redacted]

4. We believe an unmanned Soviet lunar polar orbiter will be the first mission in the new series, in about 1990. The main purpose of the mission would be to search for subsurface ice and other volatiles near the lunar poles, possibly to support the eventual establishment of a manned lunar base. The orbiter also could provide mapping and communications support for a

subsequent unmanned far-side lunar landing. In any event, a polar orbiter would add to the list of Soviet space firsts. [redacted]

5. Another mission in the lunar series is an unmanned landing on the far side of the Moon that would include returning a soil sample. This would be another space first. Such a mission would also require another satellite in lunar orbit at the same time to relay communications to and from the far side of the Moon. This lunar landing most likely would follow the polar orbiter mission in the early 1990s. A near-side lunar landing also has been discussed by senior Soviet space officials. If the lunar series is aimed at the eventual establishment of a manned lunar base, then we would expect to see additional lunar missions involving site surveys and exploration by lunar rover vehicles. [redacted]

6. In the 1975-78 time frame, Soviet institutes were conducting research on lunar transports and engineering equipment for the construction of shelters, roads, and tunnels on the Moon. This work was canceled in 1978. However, if this work has been continued elsewhere, a lunar base could be established in the late 1990s. However, we believe this is unlikely. [redacted]

7. Two Venus radar mapping missions were launched in June 1983. These missions involve one spacecraft in a polar orbit and one in an equatorial orbit, which will probably map the Venusian surface. We judge that one spacecraft is carrying a synthetic aperture radar with about a 2- to 5-km resolution. [redacted]

8. An unmanned landing on Mars is likely as early as 1986. This mission may be an orbiter/lander combination, and it may include a rover vehicle or the return of a soil sample. If either of these two events were included, the mission would require the new heavy-lift space launch vehicle and could not be conducted until the late 1980s. A Mars soil sample return mission is likely by 1990. We also have information of an optical mass spectrometer using a laser for analysis of the Martian soil being planned jointly with the Bulgarians, implying perhaps a less ambitious lander mission. [redacted]

9. We believe there is a moderate chance a Soviet manned orbital Mars mission will be conducted before the end of the century. Such a mission would require fewer resources than a lunar base and would bring greater prestige. Evidence of intentions for a manned Mars mission is almost entirely from open sources. Most of the statements indicate that such a mission is being considered and could be accomplished in the mid-to-late 1990s. Such a mission would be limited to orbital reconnaissance of Mars and return. Soviet research in long-term manned spaceflight is the only clear indication of such a mission. First, we would expect to see Soviet simulation of such a mission in Earth orbit, verifying that both people and equipment could sustain such long flights. Prior to a manned Mars mission we would also expect additional unmanned missions. [redacted]

10. Another project is part of an international effort involving the USSR, Hungary, and France, with minor participation by Bulgaria, Poland, Czechoslovakia, Austria, and West Germany. The project, VEGA, involves launching two spacecraft in December 1984 to encounter Venus in June 1985 and Halley's Comet in March 1986. This would be another first and would further enhance Soviet prestige, particularly after the United States declined to undertake such a mission. When the spacecraft encounters Venus, it will separate into descent and fly-by sections, with the descent section deploying small balloons that will carry meteorological experiments sampling the atmosphere at an altitude of about 55 km. The descent stage will continue on to a landing. In the meantime, the fly-by stage will continue on with a gravity assist from Venus and will encounter Halley's Comet in March 1986. The payload in this section will include a video-imaging system with French optics and two Hungarian cameras with Soviet charged-couple device (CCD) sensors. Each vidicon will have a 512 x 576 element CCD array. At the intended miss distance of 10,000 km, each picture element of the narrow field camera will cover a 180-meter resolution of the Comet's nucleus. Other scientific experiments will measure the Comet's ultraviolet, visible, and infrared radiation; the makeup of dust particles; and gases, using particle detectors, magnetometers, and other devices. (U)

