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Outlook for Rapid Expansion of Soviet Space Programs Through 1986 [redacted]

An Intelligence Assessment

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October 1982

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Outlook for Rapid Expansion of Soviet Space Programs Through 1986

Key Judgments

Information available as of 1 July 1982 was used in this report.

The Soviets are undertaking a variety of new space programs that will result in a period of rapid expansion such as that observed during the 1960s but that will cost considerably more. We expect Soviet space hardware costs to reach the equivalent of $12 billion a year by 1986 — double the current outlays. Approximately two-thirds of these costs are devoted to military programs. The increased costs reflect:

- Achievement of a permanent Soviet presence in space based on a new modular space station and increased use of manned spacecraft.
- Advances in the technology available for intelligence collection, photoreconnaissance, and military support satellites.
- Expansion of navigation, data relay, communications, and weather satellite networks.
- Development of a reusable spacecraft similar to the early US Dynasoar, a reusable space transportation system similar to the US shuttle, two new space launch vehicles, and increasing production of the largest of the current Soviet space launchers.

We expect new spacecraft to incorporate major technological advances in contrast to the past Soviet evolutionary design philosophy of developing systems as much as possible by integrating older components and subsystems with a gradual introduction of new technology. Soviet commitments to fulfill new military requirements for rapid data retrieval, permanent manned orbiting complexes, detailed search of large ocean areas, and improved targeting of weapon systems cannot be met in a timely fashion using the conventional technology solutions characteristic of the evolutionary approach. These design practices have not been abandoned, however, and will continue to be used whenever minor technology advances will meet

changing mission requirements. When the necessary technology is not available in the USSR, the Soviets probably will attempt to follow their past practice of buying or "borrowing" it from other countries.

Soviet leaders have indicated in their writings and statements that they do not view space as an isolated area but rather as an integral part of overall military, economic, and political policy. Outlays for space hardware will require the equivalent of some $12 billion in 1986, as compared with $6 billion in 1981. Based on current projections, expenditures for space hardware could increase from about 0.6 percent of GNP in 1981 to 0.9 percent by 1986. The Soviets probably perceive that the political, military, and economic returns of rubles invested in civilian and military space programs are greater than from other investments. Nowhere is this more clear than in Soviet efforts to establish a permanent, continuously manned orbiting space station. President Brezhnev recently stated that this is a national goal. In this sense the manned orbiting space station probably has somewhat the same stature in Soviet eyes as did our national goal of placing a man on the Moon. Approximately one-half of the increase in total expenditures on space hardware between 1981 and 1986 will go for this purpose.

Outlook for Rapid Expansion of Soviet Space Programs Through 1986

Perspective and Historical Trends

The Soviets are undertaking a variety of new programs that will have a major impact on the level of resources devoted to space activities. These programs include sophisticated planetary and manned missions, which will probably employ a new launch vehicle similar to the US Saturn V as well as real-time photographic satellites, reusable space systems, and an extensive network of new synchronous communications satellites. We expect Soviet space hardware costs to reach the equivalent of $12 billion a year by the mid-1980s—double the current cost.

Soviet space hardware costs increased from about $450 million in 1960 to over $6 billion in 1981. From 1957 to 1968, space program costs grew rapidly, reflecting the start of satellite programs. The early years were dominated by the expensive lunar and planetary programs, intelligence collection systems, and manned missions. These efforts provided a series of Soviet space "firsts," which were heavily publicized to enhance the image of the Soviet Union as a technical, scientific, and military power.

After 1968 the program leveled off as most of the space effort was devoted to maintaining the established multisatellite networks; few totally new spacecraft were introduced. The manned lunar landing programs were canceled, and emphasis was redirected to manned space stations in earth orbit, probably because of the failure of the Soviet's large space booster and the inability to overshadow the successful US Apollo manned lunar program. During the 1970s, Soviet satellites were generally simple, short-lived, single-mission systems in low Earth orbit primarily devoted to military functions such as intelligence collection, communication, or navigation.

