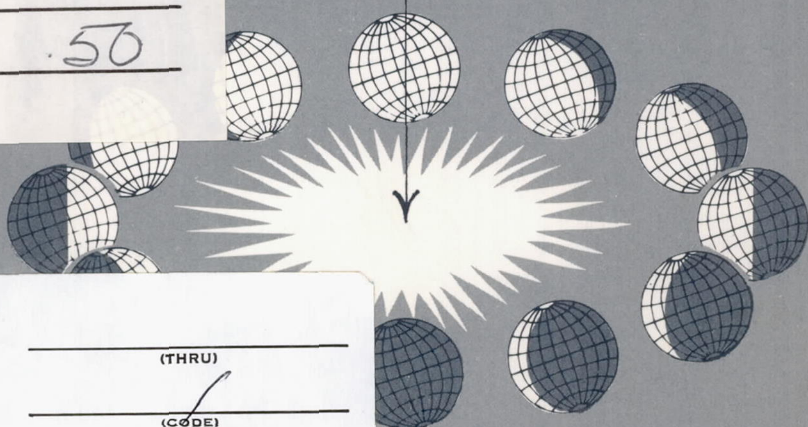
EP-30

SPACE and the INTERNATIONAL COOPERATION YEAR

A NATIONAL CHALLENGE



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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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Mr. Frutkin has spent nearly a decade in international scientific affairs. He has had the responsibility for NASA's international affairs including programs in space science and technology, since September 1959, first as Director of the Office of International Programs, then as Assistant Administrator for International Affairs. He serves as a member of the U.S. Delegation to the UN Committee on the Peaceful Uses of Outer Space and is an advisor to the National Academy of Sciences' Delegate to the International Committee on Space Research (COSPAR). Before joining NASA, Mr. Frutkin was director of the Office of Public Affairs of the U.S. National Committee for the International Geophysical Year. He was educated at Harvard College and Columbia University.

SPACE
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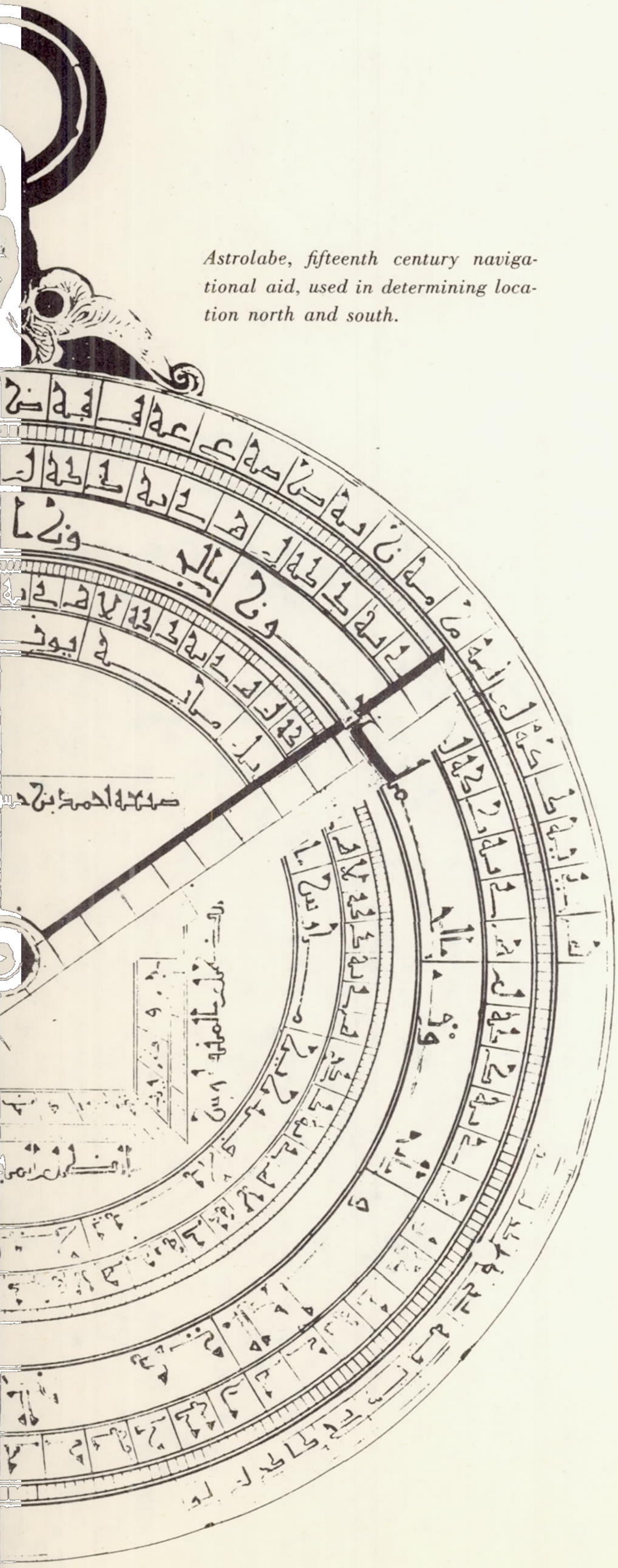
INTERNATIONAL COOPERATION YEAR 1965