11. Other possible Soviet planetary missions include exploration of Venus with large balloons. The idea of using 9-meter-diameter balloons with gondolas carrying various meteorological sensors was originally part

of the Vega project, but was dropped and is being considered as part of a separate joint Soviet-French Venus mission in the late 1980s. In addition, we have noted Soviet interest in conducting a long-duration mission involving a landing on Venus. Such a mission would require electronics capable of withstanding high temperatures for the two-week period envisioned, possibly in the late 1980s. [redacted]

12. Exploration of Jupiter is another possibility. Soviet exploration of Jupiter prior to the planned US "Galileo" mission would require several sophisticated maneuvers such as "Earth gravity assist" and "aerobraking" to offset current lift and payload shortcomings. However, such maneuvers would double the flight time, requiring about four years to reach Jupiter. Such a long flight would increase the chances of spacecraft failure. Therefore, a more likely scenario would involve waiting until the heavy-lift launch vehicle is available to provide the necessary lift capacity without the Earth-gravity-assist maneuver, which adds about two years to the flight. In any event, it will be difficult for the USSR to achieve a Jupiter mission space "first" if the US Galileo mission is launched as scheduled in 1986. One additional outer solar system mission being considered is exploration of Titan, a satellite of Saturn and the largest satellite in the solar system. This mission could be a fly by, an orbiter, a lander, or some combination. This mission could be launched as early as 1988 and would require the heavy-lift launch vehicle. [redacted]

CHAPTER VII

INTERNATIONAL COMPETITION AND COOPERATION

1. The USSR may become a serious competitor in international telecommunications and commercial space launch services. Eventually the competition may broaden to include Earth resources data, navigation and meteorological support, and materials processing and manufacturing in space. This type of competition will not only bring increased prestige and respect, but, over the longer term, will offer an opportunity for the Soviet Union to gain badly needed hard currency earnings. In addition, opportunities for technology transfer will be improved by increasing Soviet involvement in cooperative and commercial space ventures. [redacted]

2. In the late 1960s and early 1970s the Soviet Union established two international space organizations—Intercosmos and Intersputnik. The initial objectives were to involve the Communist Bloc nations in space research, take advantage of advanced technology in the Bloc, foster national pride within the Bloc, and build better relationships with lesser developed countries. Most of these early objectives have been achieved and more ambitious goals may be pursued in the mid-to-late 1980s. [redacted]

Intercosmos

3. The Council for International Cooperation in Space Exploration (Intercosmos), under the USSR Academy of Sciences, was established in 1967. Intercosmos represents the USSR in international space matters without revealing the military control of the Soviet space program. The Council coordinates the activities of the member countries, which initially included the USSR, Bulgaria, Hungary, Poland, East Germany, Romania, and Czechoslovakia. Each country forms national committees for space physics, communications, meteorology, biology, and medicine. In recent years Intercosmos has expanded to include Cuba, Mongolia, and Vietnam. Bilateral cooperative agreements also have been negotiated with France, Sweden, and India. There have been [redacted] cooperative projects with France, including at least three French-built satellites (Oreol 1 through Oreol 3), manned missions in Salyut 7, and the upcoming VEGA mission. Sweden also has provided some experimental payloads for Intercosmos satellites. [redacted]

4. Soviet leadership dominates the Intercosmos program. A Soviet official always chairs the Council and coordinates the activities of the member countries and Soviet launch facilities, spacecraft, and ground control sites. Proposals for space experiments are accepted from all Intercosmos member countries, but the Soviet Union decides which proposals are to be implemented and the extent of non-Soviet participation. [redacted]