The program is beginning to show renewed growth as the Soviets deploy more sophisticated spacecraft, expand the manned program, and establish extensive geosynchronous communications satellite networks. Included are:

- New, high-technology payloads designed to provide near-real-time photographic data and to increase navigation accuracy.
- Large space station complexes to provide a permanent manned orbital base for both military and scientific purposes.
- New communications satellite networks to increase Soviet global command and control capabilities.
- A new series of sophisticated lunar and planetary probes using a new large launch vehicle. Many of these systems will push Soviet state of the art and will result—as has happened in the past when the Soviets attempted to develop such advanced systems—in longer, more expensive development cycles.

Space Launch Vehicles

Expansion at space research and development and production facilities and construction of new or improved launch complexes are strong indicators of Soviet efforts to develop new space launch vehicles and, in general, of future Soviet intentions in space.

Pages: 2

Exemptions: (b)(3), (b)(1)

[redacted]

SL-3/4/6 space launch vehicles.

[redacted]

Increased use of the SL-12/13 booster and the corresponding increase in the number of high-technology missions associated with this space launch vehicle are major factors in the projected doubling of space costs by 1986. Geosynchronous communications and meteorological satellites, space station modules, and the lunar and planetary vehicles are launched on this booster. All of the spacecraft for these missions are larger and more complex--and thus more expensive--than the earlier spacecraft that were launched by the

[redacted]

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Planetary Probes
We believe that increased SL-12 launch vehicle production capacity in the 1980s would signify a resurgence in lunar and planetary exploration. The Soviet lunar and planetary effort since August 1976 has been limited to the launch of four Venus probes--Venera 11 and 12 in 1978 and Venera 13 and 14 in 1981.

[redacted]

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Pages: 5, 6

Exemptions: (b)(3), (b)(1)

[redacted]

Manned Missions

During the late 1960s and early 1970s, the Soviets began to deemphasize the lunar program and to emphasize the manned space program and the development of long-duration space stations. The primary goals of the manned space program have been to gain international prestige by setting new man-in-space records and by training and flying cosmonauts from other countries, to publicize numerous scientific experiments that add to Soviet prestige as well as knowledge, and to develop and test military spacecraft components and subsystems. [redacted]

Soviet scientists have indicated in their writings and statements [redacted] that the Soviets will attempt to introduce a modular space station consisting of multiple Salyut-size stations that can be changed according to mission requirements. In addition to modules for scientific experiments, meteorology, and manufacturing, the station could also contain military-related modules for reconnaissance, communications, or weapons.

[redacted]

Soviet statements suggest that a larger, "permanent" structure in the Skylab class, requiring the Saturn-V-class launch vehicle, will be launched in the late 1980s as a follow-on to the modular space station. [redacted]

[redacted]

Along with their space station program, the Soviets are developing a reusable spacecraft that is roughly comparable to the US Dynasoar program of the early 1960s. This delta-wing "space plane" could be used to ferry crews (up to six cosmonauts) to the modular space stations, to perform military reconnaissance missions, or to inspect other satellites. [redacted]

By the late 1980s, the Soviets may have a larger, shuttle-type reusable space transport system—one using a variant of the Saturn-V-type booster. [redacted]

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Military Support Satellites
In addition to intelligence collection and command and control functions, many Soviet military satellites provide navigation support to naval combatants, collect weather data, and calibrate large ABM radars.

[redacted]

Synchronous Communications Satellites
The Soviets have filed plans with the International Telecommunications Union (ITU) to establish six new synchronous communications and data-relay satellite networks in addition to those already in use.

[redacted]

We expect that by late 1982 the Soviets will launch a geosynchronous meteorological satellite that the Soviets had originally announced would be launched in 1978 as part of the Global Atmospheric Research Program (GARP). This launch will complete an announced three-tier meteorological satellite system of manned space stations in low Earth orbit, Meteor satellites at higher altitudes, and a synchronous meteorological satellite.