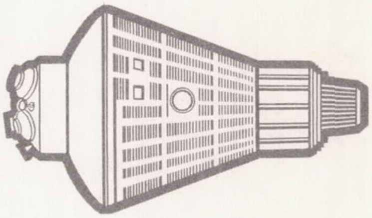
Astrolabe, fifteenth century navigational aid, used in determining location north and south.

The age of discovery that began late in the fifteenth century was the result of scientific and technological change. The leading mathematicians of the Middle Ages—Albertus Magnus, Nicholas of Cusa, Regiomontanus, and Copernicus—believed the earth a sphere. Some navigators and pilots agreed, but their belief would have served little practical purpose without the compass and the astrolabe, without the chronometer and tables of longitude. With these navigational aids, men of the stamp of Diaz and da Gama, Columbus and Cabot, Magellan and Drake opened the way for the expansion of western Europe throughout the world.

The empire builders followed the explorers, and by the middle of the seventeenth century the Spanish and Portuguese, the English, the French, and the Dutch, Danes, and Swedes had established possessions beyond the sea. The process touched the vital energies of the people of Europe. The stimulus to economic and intellectual life shaped the world we know today. But the process also enmeshed mankind in centuries of bloody conflict, with the end not yet in sight. Today's headlines from yesterday's colonial outposts are the bitter fruit of the voyages of discovery.

Five centuries later, scientific and technological change—advances in chemistry, metallurgy, and electronics—have enabled man to escape his earthly environment and to operate in the boundless sea of space. The adventure already is affecting life in all parts of the world. Changes in scientific and engineering communities, educational systems, and industries are but the first

Expanding concepts and the shrinking earth. Below: Magellan's frail fleet. Right: The Mercury Capsule.



manifestations of forces that will affect human society for generations to come. Mankind has thrilled at the prospect, but with the thrill has come deep concern that the advance of nations into space might precipitate a new cycle of conflict. Voices throughout the world have cried alarm; the presence of great stockpiles of nuclear weapons give the warnings special urgency. Can man learn to cooperate in this new environment? If he can, might this not help him live in peace on earth?

The prospect of cooperating in space and thereby establishing patterns that would reduce terrestrial tensions is appealing. Space is essentially international, for an orbiting spacecraft knows no national boundaries, and operations are so expensive that even the most affluent nations might welcome assistance. Though space has important implications for national security, it is still *relatively* uncomplicated and free from the vested interests that make joint action difficult.

The idea is so intrinsically attractive that calls for international cooperation are constantly raised, at home and abroad, by individual citizens, by newspaper editors, and particularly by those who fear the polarization of space by the United States and Russia. This is altogether wholesome and proper, yet the public knows little of the extent to which countries have already joined together in the space research. International Cooperation Year is a welcome opportunity to tell this story—to lend substance to the discussion and to provide a factual basis for future recommendations and action. With that purpose in mind, let us survey the principal areas of cooperation that have thus far developed and consider where we stand today.

COSPAR

IQSY

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IGY

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The scientific community has a long tradition of more or less informal cooperation. We need not accept the oversimplification that "science knows no international boundaries" to recognize that scientists throughout the world cooperate by corresponding, by exchanging papers, and by meeting to discuss common interests. Space science has benefited from this wholesome tradition to an extent only suggested by the fact that a typical current year will see at least thirty international conferences devoted to various aspects of space science and engineering.