5. To date, 30 satellites have been launched in the Intercosmos program. Between 1969 and 1975, Intercosmos launched an average of two satellites per year. Most of these missions consisted of relatively unsophisticated experiments in solar physics, ionospheric/magnetospheric research, cosmic rays, and space radiation. In 1976 Intercosmos introduced a new spacecraft called the automatic modular orbital station (AUOS) with a new universal radio telemetry system. Also, a new ground station entirely dedicated to receiving data from Intercosmos satellites was built in the USSR and was activated in 1980. In 1981 Intercosmos launched another new spacecraft based on the Meteor weather satellite. This spacecraft was considerably heavier than the SL-8–launched AUOS vehicle and required the SL-3 launch vehicle. We expect this trend toward more diversified missions and spacecraft to continue. In addition, emphasis is shifting more toward applied rather than pure scientific research. For example, oceanography and Earth-resources research have been emphasized in Intercosmos programs since 1979. [redacted]

6. Intercosmos participation in the Soviet manned space program also is likely to continue, including more flights by cosmonauts from member and non-

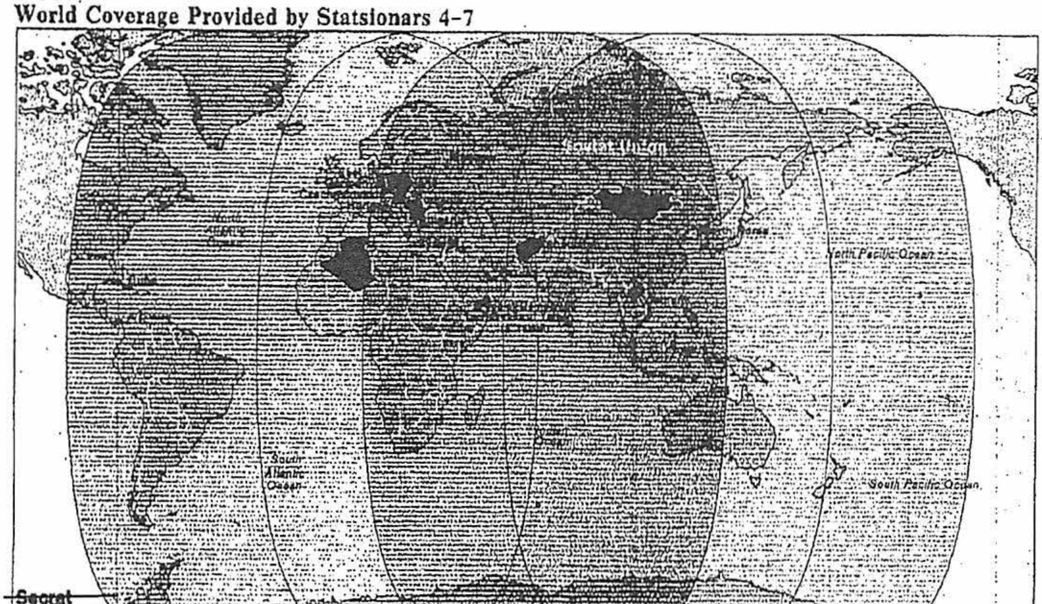
member countries as well as additional experiments. These flights have offered participating countries an opportunity to be involved in space programs that they could not undertake individually. This participation is widely publicized, and the nine national cosmonauts have been received as heroes in their own countries. As a result, national pride, government prestige, and Soviet good will all benefit. CIA [redacted]

Intersputnik

7. On 15 November 1971 representatives of the Intercosmos organization countries signed an agreement to establish Intersputnik. The original members were Bulgaria, Cuba, Czechoslovakia, East Germany, Hungary, Mongolia, Poland, Romania, and the USSR. Intersputnik is an open international organization designed to help member countries meet their needs in telephone, telegraph, TV, and radio communications. Each member sits on a governing board and has one vote. This is in contrast to Intelsat where voting is weighted and reflects the relative use of the system. Like Intelsat, Intersputnik requires contributions to a statutory fund in proportion to usage. The space segment satellites are owned by Intersputnik or they are leased from members (USSR in practice). The ground stations are owned by the individual states. (U)

