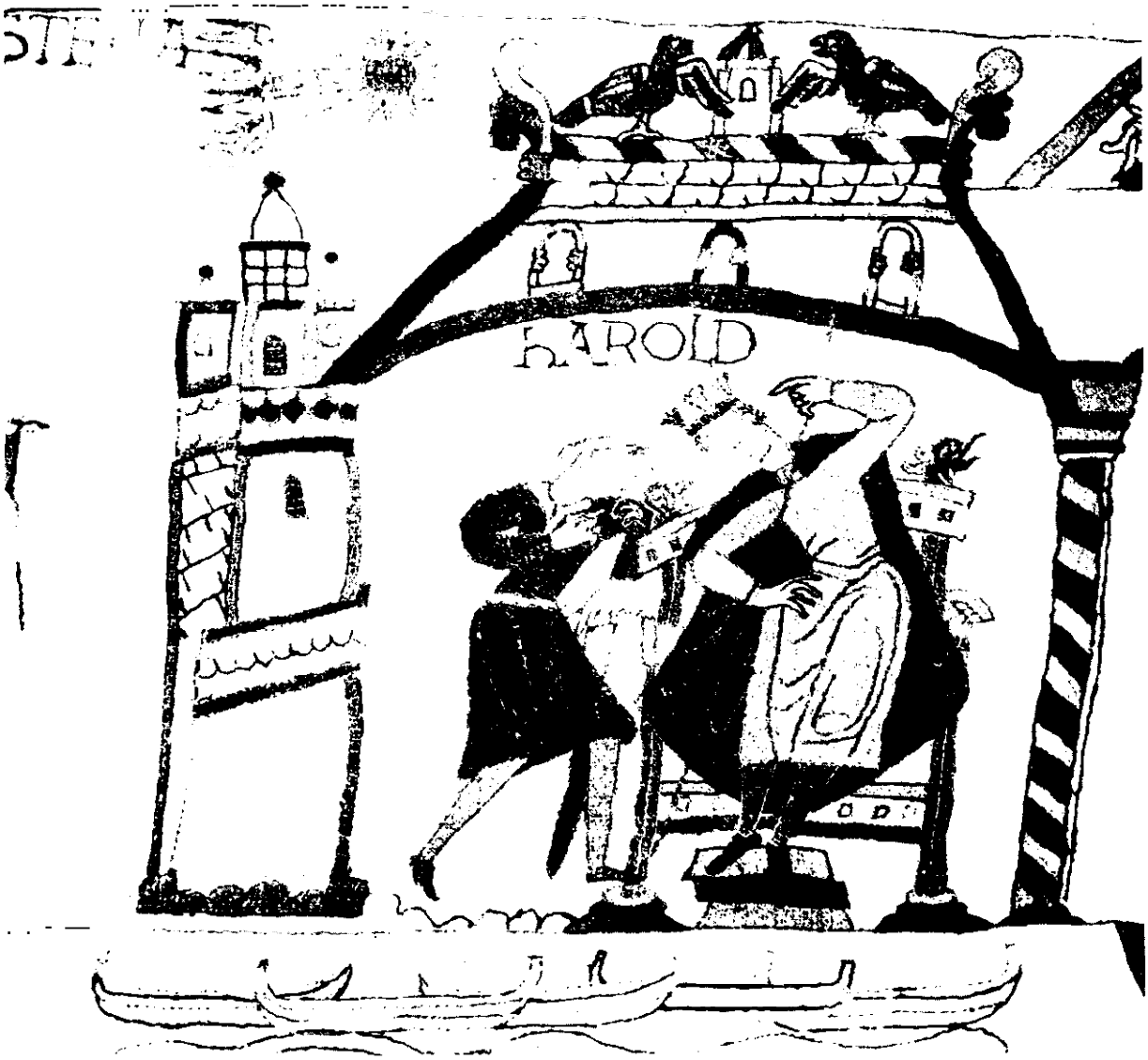
Chapter 2

History of U. S.- Soviet Cooperation in Space



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Eleventh century tapestry showing the Comet Halley

Chapter 2

History of U.S.-Soviet Cooperation in Space

BACKGROUND: FROM THE COLD WAR "MISSILE GAP" TO A COOPERATIVE SPACE AGREEMENT

The history of U.S.-Soviet cooperation in space has been marked by a number of overarching themes. In both countries, space cooperation has ostensibly been viewed as one means to achieve a greater degree of understanding and diminish conflict on Earth; a stated objective of both countries has been to encourage space cooperation for the benefit of mankind. But efforts to establish bilateral U.S.-Soviet cooperation have been marked by certain inherent tensions difficult to resolve: tensions in cooperating in space while competing on Earth; in simultaneously competing and cooperating in space, where, in both countries, military activities have been a prominent, if not driving force; in reconciling U.S,-Soviet space cooperation with the broader U.S.-Soviet political relationship; and tensions within both countries among various interests and bureaucratic perspectives in formulating national policy. United States and U.S.S.R. policies traditionally have reflected different viewpoints regarding what cooperation means and how it fits into the broader U.S.-Soviet relationship. All of these issues have colored the history of U.S.-Soviet space cooperation, and continue to shape the direction in which such cooperation may move in the future.

Early U.S. Interest in Cooperation

Since the beginning of the "space age, " in the early 1950s, both the United States and the U.S.S.R. have been committed in principle to the idea of international cooperation in space. But against a background of the Cold War and substantial military competition, initial efforts to establish U.S.-Soviet space cooperation met with little success. The Soviet approach to space was characterized by efforts to "score propaganda points against the capitalist West" rather than work cooperatively, [1] and by a strong concern for secrecy in virtually all of its space activities. The United States, on the other hand, was more favorably disposed towards cooperation with the U. S. S. R., viewing it not only as a means to promote peace, but as a means of pooling technical knowledge, placing the use of space under some degree of control, and of increasing U.S. prestige internationally. [2] Although Soviet planners gradually warmed toward space cooperation in the 1970s, the 1950s and 1960s were characterized by U.S. overtures for space cooperation which were, for the most part, rejected or ignored. They were marked by only sporadic and low-level cooperation, against a background of strident competition.

One of the earliest forums for encouraging space cooperation in the 1950s was the International Geophysical Year (IGY). The IGY—actually a period of 18 months from July 1957 to December 1958—was established by the International Council of Scientific Unions (ICSU) to pool international efforts in studying our physical environment: the Earth, the oceans, the atmosphere, and outer space. Although the IGY's program initially did not include the launching of artificial satellites, American scientists proposed such an

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[1] Joseph G, Whelan, "Soviet Attitude Toward Cooperation in Space', " in Congressional Research Service *Soviet Space Programs 1976-80,* prepared for the Senate Committee on Commerce, Science and Transportation (Washington, DC: U. S. Government Printing Office, 1982), p. 207,

[2] See Marcia Smith, 'International Cooperation in Space, " *United States Civilian Space Programs 1958-1978* a report prepared for the House Subcommittee on Space Science and Applications, Committee on Science and Technology, 97th Cong. (Washington, DC: U. S. Government Printing Office, 1981), pp. 834-837; and Dodd L. Harvey and Linda C. Ciccoritti, [' *S.-Soviet Cooperation in Space* (Miami: Center for Advanced International Studies, University of Miami, IQ741, pp. 1-22.

effort at the planning conference in Rome in 1954 of the committee established to coordinate the IGY effort, the Comite' Special de L'Annee Geophysique International (CSAGI).[3] With tens of thousands of scientists from 69 countries participating, the IGY involved investigations in many areas, both in space and on Earth, including those directed at the physics of the upper atmosphere, the Earth's heat and water regimen, and the Earth's structure and shape. Both the United States and the Soviet Union participated in the IGY, and both planned to launch a satellite in conjunction with it.

Largely because of Soviet reluctance to engage in extensive information exchange, however, cooperation in space activities both in planning for the IGY and during the IGY itself remained on a token level. Although the Soviet Union did participate in the IGY, it applied restrictions to IGY agreements for exchange of information in space, and Soviet compliance with IGY requirements in space science was poor.[4] This was due at least in part to the high level of secrecy and the lack of a clear distinction—unchanged to this day—between the Soviet military and civilian space efforts, which inhibited the Soviets in sharing information and data. The Soviet approach was different from that in the United States, which stressed a separation between civilian and military space efforts.

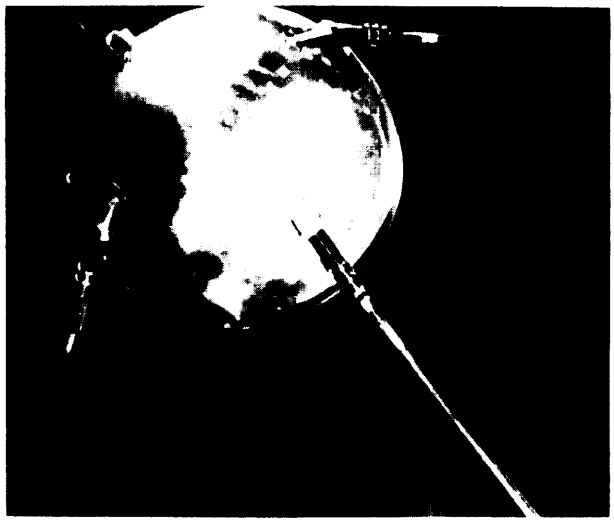

Photo credit" Nat/onal Air and Space Museum

Sputnik 1

Both the promise and problems of this space cooperation were highlighted with the Soviets' launching of Sputnik 1 in October 1957. The U.S. public and the Congress were caught by surprise, and the launch was viewed both as a humiliating defeat for U.S. prestige and as a deep national security concern. In the words of one specialist:

> The Soviet Union had demonstrated by its satellite program its capacity for launching intercontinental ballistic missiles, and its intention of exploring the space environment whose control could affect methods of maintaining peace and waging wars

The immediate effect of Sputnik, therefore, was to inspire competition. The United States increased funding for its space program, viewing expanded capabilities in space as critical to U.S. prestige and strategic defense. [5] At the same time, however, it also underlined the importance of en-

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'For a more in-depth look at this early part of space history see:

- Walter Sullivan, ***Assault on the Unknown: The International Geophysical Year (New*** York: McGraw-Hill, 1961).
- Arnold W. Frutkin, ***International Cooperation in Space*** (Englewood Cliffs, NJ: Prentice-Hall, 1965).
- Constance McLaughlin Green and Milton Lomask, ***Vanguard: A History*** (Washington, DC: National Aeronautics and Space Administration, 1970).
- Michael Collins, ***Carrying the Fire, An Astronaut's Journeys*** (New York: Farrar, Straus & Giroux, 1974).
- Harvey and Ciccoritti, ***U.S.-Soviet Cooperation in Space,*** op. cit.
- Congressional Research Service, Science Policy Research Division, ***World-Wide Space Activities,*** a report prepared for the Subcommittee on Space Science and Applications of the Committee on Science and Technology, U.S. House of Representatives (Washington, DC: U.S. Government Printing Office, 1977).
- Homer E. Newell, ***Beyond the Atmosphere: Early Years in Space Science*** (Washington, DC: National Aeronautics and Space Administration, 1980).
- Walter A. McDougall, ***The Heavens and the Earth: A Political History of the Space Age (New*** York: Basic Books, ***1985).***

[4] ***See*** Frutkin, ***International Cooperation in Space,*** op. cit., pp. 19-20:

> The Soviet Union provided virtually no advance information of a substantive character regarding either its satellite or sounding rocket programs, restricted agreements prescribing types of information to be exchanged, and released only limited quantities of digested scientific findings such as normally appear in conventional publications (p. 20)

[5] Eilene Galloway, "Congress and International Space Cooperation, " ***International Cooperation in Outer Space: A Symposium,*** prepared for the U.S. Congress, Senate Committee on Aeronautical and Space Sciences (Washington, DC: U.S. Government Printing Office, 1971), p. 4.