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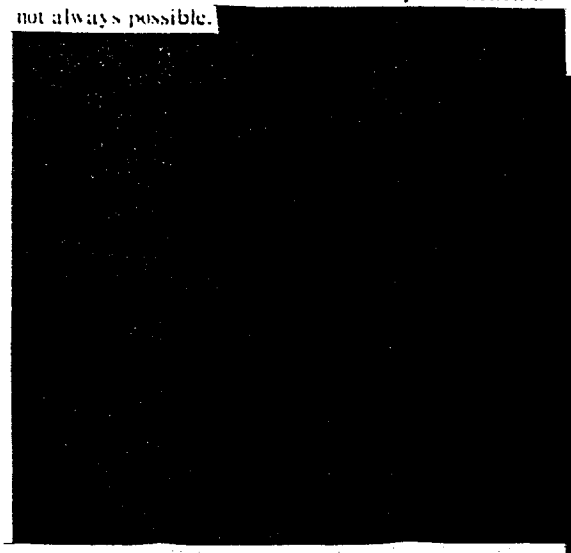
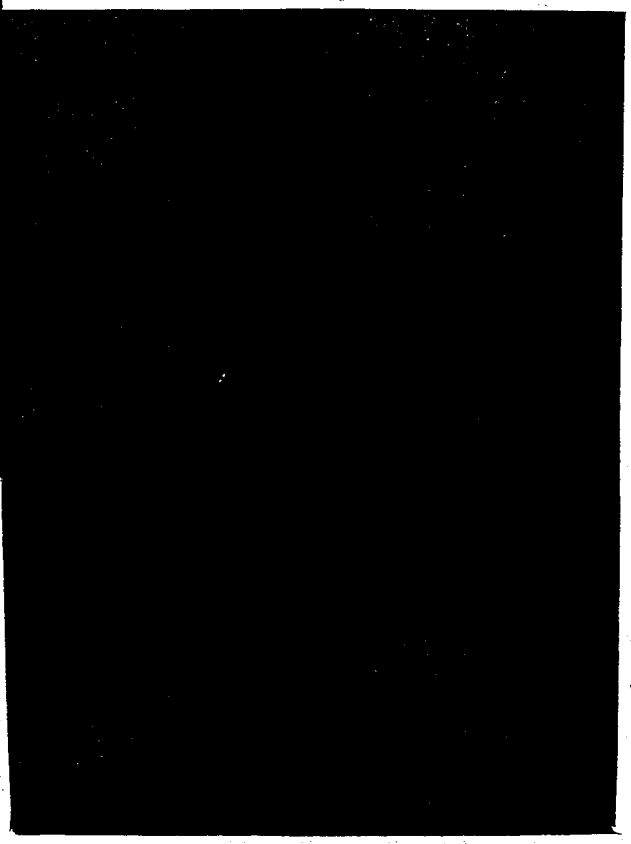
Military Versus Civilian Programs

Most Soviet satellites have primarily a military mission, but a clear civilian versus military distinction is not always possible. [redacted]



Design Philosophy and Cost Implications

The predominant Soviet design philosophy for the space program to date has stressed the gradual introduction of new technology. Evolutionary systems can be more easily developed and produced at less cost by the Soviet military-industrial sector. Existing spacecraft, subsystems, and components are used whenever possible. In most cases, to create more advanced spacecraft and satellite systems, new technology has been added in the design stage to complement existing hardware from older vehicles. The initial cost savings, however, are somewhat deceiving because a large number of satellites usually are needed to accomplish the same mission that would be performed by a single high-technology spacecraft. In addition, since few Soviet spacecraft have lifetimes exceeding 18 months, the Soviets also use multisatellite networks and frequent replacements to ensure operational reliability. Thus, the overall space hardware cost is increased because of the higher launch rate, even though individual systems are cheaper to build. For the past 10 years, the Soviet launch rate has been three to four times higher than that of the United States [redacted] even though both countries maintain about the same number of satellites in orbit. This is due primarily to the fact that US satellites have significantly longer lifetimes. [redacted]



Soviet commitments to fulfilling new military requirements for near-real-time photographic data, permanent manned orbiting complexes, detailed search of large ocean areas, and improved targeting for weapon systems cannot be met in a timely fashion using the conventional technology solutions that are characteristic of the Soviet evolutionary design approach. As

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The Soviets substantially broaden their spacecraft design efforts, many of the new spacecraft and space launch vehicles will incorporate more advanced technology.