But informal cooperation alone cannot bring significant programs into being. For this, an organizational framework is required. The space age, indeed, grew out of projects which were laid down as part of the International Geophysical Year

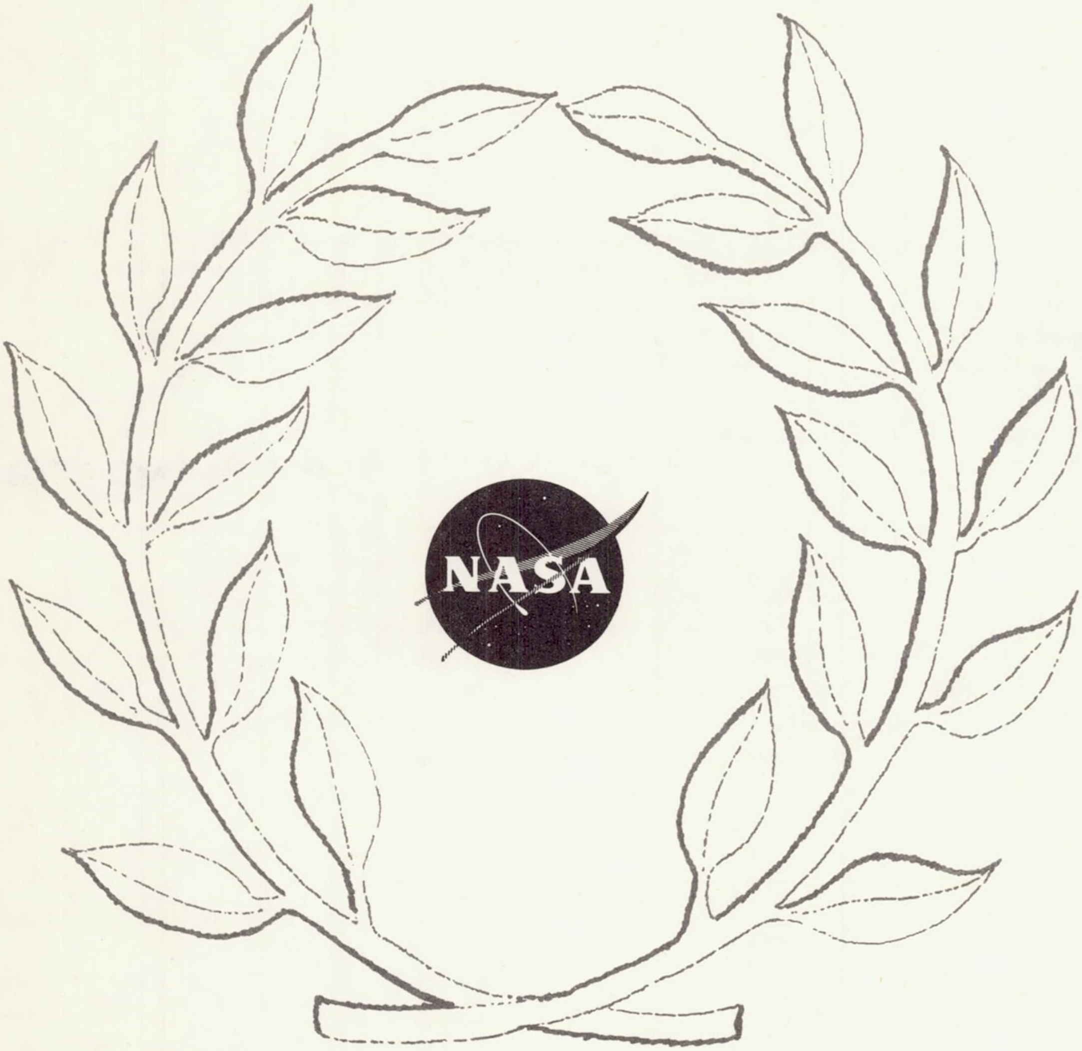
COMMUNITY

(IGY), a program of the International Council of Scientific Unions (ICSU). IGY offered such great promise that ICSU took steps to extend its benefits on a permanent basis by organizing the International Committee for Space Research (COSPAR). Today, COSPAR membership numbers thirty national bodies and ten international scientific unions. At its 1964 meeting in Florence, 430 registered participants and observers attended—130 from the United States, 58 from France, 50 from the United Kingdom, and 33 from the Soviet Union.