[6] John Logsdon, ***The Decision to go to the Moon: Project Apollo and the National Interest*** (Cambridge, MA: MIT Press, 1970).

couraging international cooperation as a means of promoting peaceful rather than military uses of outer space. As stated by the Preparedness Investigating Subcommittee of the Senate Armed Services Committee in 1958:

> . . . the same forces, the same knowledge, and the same technology which are producing ballistic missiles can also produce instruments of peace and universal cooperation . . . the truly worthwhile goal is a world of peace—the only world in which there will also be security.[7]

A total of eight successful satellite launches were accomplished during the IGY: The U.S.S.R. launched Sputnik I, 11 and 111; the United States launched Explorer I, II, and IV, Vanguard I, and Pioneer III. But despite some exchange of information, space cooperation was the most disappointing part of the IGY, and efforts outside of the IGY to engage Moscow in space cooperation remained unanswered or were refused.

Thus, the late 1950s **highlighted the twin themes of competition and cooperation which would characterize all subsequent U.S.-Soviet efforts towards cooperation in space. The IGY marked the beginning of efforts of space scientists throughout the world to work together despite political differences. But especially with the launching of Sputnik 1, it also showed the difficulties of cooperating, and revealed the Soviets as strong competitors with the United States in space technology and possessors of a military capability with startling implications.**

[7] *Inquiry into Satellite and Missile Programs,* hearings before the Preparedness\ Investigating Subcommittee of the Senate Committee on Armed Services, 85th Cong., 1st and 2d sess., Part 3 (Washington, DC: U.S. Government Printing office, 1958), pp. 2429-2430.

Photo credit Nat/onal *Air and Space Museurr*

Explorer 1

One result for the United States was the establishment of the National Aeronautics and Space Administration (NASA) to address both the competitive and cooperative sides of space. NASA was created by the National Aeronautics and Space Act of 1958, whose declaration of policy—that space activities be conducted for peaceful purposes and for the benefit of mankind—included specific goals for encouraging both peaceful competition and cooperation with foreign countries, East and West. For example, the Act calls for "the preservation of the role of the United States as a leader in aeronautical and space science and technology"[8] and for "cooperation by the United States with other nations and groups of nations. . ."[9] in the conduct and peaceful application of space-related activities.

The Early 1960s: Unfulfilled Promise

Although the goal of international cooperation had been included in NASA's charter—and although the 1960s saw expanded U.S. cooperation with countries other than the U. S. S. R., and Soviet cooperation with countries other than the United States—U.S.-Soviet relations regarding space during the decade of the **1960s** were characterized primarily by competition. The Kennedy Administration accelerated the pace of U.S. space efforts soon after entering office, and on May **25,** 1961, during an address to a joint session of the 88th Congress, President Kennedy called on the country to commit itself to landing a man on the Moon by the end of the decade. 'O Although the idea had been discussed among scientists and in Congress in the late **1950s,** this official statement of policy became part of another round of the "space race, " not "won" until 1969. The first half of the 1960s was marked by major achievements in the Soviet Vostok and Voskhod programs, in the U.S. Mercury and Gemini programs, and the first "space walk, " conducted by the Soviet cosmonaut Alexei Leonov in 1965.

[8] National Aeronautics and Space Act of 1958, Public Law 85-568, Section 102(c)(5).

[9] Ibid , Section 102(c)(7) Section 205 of the act provides formal authorization for international cooperation in space.

[10] "'John F. Kennedy, Special Message to the Congress on Urgent National Needs, " May 25, 1961, *Public Papers of the Presidents of the United States: John F. Kennedy, 1961* (Washington, DC: U .S. Cotrernrnent [>r]nting Office, 1 962), pp. 397-407.

But despite the commitment to devote more resources towards the "space race, " the idea of cooperation with the U.S.S.R. was not abandoned. President Kennedy explicitly underlined this in his State of the Union message in 1961:

> Finally, this Administration intends to explore promptly all possible areas of cooperation with the Soviet Union and other nations "to invoke the wonders of science instead of its terrors. "Specifically, I now invite all nations—including the Soviet Union—to join with us in developing a weather prediction program, in a new communications satellite program, and in preparation for probing the distant planets of Mars and Venus, probes which may someday unlock the deepest secrets of the universe.
>
> Today, this country is ahead in the science and technology of space, while the Soviet Union is ahead in the capacity to lift large vehicles into orbit. Both nations would help themselves as well as other nations by removing these endeavors from the bitter and wasteful competition of the Cold War. The United States would be willing to join with the Soviet Union and the scientists of all nations in a greater effort to make the fruits of this new knowledge available to all .. .11

Soon after taking office President Kennedy formed a special panel—a Joint NASA-President's Science Advisory Committee-Department of State Panel, directed by Jerome Wiesner—to study the possibilities for international cooperation in space activities and related fields. Focusing its attention primarily on collaboration between the United States and the U. S. S. R., the Panel made a series of concrete proposals for cooperative activities. Again Soviet interest, however, was not forthcoming on any of these proposals.

Part of the reason for the lack of agreement was the relation of cooperation in space to broader issues of U.S.-Soviet relations. While the United States hoped to isolate cooperation in space as a separate area of negotiation, the U.S.S.R. tended to view it as inextricably intertwined with broader foreign policy issues. Whereas U.S. statements reflected the hope that cooperation in space might lead to more understanding and cooperation in other areas, Soviet statements declared that issues in those other areas—especially disarmament—had to be settled first.

Soviet planners, therefore, declined to discuss issues of U.S.-Soviet cooperation in space until the political situation changed in 1961, when issues such as the Berlin crisis and the break with the Chinese Communist Party led to a fundamental shift in the Soviet stance toward the United States overall. This shift in attitude was reflected in October 1961 at the 22nd Congress of the Communist Party of the Soviet Union (CPSU), when Soviet party and government officials began discussing a policy of cooperation with other nations in the fields of trade, cultural relations, science, and technology. In December 1961, after years of relative intransigence over other U.N. resolutions, the Soviet Union for the first time gave its support to the passage of a U.N. Resolution stressing "the urgent need to strengthen international cooperation . . . for the betterment of mankind . . . ."[12] And Soviet leaders gradually moderated their position toward cooperation in space with the United States. The following February, Khrushchev sent a letter to President Kennedy congratulating the American people on John Glenn's three-orbit flight and suggesting that there be closer cooperation in space activities between the two powers .13

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[11] John F, Kennedy, "Annual Message to the Congress on the State of the Union, " Jan. 30, 1961, *Public Papers of the Presidents of the United States: John F. Kennedy, 1%1,* op. cit., pp. 26-27.

This response led to a series of talks between Hugh Dryden of NASA and Anatoliy Blagonravov of the Soviet Academy of Sciences. These talks, which were suspended temporarily during the Cuban missile crisis, led in turn to the signing of an interagency agreement in December 1962. Generally referred to as the Dryden-Blagonravov agreement of 1962, the agreement stipulated coordinated national efforts in the fields of meteorology, geomagnetism, and satellite communications experimentation. In addition, a 24-hour communications link—the so-called "cold line"* —was established for the real time exchange of satellite meteorological data between Washington and Moscow. An additional formal agreement concerned the joint publication of a study on space biology and medicine. Dryden believed that the Soviet concern for secrecy prevented further cooperation. [14]

While some useful data were exchanged, however, the results of the agreements were disappointing. Part of this was undoubtedly due to inadequate Soviet technical capabilities for processing data as well as to Soviet intransigence. The meteorological data received by U.S. scientists were late and of poorer quality than had been anticipated; no satellite data were exchanged concerning the magnetosphere; the Soviets received experimental satellite communications but declined to transmit; and the space biology and medicine study was not published until 1975, largely because of delays of up to 2 years in Soviet responses. Despite "frequent and repeated efforts to persuade the Soviets to enter new space projects, "lb U.S.-Soviet relations generally remained cold, and the level of cooperation in space seemed to follow suit.

The Late 1960s: The United States Lands a Man on the Moon

During the mid to late **1960s,** efforts to expand U.S.-Soviet space cooperation became more modest. Despite previous disappointments, the Johnson Administration continued to pursue such cooperation. But now studies on potential areas for U.S. cooperation in space—such as the Webb Report1[7]—stressed caution, urging that sights for cooperation be lowered, the serious limitations of cooperating with the U.S.S.R. be recognized, and a "measured approach" with respect to high-level initiatives vis-a-vis the U.S.S.R. be adopted. While the Kennedy Administration had hoped for big projects—extending even to a proposed joint lunar landing–the Johnson Administration shifted back to an emphasis on small "first steps" which might be a basis for broadening cooperation in the future. 'g Cooperation was left primarily for the established NASA-Soviet Academy channels, with few overtures for cooperation coming directly from the President himself. Soviet planners, for their part, seemed less inclined to cooperate, given the greater belligerence in foreign and domestic affairs of the new Brezhnev /Kosygin leadership, the escalation of the war in South Vietnam and, as before, the fact that relationships with respect to space activities were very much determined by the nature of the broader political relationship.

Thus, cooperation in space continued on a very low level. The Soviets began furnishing meteorological data via the long inactive "cold line"; perhaps most importantly, final agreement was reached on a U.N. Outer Space Treaty in 1967, which was implemented by four subsequent international treaties on space law. 1[9]But proposals for more substantive bilateral cooperation in space were consistently rejected, ignored, or sidestepped

(continued)

For a description of the Soviet change in attitude at this time see Joseph G. Whelan, "Soviet Attitude Toward International Cooperation in Space, " ***Soviet Space Programs,*** 1962-65 (Washington, DC: U.S. Government Printing Office, 1966), pp. 427-430.

For a discussion of the events in the U.N. concerning East-West cooperation in space at this time see Eilene Galloway, "Part 111: The United Nations, " *International Cooperation and Organization for Outer Space* (Washington, DC: U.S. Government Printing Office, 1965), pp. 163-227.

● Terminated in 1984.

[14]Ezell and Ezell, *The Partnership,* op. cit., PP. 58-59.

[15]U.S. Congress, Senate, Committee on Aeronautical and Space Sciences, ***NASA Authorization*** *for Fiscal Year 1970* (Washington, DC: U.S. Government Printing Office, 1969), especially pp. 635-636.

"Ibid., p. 636.