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When the Soviets attempt to meet new strategic challenges with advanced technology, they make an early commitment of resources and persistently pursue the objective in spite of failures and delays.

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Resource Implications

Soviet leaders have indicated in their writings and statements that they do not view space as an isolated

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area but rather as an integral part of overall military, economic, and political policy. Outlays for space hardware will require the equivalent of some $12 billion in 1986, as compared with $6 billion in 1981. Based on current projections, expenditures for space hardware could increase from about 0.6 percent of GNP in 1981 to 0.9 percent by 1986. The Soviets probably perceive that the political, military, and economic returns of rubles invested in civilian and military space programs are greater than could be expected from other investments. Nowhere is this more clear than in Soviet efforts to establish a permanent, continuously manned, orbiting space station. President Brezhnev recently stated that this is a national goal. In this sense the manned orbiting space station probably has somewhat the same stature in Soviet eyes as did our national goal of placing a man on the Moon. Approximately one-half of the increase in total expenditures on space hardware between 1981 and 1986 will go for this purpose.

Not only will the prestige returns be great from the orbiting space station, but there will be important military and economic payoffs as well. For example, the Soviets intend to manufacture semiconductors and special alloys aboard the space station. These manufacturing experiments have been publicized as having economic value, but they probably will have direct military applications as well

[redacted]

Expenditures for the military portion of the space program, amounting to two-thirds of the total, will increase during a period of temporary declines in the procurement for other systems such as strategic missiles. Thus, the increased expenditures for space will not be reflected in any significant change in the overall level and trend in Soviet defense expenditures. In addition to funding a portion of the manned space stations, military space programs include communications satellites for enhanced command and control, space-based intelligence collection, satellites for calibrating the large ABM radars, and ocean surveillance satellites to improve targeting of antiship weapons.

The civilian space program -one-third of the total - includes purely civilian projects like the multispectral photography provided by Earth resources satellite missions. This photography is of key importance to Soviet agricultural, energy, and mineral resources studies including crop yield estimates, the extent of crop damage or disease, data on mining, gas, and oil exploration from widely scattered areas in the USSR, and plankton movement to locate fish concentrations. Since 1979 Soviet interest in these areas has significantly increased, and we expect that at least six of these missions will be launched annually through 1986 in addition to the studies conducted aboard the manned space stations.

[redacted]

The Soviet space program continues to preempt a growing share of the nation's most modern production and research and development facilities and many of the finest scientific, engineering, and managerial talents of the economy, and it must be subject to considerable review in light of current economic performance. On balance, the Soviets probably regard space systems as a cost-effective means to increase military power, enhance prestige at home and abroad, and gather data applicable to a variety of economic uses.

Outlook

Current Soviet space activities underscore the utility of man in space, the usefulness of satellites to support military operations, and the international prestige associated with space exploration. Although the new space programs will result in increased costs over the next few years, we expect space hardware costs to level off in the late 1980s as the new satellite networks are established and prove their reliability. The overall

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satellite launch rate, which is currently about 100 per year, should peak at about 120 launches per year during the mid-1980s as the Soviets continue to orbit both old and new systems until the reliability of the new systems has been established. The launch rate should then fall below 90 launches per year by 1990 as the older systems are phased out and the Soviets exploit the increased sophistication and longer lifetimes of the new systems. The development of reusable space systems, the reduced launch rate, and satellites with increased lifetimes in the late 1980s will help prevent further rapid increases in space costs. As their capabilities in space increase, the Soviets also will become increasingly dependent upon the new systems for intelligence collection, navigation support, and maintaining order-of-battle and targeting data. [redacted]