As a nongovernmental body, COSPAR brings space scientists together in an environment that minimizes political considerations, yet permits responsible and authoritative planning. Through its meetings, symposia, and publications, COSPAR facilitates communication among scientists. It establishes standards for reporting research results, and it sponsors World Data Centers for depositing and exchanging experimental data. These activities are important, but the more creative side of COSPAR lies in its six working groups, whose central function is to define suitable objectives and programs for space research. The imaginative role that a working group can play is illustrated by the synoptic sounding-rocket programs sponsored by Working Group II, which is responsible for the space aspects of the International Year of the Quiet Sun. This working group is promoting synoptic launchings of some ten types of rocket experiments for which there are well-developed techniques and which can be conducted on a widespread basis. The effort already has produced a coordinated series of rocket flights to study the ionosphere and several series of sodium vapor experiments to measure winds in the high atmosphere.

Although COSPAR recommendations bind no government, they reflect the opinion of space scientists throughout the world. The policy implications are illustrated by COSPAR endorsement in 1964 of a report by its Consultative Group on the Potentially Harmful Effects of Space Experiments. This report put to rest, more effectively than could be done by any other means, fears that the exhaust from large boosters would contaminate the upper atmosphere and that Project West Ford's orbiting dipoles would interfere with optical or radio astronomy.

Another nongovernmental forum, principally for annual symposia on the engineering aspects of space research, exists in the International Astronautical Federation, which brings together a considerable number of national rocket societies with long-standing interests in promoting space exploration.



U.S. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

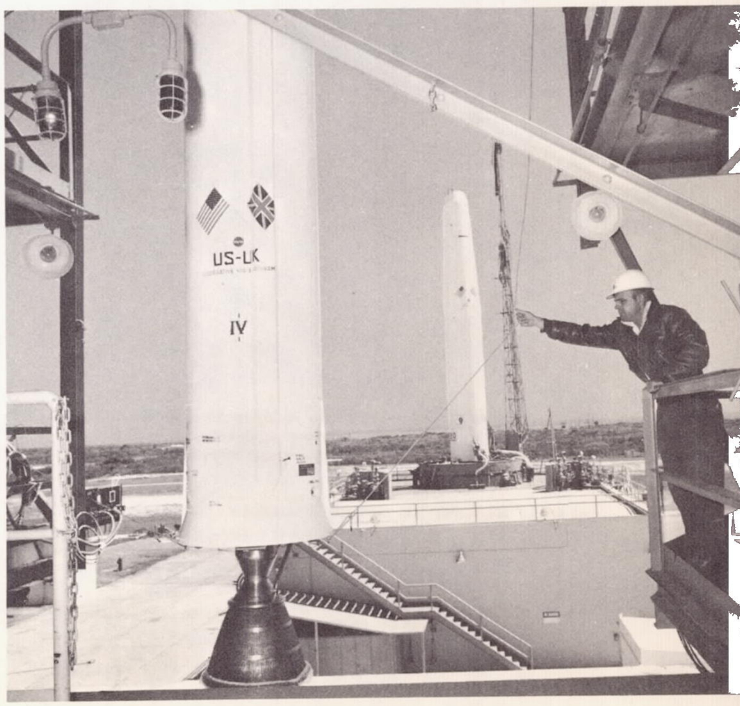
The most extensive cooperation in space—cooperation that has involved sixty-nine nations and touched every continent—has been based on the broad and varied program of the U.S. National Aeronautics and Space Administration. The National Aeronautics and Space Act of 1958 expressed a national purpose to devote our space activities to peaceful purposes and to execute them in cooperation with other nations and groups of nations. Congress was influenced by the successful precedent of the International Geophysical Year, but more than that, it hoped that cooperative activities would bear witness to our peaceful aims, establish patterns of cooperation that would further our goal of a stable world order, and contribute to the NASA mission. Cooperative activities, it was foreseen, could help by (1) affording opportunities to the best brains abroad to contribute to and participate in space research, (2) stimulating technical development abroad which might help reduce some of the gaps causing political and economic strains, (3) providing a framework for other countries to join in cost-sharing and complementary programs, (4) giving access to geographic areas of special significance overseas, and (5) helping support our operations abroad.