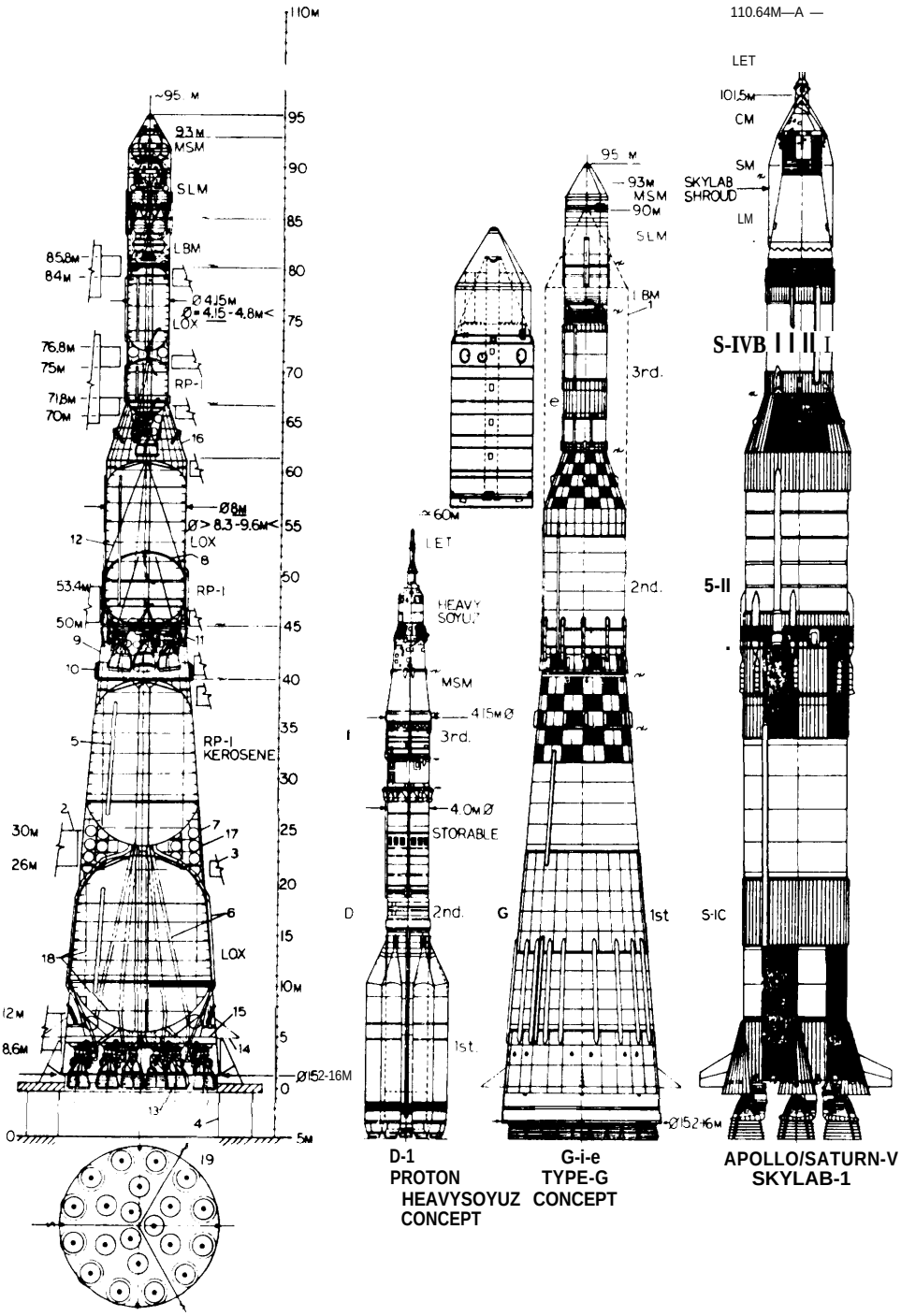
[17]James E. Webb, "Report on Possible Projects for Substantive Cooperation With the Soviet Union in the Field of Outer Space, ' known as the Webb Report (letter of transmittal dated Jan. 31, 1964) cited in Harvey and Ciccoritti, U.S.-Soviet *Cooperation* in *Space,* op. cit., pp. 138-139.

[18]Harvey and Ciccoritti, *U.S.-Soviet* ***Cooperation in*** *Space,* op. cit., pp. 135-139.

[19]See ch. 1.

Figure2-l .—Soviet Type G Booster, and U.S. Saturn V

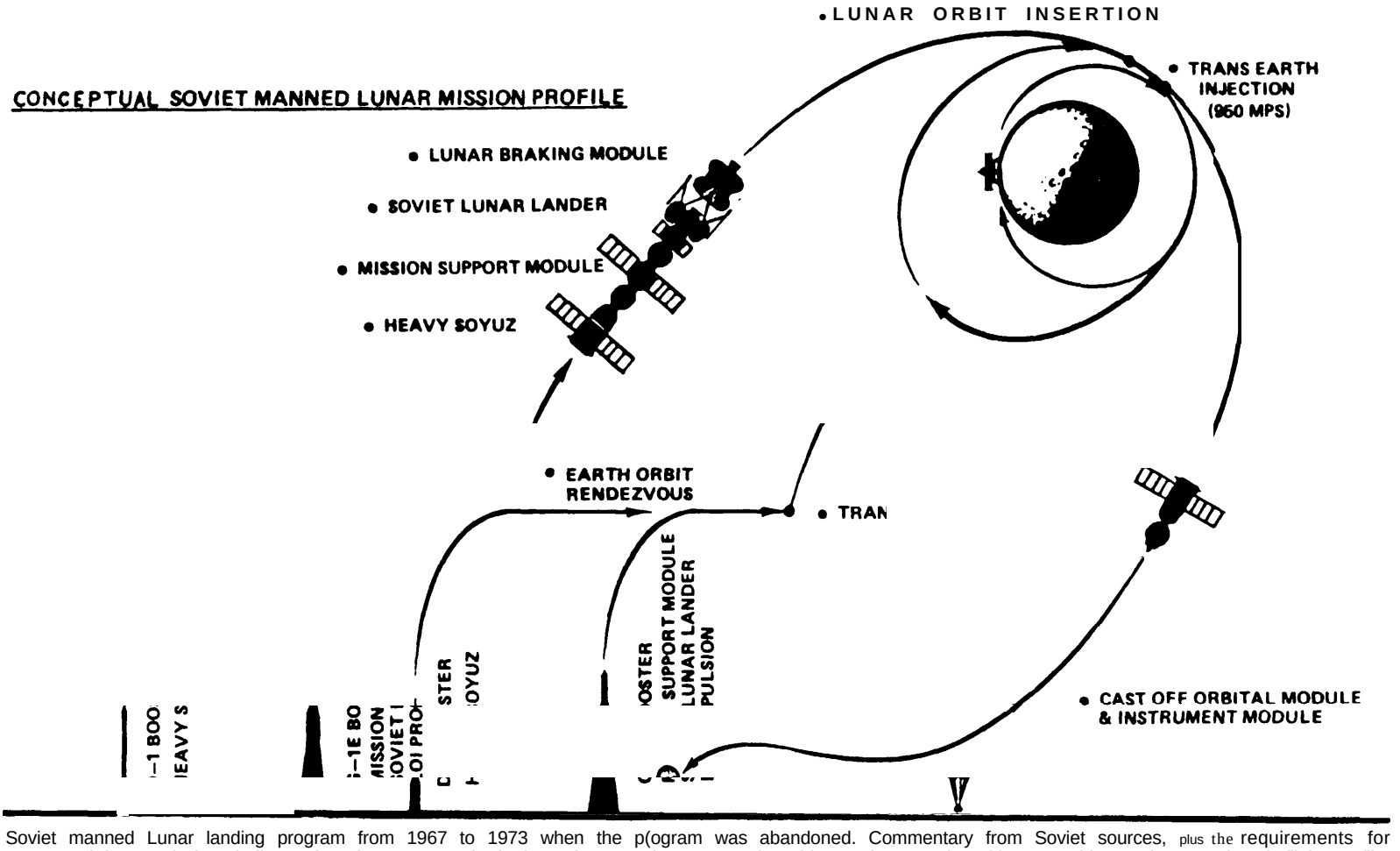
FIGURE- N



The Type-G booster has never been placed on display, and the U.S.S.R. has never released any data on its characteristics. The design shown here was developed from deductions about the probable Soviet manned lunar mission profile and from a line drawing of its possible service gantry.

SOURCE: Charles P Vlck, 198244

Figure 2-2.–Conceptual Illustration, Soviet Manned Lunar Landing Program, 1967-73



Soviet manned Lunar landing program from 1967 to 1973 when the p(ogram was abandoned. Commentary from Soviet sources, plus the requirements for a manned lunar mission, indicate that the U.S.S.R. had planned to conduct an Earth Orbit Rendezvous (EOR)/Lunar Orbit Rendezvous (LOR) flight profile. A manned craft would meet the huge unmanned payload in Earth orbit before being propelled off to the Moon. At the completion of the lunar phase of the mission, the crew would return to Earth in a variant of their Soyuz spacecraft. All necessary hardware had been developed. The repeated failure of the G-1-e booster blocked the mission.

SOURCE Charles P Vlck, 1983

by Soviet officials. Simultaneously, efforts were intensified to gain the advantage in the new leg of the space race: placing a man on the Moon.

One of the key elements of the Moon race was the ability to launch heavy payloads. The Soviets were testing their Type-G series launchers, but encountered a series of failures. The development of the Saturn V was largely responsible for the United States' success in landing a man on the Moon .20

[20]For a discussion of the development of U.S. launch vehicles at this time see Charles S. Sheldon 11, "Launch Vehicles and Propulsion, " ***United States Civilian Space Programs 1958-1978,*** prepared for the House Subcommittee on Space Science and Applications of the Committee on Science and Technology (Washington, DC: U.S. Government Printing Office, January 1981), pp. 210-217.

For a discussion of the development of U.S.S.R. launch vehicles at this time see Charles P. Vick, "The Soviet G-1-e Manned Lunar Landing Programme Booster, " *JBIS: **Journal of the British** Interplanetary* Society, XXXVIII, No. 1 (January 1985), pp. 11-18.

With the end of the 1960s, many congressional and other U.S. observers believed that the beginning of the Nixon Administration and the landing of an American on the Moon in 1969 would trigger more U.S.-Soviet cooperation in space. With the United States having "won the space race, " many believed that American "superiority" would provide incentive for the U.S.S.R. to cooperate rather than fall farther behind in a costly competition. The new Administration had stated a desire to move from an "era of confrontation to an era of negotiation" in relations with the Soviet Union; the new NASA administrator, Thomas Paine, had renewed efforts to interest the Soviet Academy of Sciences in cooperative projects. The successful landing of the U.S. Apollo 11 manned spacecraft on the Moon encouraged many observers to believe that the Soviets would now accept these offers. A number of congressional addresses and resolutions introduced in the

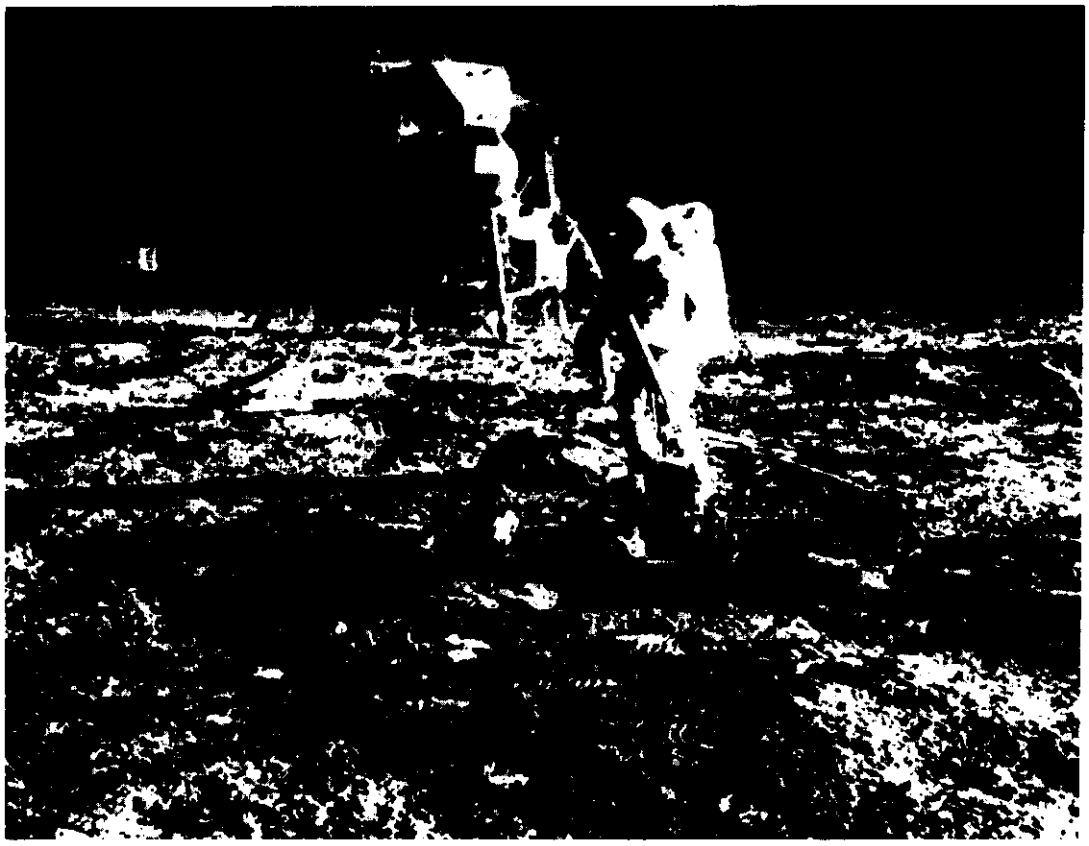


Photo credit: National Alr and Space Museum

U.S. Apollo Astronauts: The First Moon Walk

House and Senate urged that the lunar landing be viewed as a catalyst for changing the direction of the U.S. program to place more emphasis on U.S.-Soviet cooperation rather than competition.[21]

[21] See for example:
- U.S. Congress, House, Representative Hechler Speaking on Apollo and World Peace, 91st Cong., 1st sess., July 21, 1969, *Congressional Record*, H6116.
- U. S. Congress House, Representative Keith Commenting on Introducing H. Con. Res 305 Regarding Future Space Exploration Jointly by U.S. and Other Nations, 91st Cong., 1st sess., July 24, 1969, *Congressional Record*, H6294.
- U.S. Congress, Senate, Senator Gravel Commenting on and Introducing Senate Resolution 221 to Internationalize the U.S. Space Program, 91st Cong., 1st sess., July 22, 1969, *Congressional Record*, S8385.
- U.S. Congress, Senate, Senator Proxmire Introducing Senate Resolution 285–Resolution Authorizing the Senate Foreign Relations Committee to Undertake a Comprehensive Study of All Possibilities for International Cooperation in Space, 91st Cong., 1st sess., Nov. 18, 1969, *Congressional Record*, S14593.
- U.S Congress, House, Representative Miller Commenting on the Possibility of U.S.-U. S. S. R. Future Exploration of Space, 91st Cong., 1st sess., Aug. 11, 1969, *Congressional Record*, S47251,
- U.S. Congress, Senate, Senator Fulbright Commenting on U. S.-Soviet Competition in Space and Possibility of Future Cooperation, 91st Cong., 1st sess., Aug. 11, 1969, *Congressional Record*, S~b31.
- U.S Congress, Senate, Senator Percy Commenting on U.S.-SOviet Cooperation in Space, 91st Cong., 1st sess., Aug. 12, IQ@. *Congressional Record*, S9828.