8. At this point, the Intersputnik system is much smaller and more limited in services than Intelsat, which now includes 107 members, 310 ground stations with 397 antennas, and a space network of 15 satellites. In contrast, Intersputnik currently is limited to coverage provided by Gorizont 4/Statsionar 4 over the Atlantic and Gorizont 5/Statsionar 5 over the Indian Ocean. This coverage, however, includes all of South America, Central America, Africa, and Asia. (See figure VII-1.) Intersputnik services are considerably

Figure VII-1
World Coverage Provided by Statsionars 4-7



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Area of coverage

Statsionar 4 and 5 | Statsionar 6 and 7

Country in Intersputnik communications system less expensive than those of Intelsat. The satellite voice circuit may be leased for about $12,000 annually, compared to about $20,000 for similar services from Intelsat. (U)

9. In the 1980s the USSR began marketing Intersputnik circuits to developing countries. This effort has been successful because of Intersputnik's lower prices and easier membership requirements. Technological progress has enabled Intersputnik to become an even stronger competitor. Since the original nine Soviet Bloc countries formed Intersputnik, five additional states have become signatory members: Vietnam, South Yemen, Afghanistan, Syria, and Laos. Other countries such as Algeria and Iraq have become users but are not signatory members. By the end of this year, 16 Intersputnik ground stations will be connected via the Gorizont satellites. In 1984 North Korea will open its Intersputnik station. In addition, Soviet officials are negotiating with Libya, Angola, Mozambique, Madagascar, and Sri Lanka to join Intersputnik. Nicaragua and other Latin American countries also are interested in becoming members. Thus, Intersputnik is becoming Intelsat's foremost competition in the international telecommunications market. [redacted]

Intelsat and Inmarsat

10. The Soviets, although users of Intelsat services, have never become members. It is doubtful they will ever join because membership requires that states not offer competitive services. Soviet use of Intelsat has been limited, ranking in the bottom 10 percent of the 130 users of Intelsat services. [redacted]

11. In contrast to Intelsat participation, the Soviet Union is a charter member of the International Maritime Satellite Organization (Inmarsat). The USSR currently holds 14-percent ownership but accounts for less than 1-percent usage. Soviet ownership will soon shrink to about 7 percent as other countries join and relative Soviet use declines even further. Despite these developments, Soviet officials have publicly stated they do not intend to create another maritime satellite service to compete with Inmarsat. They have indicated that the Volna communications satellite system will remain limited to use by Soviet shipping only. [redacted]

Commercial Space Launch Services

12. The USSR is planning to enter international commercial competition in providing space launch services. Soviet launch vehicles have placed three Indian satellites in orbit and agreements have been readied to launch a Swedish-built satellite. To be successful in this arena, the Soviets will have to offer prices competitive with those of the United States, the European Space Agency (ESA),[10] and Japan. They may also release some technical and reliability information on their boosters, provide insurance, and allow Western access to satellite and launch support facilities. This would be a sharp break with past practices, but the prospect of acquiring hard currency, increasing trade in high-technology products, and offsetting some space costs may outweigh security concerns. [redacted]

13. The USSR may offer space launch services at prices well below both ESA's Ariane and the US shuttle. We believe, on the basis of the expected launch rate, that the demand for commercial space launchers may exceed the projected capacity of the shuttle and Ariane launch vehicles. The SL-12/13 Proton booster would be the most likely launch vehicle for Soviet-offered commercial services. The Proton is the world's largest expendable space booster, and the only one that could compete with Western vehicles in launching payloads to geosynchronous orbit. The Proton has achieved about a 90-percent reliability rate during the past 10 years. Extensive new Proton production facilities suggest that the launch rate may double in the next few years. By the late 1980s, about five Protons could be available each year for commercial purposes. Inmarsat has been the target of recent Soviet efforts to provide Proton launch services for the next generation of Marisats (maritime satellites) in the 1988-89 period. [redacted]

14. The new Soviet heavy-lift launch vehicle and space shuttle will further enhance Soviet commercial potential. The Soviet shuttle appears to be virtually