Following its mandate, NASA in March 1959 offered to enter into projects of mutual interest with scientists of other countries. From the first, the governing philosophy has been that for cooperation to be effective, it must be literal and substantive. From this basic premise are derived the specific guidelines for cooperation: that all participants commit their own resources in funds, personnel, and equipment; that there be no dollar export from the United States; that the content of a given project be of mutual interest and possess valid scientific objectives; that the organizational context be civilian in character; and that the scientific results be open to all interested parties.

The cooperative space program which has developed has effectively achieved all of these objectives of mutual interest and value.

Four international satellites are now in orbit. *Ariel I*, engineered and launched by NASA in April 1962, carries satellite instrumentation designed, prepared, and funded under the direction of the British National Committee for Space Research. It has provided valuable data on spatial conditions not previously measured in combination. *Ariel II*, a similar satellite, was orbited in March 1964, and the British are now engaged with NASA in a cooperative project involving a third satellite, this one engineered as well as instrumented by the British. *Alouette*, the Canadian satellite launched by NASA in September 1962, was designed, funded and engineered by the Canadian Telecommunications Establishment (DRTE). This satellite, the first to sound the ionosphere from above, proved so successful that the Canadian government then offered to assume full responsibility for a more considerable portion of the established NASA program for ionospheric studies. Accordingly, NASA and DRTE have agreed to the ISIS program (International Satellites for Ionospheric Studies), which provides for NASA to launch four additional Canadian satellites to monitor the ionosphere through the next maximum of the solar cycle. In December 1964, Italy became the third nation to launch a satellite when an Italian crew used the facilities at Wallops Island, Virginia, and a Scout vehicle to place an Italian-built and instrumented *San Marco* spacecraft in orbit. This was in preparation for the eventual Italian launching of an identical satellite from a towable platform in the Indian Ocean to determine local atmospheric densities in the equatorial upper atmosphere.

NASA launchings in 1965 include (1) a French satellite to measure very low frequency radio emission and (2) the first Canadian satellite in the ISIS series. The third British satellite will be ready in



The United States—United Kingdom teams prepare to launch Ariel I. Here the second stage is being readied for mating to the Thor-Delta.

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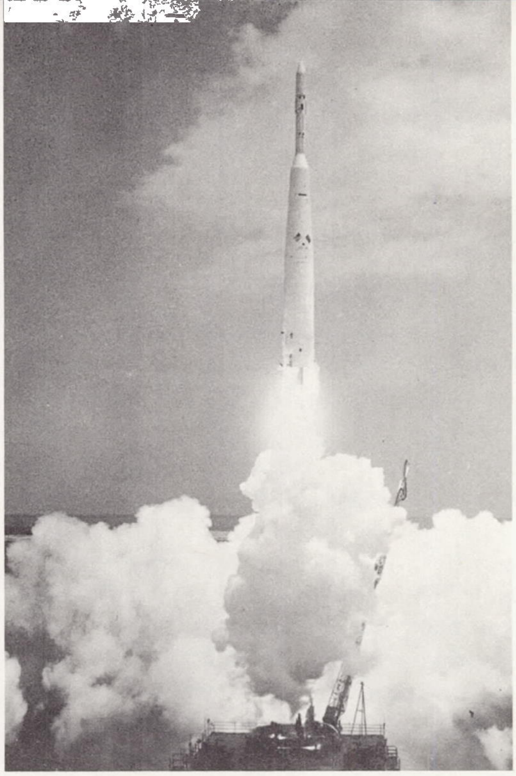
A



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A *A Thor-Delta lifts off from Cape Canaveral (Cape Kennedy) April 26, 1962, carrying the first international satellite, Ariel I.*

B *Flag raising ceremony March 27, 1964, the day NASA launched Ariel II, Wallops Island, Va.*

C *Canadian Defense Research Board technicians connect instrumentation in the topside sounder satellite prototype model, Alouette, preparatory to thermal tests at the board's research station near Quebec.*

late 1966 and two satellites prepared by the new European Space Research Organization in 1967. The Italian platform launching is projected for late 1966 or early 1967. NASA and the German Federal Ministry for Scientific Research have agreed on the launching of a German scientific satellite in 1968 to study the earth's radiation belts.