But instead of acknowledging "defeat," American technological superiority, and a new willingness to cooperate, Soviet officials asserted that there never had been a "space race" to the Moon, and simply congratulated the United States on matching the significant technological achievements already attained by the U. S. S. R.:

> Man's walk on the Moon will go down in the chronicles of the twentieth century as an important event, along with such related significant achievements as the launching of the first artificial satellite, the first space flight by Iurii Gagarin, Aleksey Leonov's first walk in space, and the first launchings of automatic spacecraft towards the Moon, Venus, and Mars.[22]

After Apollo 11 the Soviets continued until 1976 to launch unmanned probes for exploration of the Moon. Their manned space program was directed more towards Earth-orbit operations, leading to the successful Salyut program of the 1970s. But at the time of the Moon landing extensive U. S.-Soviet cooperation in space appeared to remain elusive.

[22] L. Sedov, "Chelovek na lune" [A Man on the Moon], *Pravda*, July 23, 1969.

THE 1970s: MOVES TOWARD BROADER COOPERATION

Rendezvous and Docking for Space Rescue

A major shift towards broader cooperation came with the **1970s.** The end of the 1960s saw a relaxation of tensions on a number of fronts, including the signing of the Non-Proliferation Treaty in 1968 and the beginning of the Strategic Arms Limitation Talks (SALT I) in 1969. In the period following the lunar landing, one relatively large-scale U.S. proposal for a U.S.-Soviet cooperative space project received a positive response: the idea of astronaut safety and reciprocal rescue capability as a basis for cooperation. In May 1970, a U.S. proposal to develop a common docking mechanism for manned spacecraft and space stations was accepted by the U.S.S.R.

It is unclear why the Soviets became interested in space cooperation with the United States at this time. Some observers argue that Soviet acceptance was based primarily on Soviet technological requirements. Despite some docking successes, the repetition of docking difficulties in the Soviet space program was considered by some to provide a technical incentive for their acceptance of cooperation with the United States. For example, in 1968 the manned Soyuz 3 approached the unmanned Soyuz 2 in orbit with the apparent intention of docking, but no docking occurred. In October of 1969a tandem flight of three manned spacecraft took place; two of these were expected to dock, but did not do so—presumably a failed mission.

Other observers, however, argue that the Soviet shift was motivated more by political considerations. Following the beginning of a general relaxation of tensions, these observers suggest, the U.S.S.R. viewed a joint U.S.-Soviet venture in space as a means to enhance its image around the world and at home.

The Soviets, for their part, have described the shift almost entirely as an outgrowth of changes in their broader political relation with the United States:

> The atmosphere of the "Cold War" of the 1950s to 1960s precluded giving U.S.-Soviet cooperation in space the character of a constantly expanding process. It is not accidental that cooperative activity in the 1960s was limited to an exchange of information, contact between scientists, and individual experiments. Efforts on the part of the U.S. military industrial complex to direct American aeronautics towards military channels, and considerations of prestige and competition . . . created the impression for a wide American public that any Soviet success in space was to the detriment of the "national interests" of the United States.
>
> Changes in the character of Soviet-American relations, and positive results of discussions on the highest level in Moscow and Washington, allowed for a significant expansion of U.S.-Soviet cooperation in the research on and use of space .23

Discussions were begun in 1970 for joint development of a common docking mechanism. The United States, however, had not intended to establish cooperation on one isolated topic; since before the days of the Dryden-Blagonravov talks, the U.S. thrust had always been toward a broad range of cooperative space activities .24 After the meeting on docking was successful, therefore, discussions of other forms of cooperation were held in Moscow in January 1971, and an agreement was signed between NASA and the Soviet Academy of Sciences involving coordination of space activities, data exchanges, and a lunar sample exchange. This agency-to-agency agreement established the framework for what would evolve into the 1972 intergovernmental agreement.

[23]G. S. Khozin, *S. S. S. R.-S. Sh.A.: Orbity kosmicheskogo sotrudnichestva* [U. S. S. R.-U. S. A.: Orbits of Space Cooperation] (Moscow: Mezhdunarodnye Otnoshenia, 1976), p. 6.

[24]Harvey and Ciccoritti, U.S.-soviet Cooperation *in Space,* op. cit., pp. 220-221, 229.

Initiation of Cooperative Space Science and Applications

The text of the agreement of 1971 between NASA and the Soviet Academy of Sciences sets forth a fairly specific plan for cooperation in a number of applications and science areas:

1. In the field of meteorological satellites, to work jointly to make improvements in the current exchange of data and to consider alternative possibilities for coordinating satellite systems of both countries so as to achieve the economic and other advantages of complementary systems.
2. In the field of meteorological rocket soundings, to formulate provisions for a program of soundings along selected meridional lines in cooperation with other countries.
3. In the field of the natural environment, to study the possibility of conducting coordinated surface, air, and space research over specified international waters and to exchange results of measurements made by each country over similar land sites in their respective territories so as to achieve the potential applications of space and conventional survey techniques for investigating the natural environment in the common interests.
4. In the field of exploration of near-Earth space, the Moon, and the planets, to work jointly to define the most important scientific objectives in each area, to exchange information on the scientific objectives and results of their national programs in these fields, to consider the possibilities for coordination of certain lunar explorations, and, in particular, to initiate an exchange of lunar surface samples by performing an agreed exchange of samples already obtained in the Apollo and Luna programs.
5. In the field of space biology and medicine, to develop appropriate procedures and recommendations to assure a more detailed and regular exchange of information including biomedical data obtained in manned space flights .25

[25]NASA News Release, HQ, 71-57, "U.S.-Soviet Agreement," Mar. 31,1971; NASA News Release, HQ,71-9, "U.S./U.S.S.R. Space Meeting," Jan. 21, 1971.

Soviet officials favored signing a more general set of agreements, but NASA negotiators, recalling the disappointing experience of the Dryden-Blagonravov agreements, argued for a set of goals as specific as possible. Under the framework of this agreement, five Joint Working Groups were established to determine means by which these projects would be implemented: the Joint Working Group on Meteorological Satellites; Joint Working Group on Meteorological Rocket Soundings; Joint Working Group on the Natural Environment; Joint Working Group on the Exploration of near-Earth, the Moon, and the Planets; and the Joint Working Group on Space Biology and Medicine.

Informal discussions of a joint docking proposal took place at the time the 1971 agreement was signed; it remained for a 1972 intergovernmental agreement to incorporate the joint docking project into a formal cooperative project between the two countries.

The 1972 Agreement

The intergovernmental *Agreement Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes (see* below) was drafted and signed with the dawning of "detente" in U.S.-Soviet relations overall. The Summit meeting between President Nixon and Soviet Premier Brezhnev in Moscow in May 1972—the first time a U.S. President had officially visited the Soviet capital—triggered hopes that better relations and increased interaction in scientific, economic, and cultural affairs would usher in a new era of peace and cooperation. This summit meeting set the stage for the signing of a total of 11 bilateral agreements for scientific and technical cooperation between 1972-74. In addition to the agreement for cooperation in space, three other bilateral agreements were signed in 1972, for cooperation in science and technology, environmental protection, and medical science and public health. In 1973 four additional agreements were signed, in agriculture, studies of the world's oceans, transportation, and the peaceful uses of atomic energy. Three final agreements were signed in 1974 on housing and other construction, energy, and artificial heart research. The Apollo-Soyuz Test Project (ASTP) was to be among the most ambitious and most spectacular joint efforts between the two countries.

Photo credlf National *Aeronautics and Space Administration*

President Richard Nixon and Premier Alexei N. Kosygin signing the 1972 Agreement in Moscow

ASTP was specifically described in the points of agreement shown in box 2A, relating to Article 3 of the **1972** Agreement.

The Apollo-Soyuz Test Project (ASTP)

Details of the Apollo-Soyuz Test Project (ASTP) are already well known. As a contribution not only towards detente, but towards the development of a universal, androgynous docking system, the United States and the Soviet Union jointly developed and conducted a flight where the U.S. Apollo spacecraft, carrying a special docking module, rendezvoused and docked with a modified Soviet Soyuz. Soyuz 19 was sent up from Tiuratam (Tyuratam), in the Kazakh Republic of the U. S. S. R., with two cosmonauts on board: Colonel Alexei Arkhipovich Leonov and Valerii Nikolaievich Kubasov. The Apollo was launched from the Kennedy Space Center, with three astronauts: Brigadier-General Thomas P. Stafford, Major Donald K. Slayton, and Major Vance D. Brand.

On July 17, 1975, Apollo and Soyuz docked in orbit 225 kilometers above the Earth, and for 2 days the two crews paid exchange visits and conducted five joint experiments. Figure 2-5 depicts the ASTP mission profile and timeline. Live television coverage of the event was broadcast to rnil-

Agreement Between the United States of America and the Union of Soviet Socialist Republics Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes, Signed at Moscow, May 24, 1972

The United States of America and the Union of Soviet Socialist Republics;

Considering the role which the U.S.A. and the U.S.S.R. play in the exploration and use of outer space for peaceful purposes;

Striving for a further expansion of cooperation between the U.S.A. and the U.S.S.R. in the exploration and use of outer space for peaceful purposes;

Noting the positive cooperation which the parties have already experienced in this area;

Desiring to make the results of scientific research gained from the exploration and use of outer space for peaceful purposes available for the benefit of the peoples of the two countries and of all peoples of the world;

Taking into consideration the provisions of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies,[27] as well as the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space;[28]

In accordance with the Agreement between the United States of America and the Union of Soviet Socialist Republics on Exchanges and Cooperation in Scientific, Technical, Educational, Cultural, and Other Fields, signed April 11, 1972,[29] and in order to develop further the principles of mutually beneficial cooperation between the two countries;

Have agreed as follows:

ARTICLE 1.—The parties will develop cooperation in the fields of space meteorology; study of the natural environment; exploration of near Earth space, the Moon and the planets; and space biology and medicine; and in particular, will cooperate to take all appropriate measures to encourage and achieve the fulfillment of the Summary of Results of Discussion on Space Cooperation Between the U.S. National Aeronautics and Space Administration and the Academy of Sciences of the U.S.S.R. dated January 21, 1971.

ARTICLE 2.—The parties will carry out such cooperation by means of mutual exchanges of scientific information and delegations, through meetings of scientists and specialists of both countries, and also in such other ways as may be mutually agreed. Joint working groups may be created for the development and implementation of appropriate programs of cooperation.