[10] ESA was founded in 1972 by a 10-member consortium of West European countries led by France and West Germany. The purpose was to challenge NASA's monopoly on commercial space-launch services. Arianespace is the French-based marketing corporation for ESA's space-launch services. The French Space Agency is the principal shareholder (59 percent) in Arianespace and soon will take over the entire Ariane program, including the launch facilities in South America at Kourou, French Guiana. (U)

identical to the US orbiter in size and configuration, including the same dimensions of the payload bay. Thus, payloads designed for the US shuttle may be compatible with the Soviet orbiter. The new heavy-lift launch vehicle and shuttle launch facilities are being constructed with two separate launch control facilities, which would provide for easy separation of military and commercial launch activities. [redacted]

Remote Sensing

15. Current US commitments to provide Earth resources data to domestic and foreign users with Landsat do not extend beyond the mid-1980s. Furthermore, there is no indication that the private sector is willing to become involved. At this point France has expressed an interest in providing this service with SPOT, a high-resolution, multispectral Earth resources satellite. Also, the Japanese may provide data from their future Earth resources satellites. The USSR may also see an opportunity and move to offer similar services. If so, there are two approaches the USSR could take in entering the Earth resources data market. First, they could offer data from the MKF-6 multispectral camera system. This system, built by Zeiss-Jena, has been flown on Salyuts 6 and 7 and possibly on unmanned photoreconnaissance-type spacecraft. The MKF-6 camera takes pictures in six spectral bands with a resolution of 10 to 20 meters. Although this is much better than the resolution of either the thematic mapper or multispectral scanner on the US Landsat, the data are more limited in quantity and generally not as timely. A second and more likely choice involves new sensors currently being developed and tested on board the Meteor-Priroda spacecraft. These sensors are high-resolution, electro-optical, multispectral scanning devices with resolutions similiar to Landsat D (30- and 80-meter picture element sizes). [redacted]

16. The first operational Meteor-Priroda is expected to be launched in 1985. We believe an operational land remote-sensing system will be available by the late 1980s. Such a system would provide the opportunity to improve Soviet access to Third World countries by providing Earth resources data for national development. Soviet engineers would be required to process the data. [redacted]

Processing and Manufacturing of Materials in Space

17. There is considerable interest in the manufacture of high-value, low-volume products in space. Extensive research in this field is under way in the United States, the USSR, Europe, and Japan. Activities on board the Salyut 6 space station between 1976 and 1981 indicate that Soviet interest has progressed beyond the initial research phase. These activities included experiments to produce unique semiconductors, superconductors, special alloys, glass, and crystals. Much of this work continued on Salyut 7. These experiments were more extensive than those planned for the US Spacelab mission in 1984. [redacted]

18. At this point, we believe the Soviets are ready to move beyond the research and development phase of materials processing in space. The most likely next step would be to create a special materials processing module as part of a modular space station. Such a space station can be assembled in orbit by the mid-1980s. Most of the materials developed in the Salyut experiments have a military or scientific application. However, a Soviet modular space station also could manufacture materials for commercial markets. [redacted]

Other Areas of Competition

19. There are other activities in space where the Soviets may choose to compete. This competition may not provide direct economic benefits, but could enhance the image of the Soviet Union as a technological power and a friend to developing countries. Such competition could include the provision of data from GLONASS, the Soviet global navigation system. This system may be available to any user without charge, provided the user has the appropriate receiver and data processor. The Soviets might make receivers available at low cost, making the system more attractive to some users. The Soviet GLONASS system is expected to be operational at about the same time as the US Global Positioning System (GPS). [redacted]

20. The launching of GOMS, a geostationary meteorological satellite delayed since 1978, could fill a void in weather coverage that exists over the Indian Ocean. The USSR could then offer ground terminals for receiving GOMS data, which several African and Asian nations may find useful, especially if used in conjunction with Earth resources data. [redacted]

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