Foreign scientists are also invited to propose individual experiments for inclusion on NASA satellites. Their proposals are reviewed in competition with those submitted by American scientists and, if selected, are funded and prepared by sponsoring agencies abroad. One such experiment has already flown successfully. Fifteen additional ones have been scheduled for later flights, and several more are under consideration. NASA has now opened virtually all categories of its spacecraft, including manned spacecraft and planetary probes, to foreign participation on this cooperative basis.

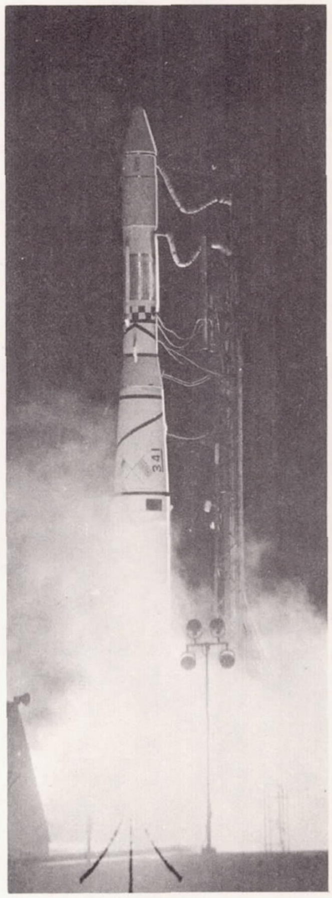
Cooperative sounding rocket projects have special international appeal. To nations wishing to initiate space programs, they offer relatively low-cost opportunities on a smaller but significant scale. To NASA, they offer the use of sites overseas of unique scientific interest and a means of organizing simultaneous launchings in different locations (a practice required for certain scientific objectives). The basic elements in sounding rocket projects are the scientific instrumentation, the rockets themselves, the launching sites and the ground instrumentation to retrieve data from the rockets, and the analysis of the data. Cooperating countries divide responsibility for these elements in ways that suit the requirements of the individual projects. More than 130 rockets have been

A *A Thor-Agena B successfully launched Alouette at 2:05 a.m. (EDT) on September 29, 1962, from the Pacific Missile Range (now the Western Test Range).*

B *The Italian San Marco satellite attached to its Scout launch vehicle is checked out before launching by NASA at Wallops Island, Va.*

C *The four-stage solid propellant Scout, designated San Marco-Scout I, is positioned for launching.*

A



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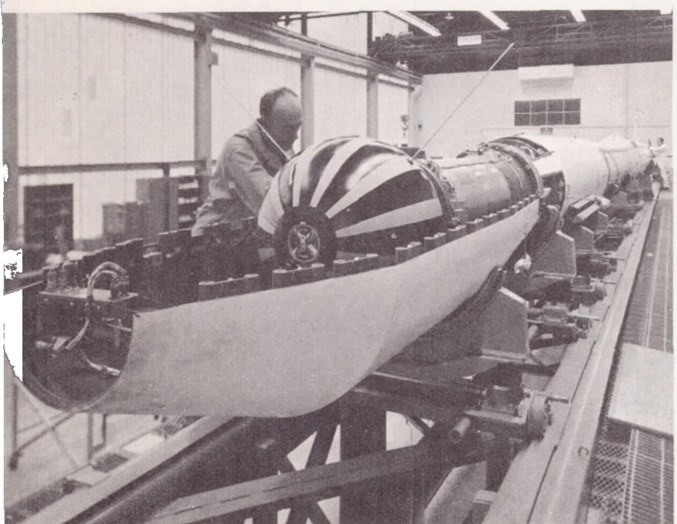