ARTICLE 3.—The Parties have agreed to carry out projects for developing compatible rendezvous and docking systems of United States and Soviet manned spacecraft and stations in order to enhance the safety of manned flights in space and to provide the opportunity for conducting joint scientific experiments in the future. It is planned that the first experimental flight to test these systems be conducted during 1975, envisaging the docking of a United States Apollo-type spacecraft and a Soviet Soyuz-type spacecraft with visits of Astronauts in each other's spacecraft. The implementation of these projects will be carried out on the basis of principles and procedures which will be developed in accordance with the Summary of Results of the Meeting Between Representatives of the U.S. National Aeronautics and Space Administration and the U.S.S.R. Academy of Sciences on the Question of Developing Compatible Systems for Rendezvous and Docking of Manned Spacecraft and Space Stations of the U.S.A. and the U.S.S.R. dated April 6, 1972. [See above].

ARTICLE 4.—The Parties will encourage international efforts to resolve problems of international law in the exploration and use of outer space for peaceful purposes with the aim of strengthening the legal order in space and further developing international space law and will cooperate in this field.

ARTICLE 5.—The Parties may by mutual agreement determine other areas of cooperation in the exploration and use of outer space for peaceful purposes.

ARTICLE 6.—This Agreement shall enter into force upon signature and shall remain in force for five years. It may be modified or extended by mutual agreement of the Parties.

Done at Moscow this 24th day of May 1972 **in duplicate, in the English and Russian languages both equally authentic.**

For the United States of America
Richard Nixon
President of the United States of America

For the Union of Soviet Socialist Republics
A. N. Kosygin
Chairman of the Council of Ministers of the U.S.S.R.

[27] TIAS 6347; 18 UST 2410; 610 UNTS 205.
[28] TIAS 6599; 19 UST 7570; 672 UNTS 119.
[29] TIAS 7343; 23 UST 790.

lions around the world with enthusiastic commentary and dramatic pictures. The astronauts and cosmonauts on board emphasized ASTP'S importance as a symbol of the peaceful intentions of both countries. And on an official level, the hope was expressed that ASTP would lead to wider and more extensive U.S.-Soviet cooperative efforts in the future. Upon the landing of Apollo and Soyuz spacecraft, L. 1. Brezhnev stated:

> A relaxation of tensions and improvements in Soviet-American relations have created the conditions for carrying out the first international space flight. They are opening new possibilities for wide, fruitful development of scientific links between countries and peoples in the interests of peace and progress of all mankind .30

Amid the generally enthusiastic response over the success of ASTP, however, many observers began to express criticism of the project as a primarily symbolic, empty, and wasteful use of U.S. space dollars.[31]

Despite the dramatic hopes it represented, the ASTP gradually became the most visible and controversial product of U.S.-Soviet cooperation in space. It became symbolic of cooperation in the minds of most, and for many it was the only memorable product of U.S.-Soviet space cooperation. It has also received the sharpest criticism. Critics argued that it was a "costly space circus, " a "250 million dollar handshake, "[32] and that funds allocated to ASTP should have been used for more fruitful projects. They also argued that the United States financed a chance for the Soviet Union to present itself as technologically equal to the United States, and asserted that such a joint technological undertaking inevitably involved a transfer of American space technology to the Soviet space program. Finally, they argued that the development of an androgynous docking system itself was unjustified, since the ASTP was to be the last time that the U.S. Apollo spacecraft would be used. Supporters of ASTF' countered that no significant technology transfer occurred, and that the joint mission was valuable as a symbol of world peace—"a dramatic demonstration to both nations" and to the world of the potential "prac-

[30] G. S. Khozin, *S. S. S. R.-S.Sh.A: Orbity kosmicheskogo sotrudnichestva*, op. cit., p. 7

[31] It is difficult to determine the precise cost of ASTP for the United States and U.S.S.R. According to *NASA Pocket Statistics—January 1985* (Washington, DC: Office of Management, NASA, 1985), p. C-5, ASTP cost a total of $214.2 million. The existing Apollo Command Space Module and Saturn 1 B launch vehicle, valued at $100 million, were transferred to the project at no cost from the completed Apollo program. (Similar leftover Apollo hardware was donated to the National Air and Space Museum.) Substantial additional support costs may have been incurred by NASA for ASTP which did not show up as a direct charge to the project. Soviet planners did not publicize their ASTP budget, which precludes a dollar-to-ruble comparison. Soviet costs included flying a practice mission, Soyuz 16, which went through all the maneuvers required for docking, and committing a backup Soyuz. See also U.S. General Accounting Office, *A Progress Report on United States-Soviet Union Cooperative Programs* (Washington, DC: U.S. Government Printing Office, Jan. 8, 1975), pp. 34-37.

[32] See, for example, James Oberg, *Red Star in Orbit* (New York: Random House, 1981), p. 139.

[page omitted]

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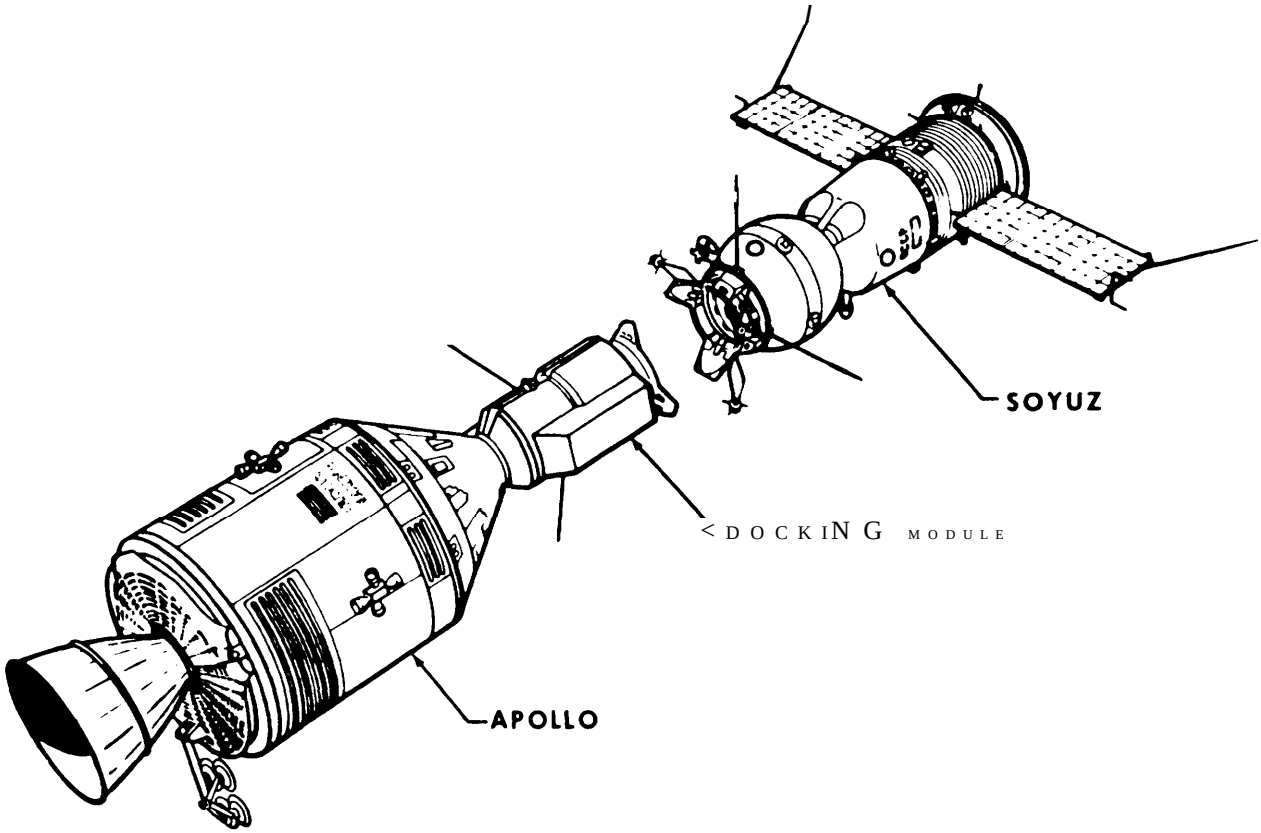
The scanned version of the page was almost entirely black and not usable.

Figure 2-3.—Apollo Command Module and Soviet Soyuz Counterpart



SOURCE NASA ASTP press release

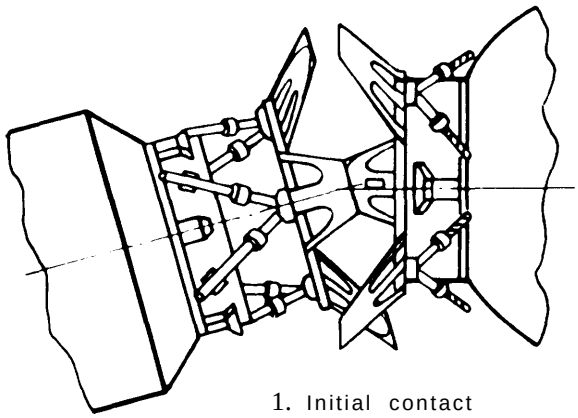
Photo credit *National Aeronauttcs and Space Administration*

Astronaut Donald K. Slayton and Cosmonaut Aleksei A. Leonov in the Orbital Module during the ASTP

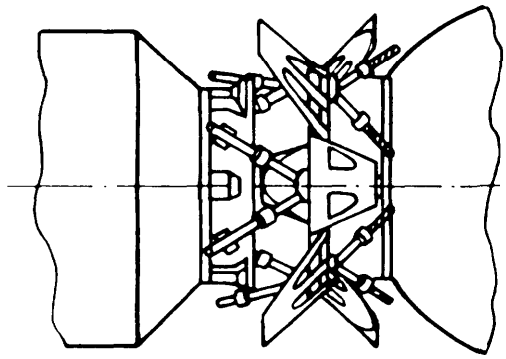
ticality and benefits of detente. " In more practical terms, they believed that the result was "a more open [Soviet] space program, "[33] and that the establishment of U.S.-Soviet working procedures for joint manned missions was potentially useful for the future. Disagreements over the benefits and liabilities of ASTP continue today (see chapter 5).

[33]Preceding quotes from a lettter to Senator Matsunaga from Dr. Thomas O. Paine, dated Sept. 6, 1984, in East-West Cooperation ***in Outer Space,*** hearings before the Senate Committee on Foreign Relations, Sept. 13, 1984 (Washington, DC: U.S. Government Printing Office, 1984), p. 65.

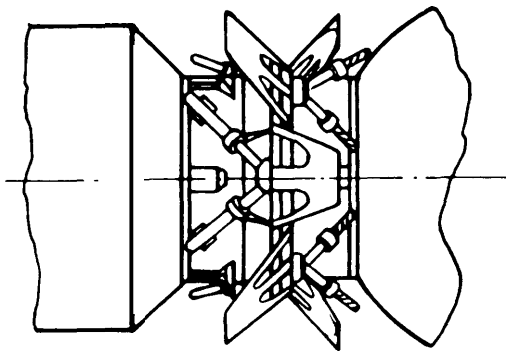
Figure 2-4.— Docking Mechanism Developed for Use in ASTP



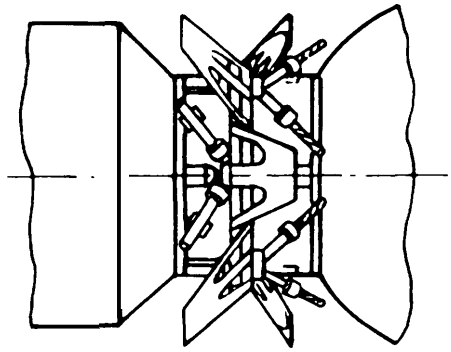
1. Initial contact



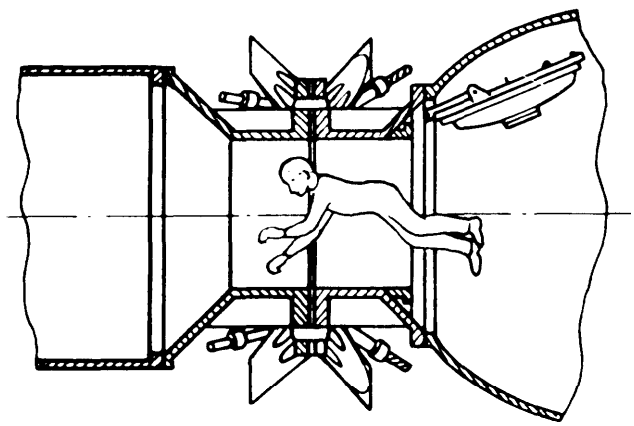
2. Guide ring mate and capture



3. Mutual alignment and retraction



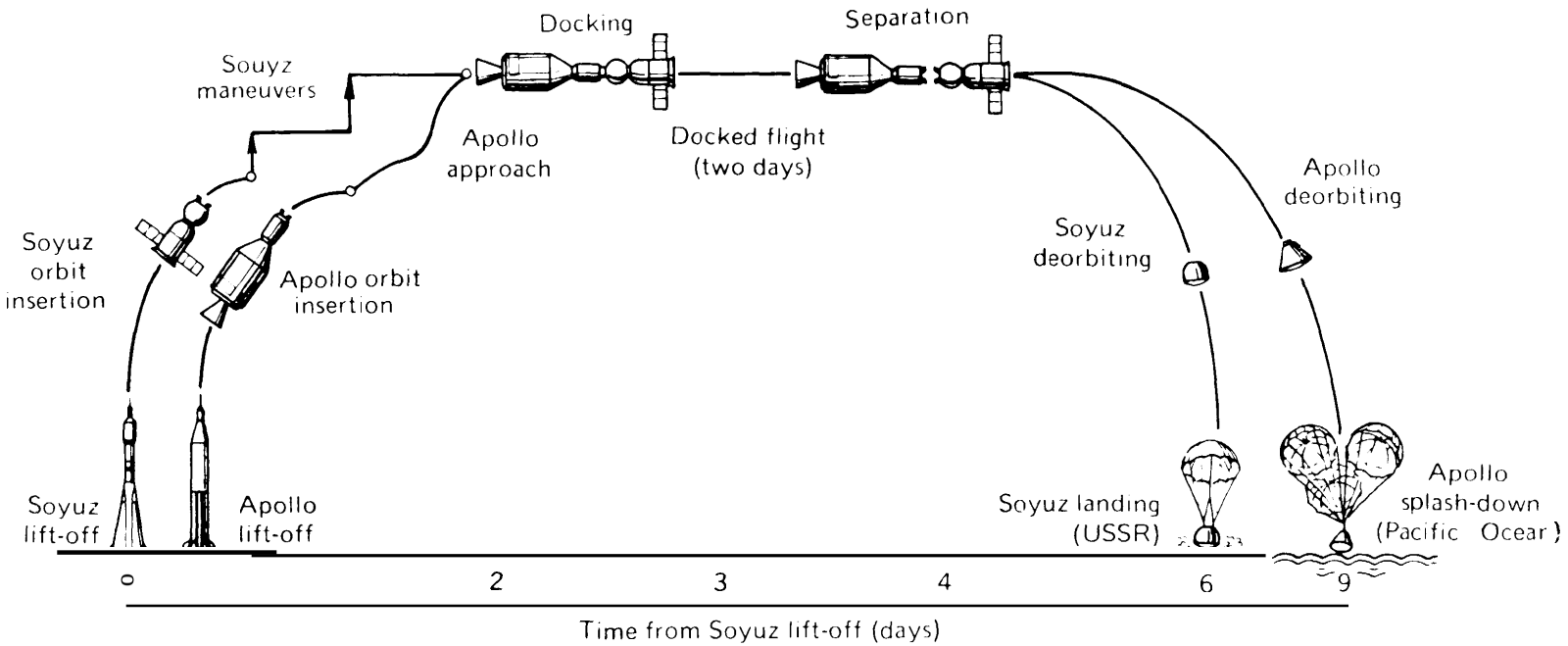
4. Hard and pressure-tight coupling



5. Cosmonauts' transfer

SOURCE Soviet ASTP press klt

Figure 2-5.—ASTP Mission Profile ○ Timeline



The joint Apollo-Soyuz Test Project (ASTP) of July 1975 was the high point of U.S.-Soviet cooperation in space. The nine-day mission is the only joint crewed project ever undertaken by the two countries.

SOURCE: Soviet ASTP press kit.

POST ASTP: CHANGING U.S. POSITION

Whatever the ultimate assessment of the project, the aftermath of ASTP was marked by high hopes for future cooperation which gradually eroded towards the end of the **1970s.** Discussions on forms of future cooperation were begun almost immediately after the ASTP was completed. In May 1977, the 1972 agreement was renewed for 5 more years, largely emphasizing the same directions as established in the 1972 agreement: delivery of Soviet lunar samples; mutual briefings on Venera 9 and 10 and Viking landers on Mars; U.S. participation in Soviet experiments aboard their biological satellites; continuation of the joint project for remote sensing of crops and vegetation; and tests to cross-calibrate NASA and Soviet meteorological rockets. 34

In addition, the agreement called for looking into another large-scale joint project, a joint Shuttle/Salyut mission, and the possibility of developing an international space platform—activities designed to use complementary areas of the United States and Soviet space programs to provide solid scientific and technical benefits. The long orbital staytime of the Salyut, for example, coupled with the greater flexibility of the Shuttle—its ability to ferry people and large quantities of supplies in a reusable craft—were regarded as especially complementary for joint scientific and applied experiments and for further developing the two countries' rendezvous and docking capabilities.[35] An agreement was signed between NASA and the Soviet Academy of Sciences establishing two joint working groups to study "the objectives, feasibility and means of carrying out a joint experimental program using the Soyuz/Salyut and Shuttle spacecraft"[36]—one working group for basic and applied scientific experiments, and one for operations. A third working group was established "for preliminary consideration of the feasibility of developing an International Space Platform on a bilateral or multilateral basis in the future. "[37]

The working groups began to meet soon after the agreement was signed to discuss planning for the mission—its feasibility, potential, and possible operating modes for conducting experiments. The working groups were to proceed on the assumption that the first Shuttle/ Salyut flight would take place in 1981, but no further commitments were made.

Cooperation in space, however, again became prey to a broader U.S.-Soviet political relationship. By 1978 the human rights issue had already created severe strains in U.S.-Soviet relations. These strains were further aggravated by the establishment of formal diplomatic relations between the United States and China on January 1, 1979, and the granting of most favored nation status to China, but not the U. S. S. R., in the same year; by delays in concluding the SALT II agreement, and then its failure to gain ratification in Washington; by the publication of official evidence alleging the presence of a Soviet brigade in Cuba; by the NATO decision in December 1979 to deploy Pershing II and ground-launched cruise missiles in Europe; and, ultimately, by the Soviet invasion of Afghanistan in the same month. These strains were severely exacerbated by the exile of Andrei Sakharov to Gorkii in January 1979; by U.S. charges in April 1980 of a Soviet violation of the Biological Weapons Convention in an incident in Sverdlovsk 1 year before; and by the cutback in Jewish emigration starting in January 1979 and continuing at least through the first half of the 1980s.

Along with other measures intended to show displeasure with Soviet actions, the United States severely curtailed cooperation in space with the U.S.S.R. By **1978,** the White House was questioning whether it was in the interest of the United States to be seen as a cooperative partner in another spectacular and costly manned mission with the U. S. S. R., and the Shuttle/Salyut project was gradually set aside. By the end of the decade, the United States had greatly curtailed cooperation in other areas of space cooperation as well.

[34] *NASA Authorization for Fiscal Year 1978,* hearings before the Subcommittee on Science, Technology, and Space for the Committee on Commerce, Science, and Transportation, U.S. Senate, 95th Cong., 1st sess., on ***S36.5,*** Feb. 25, Mar. 1 and 3, 1977, Part 2 (Washington, DC: U.S. Government Printing Office, 19'77), p. 815.

"Whelan, "Soviet Attitude Toward International Cooperation in Space, " op. cit., pp. 214-221.

[36] Agreement Between the U.S.S.R. Academy of Sciences and the National Aeronautics and Space Administration of the USA on Cooperation in the Area of Manned Space Flight, May 11, 1977, p. 2.

[37] 1 bid., p. 4,

The 1980s: Promise for the Future?

The early years of the 1980s were not promising for further U.S.-Soviet space cooperation. With U.S.-Soviet cooperation already at an exceedingly low level, declaration of martial law in Poland exacerbated the rift in U.S.-Soviet relations and further reduced initiative for cooperation in space. As part of U.S. sanctions against the U. S. S. R., the 1972/77 Agreement for cooperation in space was allowed to expire when it came up for renewal in 1982.

The level of U.S.-Soviet cooperative space activity since the agreement lapsed has decreased substantially. The joint working groups are no longer constituted, and no new projects have been started.

Despite the lapse of formal cooperation, however, several projects begun under the 1972/77 agreement have continued, and there has been a degree of continuing low-level scientist-to-scientist cooperative activity in certain areas. These ongoing projects include the following areas:

- **Space biology and medicine:** In 1983, for example, Cosmos 1514, a primate mission, carried four U.S. medical research devices; other Cosmos biosatellite flights carrying American experiments included Cosmos 782 (1975), Cosmos 936 (1977), and Cosmos 1129 (1979). This collaboration had been planned before the expiration of the 1977 Agreement, and was allowed to be carried out under agreements between NASA and the Soviet Academy of Sciences. CAT-scan bone data from Salyut missions are still being supplied to NASA, also under continuation from the previous agreement. Some exchanges continue between individual working group members on an informal basis, especially through attendance at professional conferences and meetings. [38]
- **Near-Earth Space, Moon, and Planets:** Leading Soviet scientists recently presented radar data from Venera 15 and 16, both currently in orbit about Venus, at a number of U.S. conferences and academic institutions. U.S. and Soviet scientists also continue to exchange Pioneer-Venus radar altimetry data and Venera gas chromatographic and mass spectrometric data. Recent collaborations in studies of solar wind interactions with Venus, landing sites for a forthcoming Venera mission, and Venus lightning have involved exchange and subsequent interpretation of data. Such exchanges are of considerable interest to U.S. scientists in the absence of published data on these topics.
- **Venus Halley (VEGA) Mission:** The present missions to the planet Venus and to Halley's Comet do not involve official U.S.-Soviet cooperation, but coordination among the various countries calls for U. S .-Soviet interaction on different levels. The Soviet Union, the European Space Agency (ESA), and Japan are sending spacecraft to the vicinity of the comet, with the United States playing a supporting role both in preparing for the mission and in subsequent data analysis. To facilitate this cooperation and coordination, an informal multilateral body known as the Interagency Consultative Group (IACG)—an international working group comprised of representatives from NASA, the European Space Agency (ESA), Japan's National Space Development Agency, and the Soviet Interkosmos—was created in 1981. In addition, three experiments designed and built in the United States are flying aboard the two Russian space probes: a comet dust counter, developed by John Simpson, University of Chicago; a Venus nephelometer, by Boris Ragent of NASA Ames Research Center; and a Comet Neutral Mass Spectrometer, by John Hsieh, University of Arizona .39 Other U.S. scientists will be involved in analysis and processing as data are received on Earth.

[38] See Norman V. Martello, *Biomedical Research Division Significant Accomplishments for FY 1984, NASA Technical Memorandum 86692* (Moffett Field, CA: Biomedical Research Division, Ames Research Center, NASA, February 1985), p. 119.

[39] See Colin Norman, "U.S. Instruments Fly on Soviet Spacecraft," *Science*, CCXXVII, No. 4684 (Jan. 18, 1985), pp. 274-275; and Louis D. Friedman and Carl Sagan, *U. S. **U.S.S.R.** Cooperation in Exploring the Solar System*, an internal report of The Planetary Society (Pasadena, CA: The Planetary Society, 1985), At least four other scientists from the United States are part icipating as theoretician co-investigators: Bradford Smith, Andrew Nagy, Thomas Cravens, and Asoka Mendis.

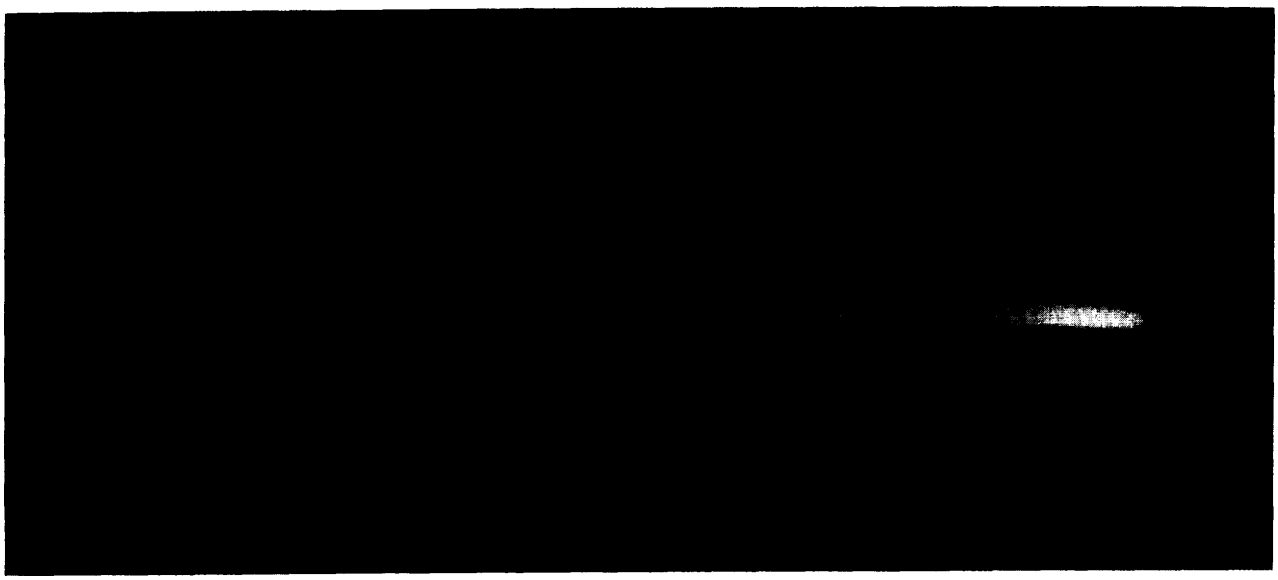


Photo credit National Air and Space Museum

View of Comet Halley, taken in May 1910

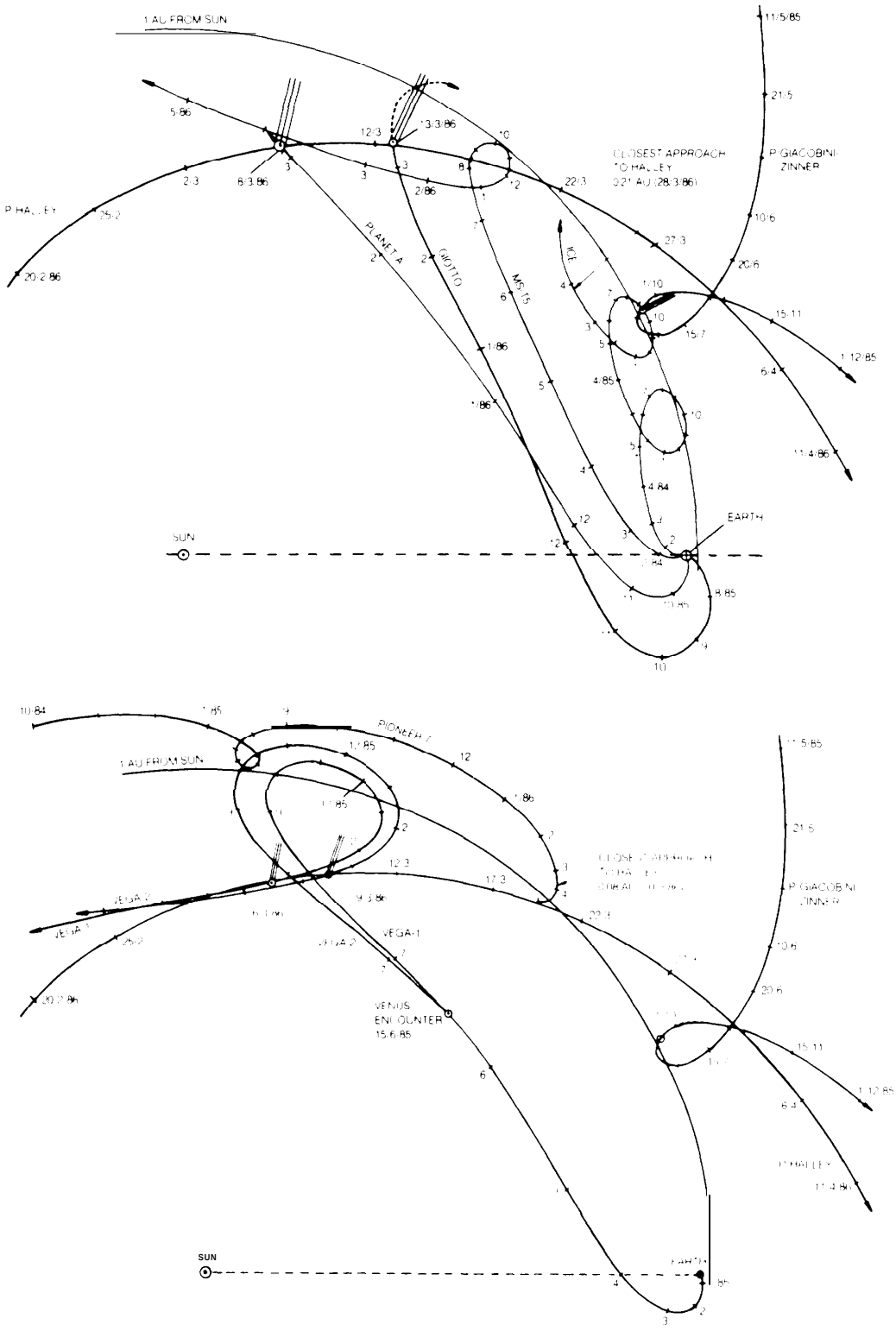
The present VEGA mission, however, cannot be viewed as an example of official U. S.-Soviet cooperation in space. The interagency agreements governing Halley are bilateral, so that, for example, the United States and ESA have an agreement, but there is no NASA-Interkosmos agreement. Indeed, at present the Soviet Union does not officially recognize the U.S. role in the IACG, and has not recognized U.S. participation in the Venus/Halley's Comet mission; the U.S. experiments are being carried on Soviet spacecraft via third-party agreements.[40] But in light of the American experiment on board the Soviet spacecraft, and the role of the United States in data analysis and tracking, some observers believe that U.S.-Soviet cooperation will expand as data from the mission are received.

- **Pathfinder and International Halley Watch:** The IACG has identified a number of cooperative activities that will enhance the overall science return from these missions. The most significant of these is "Pathfinder," an effort which utilizes the U.S.S.R.'s VEGA spacecraft to improve the targetting accuracy of ESA's Giotto spacecraft during the latter's encounter with Halley's Comet. One week later NASA will assist in the Pathfinder activity by providing tracking support from its Deep Space Network antennas in California, Spain, and Australia. Also, several years ago U.S. scientists established the International Halley Watch (IHW), an activity to coordinate ground-based astronomical observations of Halley's Comet. The IHW has become truly international in character, with participation by astronomers all over the world, including the Soviet Union. And some cooperation continues in related areas as well. For example, United States, ESA, Japanese, and Soviet scientists are scheduled to be at NASA's Goddard Space Flight Center when the U.S. International Cometary Explorer (ICE) spacecraft flies by the comet Giacobini-Zinner in September 1985.[41]
- **Space Applications:** In the area of space applications, there are at present no ongoing projects begun under the 1972 agreement, al-

[40] The Comet Duster designed by John Simpson, to measure the density and mass distribution of dust particles in the comet's tail, was incorporated in a German package, through the Max Planck Institute in West Germany. The other two experiments were included via Hungarian participation.

[41] "First Space Probe to Comet Now Halfway to Target," *Goddard News*, XXXI, No. 3 (March 1985), pp. 1-2.

Figure 2-6.—Trajectories of the Various Halley Spacecraft Relative to a Fixed Sun. Earth Line



SOURCE European Space Agency

though some level of discussion has continued in forums outside of the now lapsed space agreement. In one of the working groups under the 1972 *Agreement for Cooperation in the Field of Environmental Protection,* for example, which is still in force today—in Working Group VIII, on the Influence of the Environment on Climate and Environmental Protection—some U.S.-Soviet discussion has taken place since 1982 on possibilities for expanding cooperative work in climatic applications of space. The tenth meeting of the working group, for example, in January and February 1985, discussed the possibility of using satellite data for joint cloud, hurricane, and/or surface radiation research, in either this or some other forum .42

The key joint applications projects currently in operation, however, are multilateral in nature, such as the COSPAS/SARSAT search and rescue agreement, As discussed in appendix C, the COSPAS/SARSAT system is the result of two multilateral agreements signed separately: the SARSAT agreement among Canada, France, and the United States; and the COSPAS/SARSAT agreement among the United States, Canada, France, and the U.S.S.R. But the project continues, and in October 1984 the parties signed a new agreement covering extension of the program from its experimental phase to initial operations over the next 5 to 7 years.

- **Nongovernmental U.S.-Soviet Telecommunications: As a sidelight to U.S.-Soviet** intergovernmental or interagency cooperation in space, recent years have also seen instances of more indirect "space cooperation" outside of the auspices of official agreement. These have taken the form of satellite telecommunications link-ups, both video and audio, between U.S. and Soviet scientists (and in one case a U.S. Congressman) for discussion of a variety of current scientific and other topics.

  The first of these recent "space applications" projects, organized by the Esalen Soviet-American Exchange Program, took place in September 1982 and May 1983. In the second session, U.S. Congressman George Brown and Soviet Academician E. P. Velikhov discussed the value of satellite telecommunications as a vehicle for scientific and cultural exchange, and proposed that a permanent satellite communication project be established between the United States and the U.S.S.R. Two more exchanges occurred later in 1983, with the second one involving a colloquy between Soviet and American scientists. And in September 1984 a similar satellite teleconference hosted four American and three Soviet scientists (including Dr. Roald Sagdeyev, Director of the Institute of Space Research) in discussions of cooperation in various fields of science: 1) fusion research, 2) astrophysics, 3) seismology, and 4) biophysics.

Whether politically or scientifically motivated, however, cooperation in all of these areas has remained on a very low level. By 1984, Soviet officials were stating that space cooperation, even on the level of scientist-to-scientist exchange, could not be sustained without the framework of a bilateral agreement between the U.S. and Soviet governments.

The mid-1980s, therefore, have brought increased debate concerning the merits and demerits of official, bilateral U.S.-Soviet cooperation in space. These debates have yet to be resolved, and are discussed in chapter 5. In contrast to 1982, however, the mid-1980s have seen a sharp rise in congressional and Administration interest in expanding U.S.-Soviet cooperation in space, on a scale perhaps larger than ever before. In a speech at the White House in June 1984, President Reagan explicitly called for renewing U.S.-Soviet cooperation in space as well as other areas. Hearings on this topic were held by the Senate Committee on Foreign Relations in September 1984. This was followed by the enactment of Public Law 98-562, which calls for "energetically" pursuing a renewal of the 1972/77 agreement on space cooperation and "exploring further opportunities for cooperative East-West ventures in space. "

Specific projects have also been proposed. The most prominent of these is the revival of the no-

[42] See U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection: Protocol, Tenth Joint Meeting of Working Group VIII, on the Influence of Environmental Changes on Climate, Jan. 24-Feb. 7, 1985 (unpublished typescript),

tion of a Shuttle /Salyut mission, or a joint simulated space rescue mission as specified in the Public Law. In this project, "marooned" astronauts and cosmonauts would simulate a rescue between the U.S. Shuttle and the Soviet Salyut space station. As currently envisioned, the shuttle would pull up near the Soviet Salyut, and an astronaut wearing a jetpack would fly from the shuttle to the Soviet station, perhaps ferrying a cosmonaut back and forth between the two craft.

On February 6, 1985, Senator Matsunaga introduced S, J. Res. 46 in support of U, S.-Soviet cooperation on Mars exploration missions .43 Initially cosponsored by Senators Proxmire and Simon, the resolution calls for exploring opportunities for cooperation with the Soviet Union on specified Mars exploration missions and examining opportunities for joint East-West Mars-related activities. According to Matsunaga, these missions could be pursued on a manned or unmanned basis. Since both countries are presently planning unmanned missions to Mars, for exampIe—the United States with its scheduled launch of a Mars orbiting mapper in 1990, and the Soviets with a planned launch of a mission to the Mars moon known as Phobos in 1988—he suggests that ways be sought to coordinate missions to best share data and information. A manned mission to Mars, he suggests, could well become "history's most stirring undertaking. "[44] Other proposals include a joint unmanned mission to Venus; joint unmanned exploration of the moon; a joint manned lunar base; and joint study of asteroids and defense against a possible asteroid collision with Earth .45

These proposals, however, remain controversial, and as of this writing, Soviet officials have not responded to any of these *overtures* for renewing cooperation on a bilateral basis. Several prominent Soviet scientists have emphasized their own desire to expand cooperative projects in space, and have underlined the difficulties in doing so without an overarching bilateral intergovernmental agreement. News stories from a meeting in Houston refer to possible "hints" that the Soviets may be interested in expanding space cooperation overall .[46] But Soviet officials have also stated that the U.S. Strategic Defense Initiative would be a serious obstacle to any major cooperation in space, and that more important military and strategic issues will have to be resolved before serious discussions on renewing any large-scale bilateral cooperation in space can be initiated. Soviet officials so far have not responded to any U.S. overtures on an official basis.

Thus, the same twin issues which surrounded U.S.-Soviet space cooperation more than 30 years ago—competition and cooperation in space, and the relation of space cooperation to broader political relations—are facing proponents and opponents of space cooperation today. Cooperation, however limited, has illustrated the scientific benefits which can be gained from pooling efforts of the two superpowers, particularly in certain areas of space research and applications. But the past 30 years have also highlighted the difficulties in reconciling space cooperation with broader political realities, and shaping and implementing mutually beneficial projects fairly and effectively.

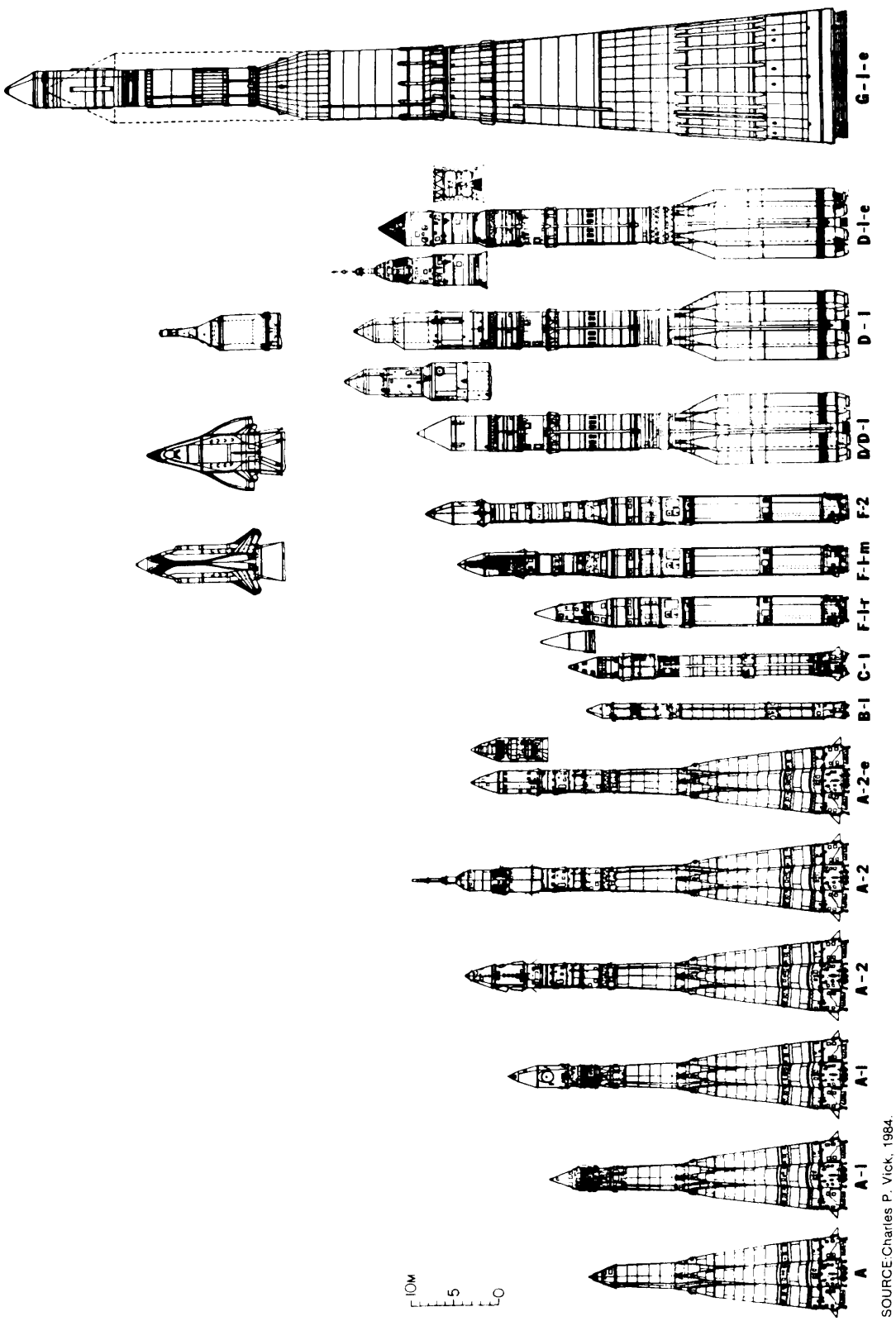
[43] S.J. Res. *46;* A joint resolution relating to NASA and cooperative Mars exploration, *referred* to the Senate Foreign Relations Committee, introduced by Senator Matsunaga with cosponsors Senator-s Gorton, Proxmire, Kassebaum, Pen, Stafford, Simon, Mathias, Kerry, and Cranston. Initially introduced in Jan. 21, 1985, as S. J. Res 18 by Senator Matsunaga, with cosponsors Senators Proxmire and Simon. As of June 6, 1985, there were 11 cosponsors,

[44] See Spark M. Matsunaga, "Needed: Cooperation, Not War, in Space, " *Newsday,* Apr. 9, 1984.

[45] For a discussion of these and other suggestions see:

- Craig Covault, "U.S. Plans Soviet Talks on Joint Manned Mission," *Aviation Week and Space Technology,* CXXII, No. 1 (Jan. 7, 1985), pp. 16-18.
- John Holmes, "Geneva Talks May Reshape U.S., Soviet Space Roles," *The Washington Times* (Mar. 11, 1985).
- "U.S.-Soviet Space Cooperation Possible, Beggs Says," *Aerospace Daily* (Jan. 10, 1985), p. 52.

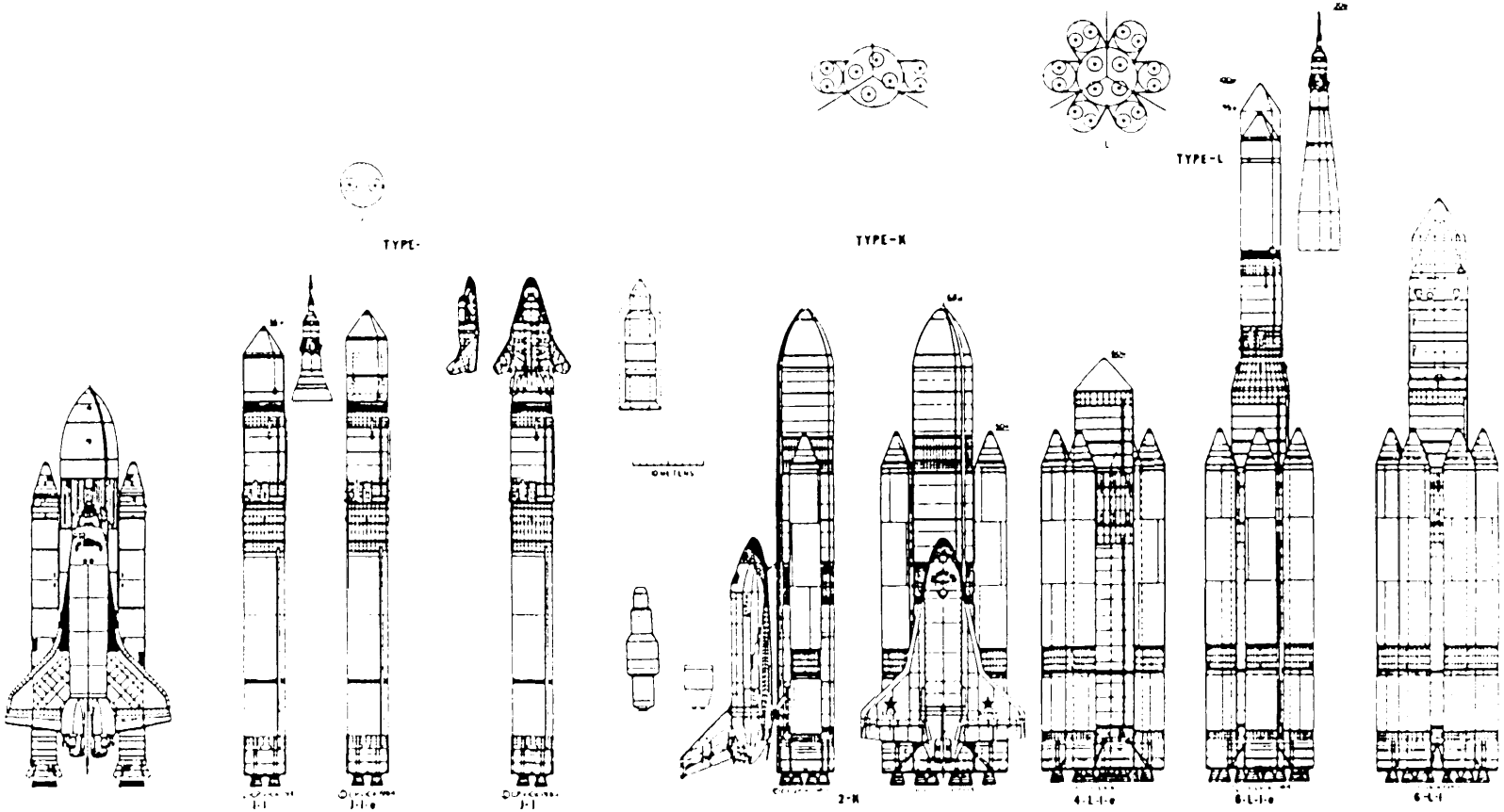
[46] See William Harwood, "Soviets Hint Space Cooperation," UPI news story, Apr. 2, 1985; and William Harwood, "Soviets Outline Ambitious Space Program," UPI news story, Apr. 2, 1985.



SOURCE: Charles P. Vick, 1984.

Figure 2-7.— Primary Operational Soviet Launch Vehicle Family, and Canceled Type-A, A-1, B-1, and Type G-1-e Boosters

Figure 2-8.—Artist's Depiction of Direction of the Soviet Space Program



High degree of technical capability being by the today, which may offer new possibilities for cooperation as well as competition

SOURCE: Charles P. Vick, 1984.