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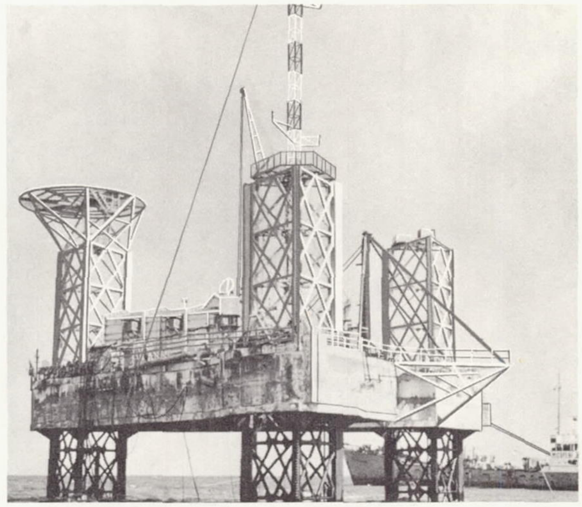
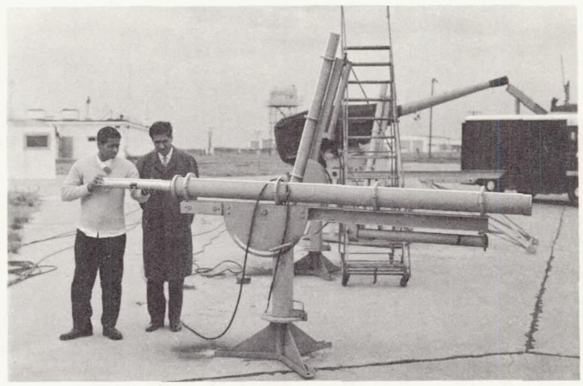
launched in joint NASA projects with seventeen countries.

One of the attractive features of NASA's bilateral sounding rocket projects is that they tend to serve as nuclei for continuing multilateral activity. Ionospheric studies with Norway have led to collaborative efforts among all three Scandinavian countries. A small sounding rocket project with Argentina has helped to engender regional interest: teams of technicians and scientists from other Latin American countries spent a month observing the preparation and launching of a recent ionospheric series from the range at Chamical. Thus, Chamical is beginning to serve in a sense as a Latin American training center for the use of sounding rockets in geophysical and meteorological research. In August 1964, Argentina and Brazil actually signed a memorandum of understanding which provides a framework for future cooperation in space research to which these countries can bring competence developed in cooperative programs with NASA. Both Argentina and Brazil are now undertaking with NASA joint programs of high altitude meteorological sounding rocket studies which will serve as elements in an experimental inter-American meteorological sounding rocket network.

Ground-based cooperative projects provide for observations of, or measurements based on, NASA spacecraft by experimenters abroad using their own resources. Such projects permit NASA to gain data overseas on a scale that would be difficult, if not impossible, if the United States had to finance the equipment and make arrangements for its installation. For other countries, these ground-based



The launching platform constructed by the Italian Space Committee for the San Marco program is shown in place on the continental shelf off the coast of Kenya.



Indian and Pakistani technicians loading Judi-Dart into launcher. This is a part of their training in launching meteorological satellites in connection with the International Indian Ocean Expedition.

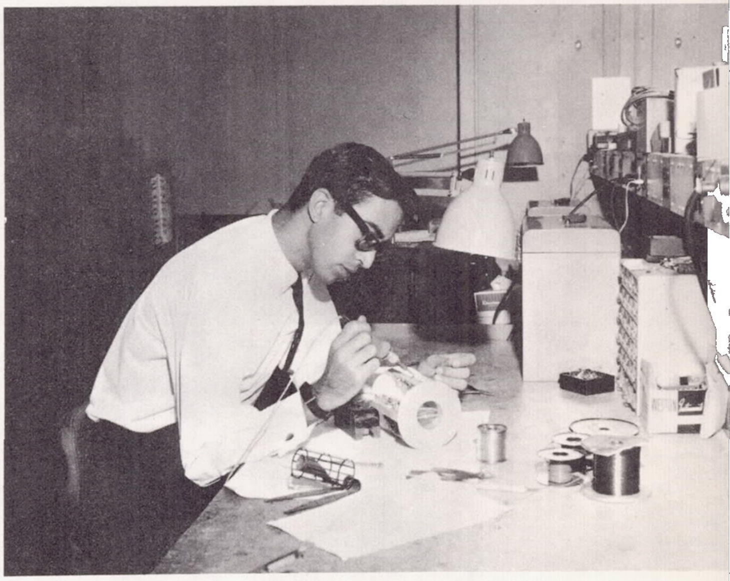
projects are appealing because they permit participation in space programs of great scope without requiring expensive vehicle or spacecraft hardware. When the fixed-frequency topside sounder satellite was launched in August 1964, twenty-three ground stations in fourteen countries were in position to make coordinated ground observations. When the polar beacon satellite was launched in October, more than sixty-one ground stations in twenty-seven countries were ready to use its signal for electron density measurements. This array of stations in a total of thirty-two countries provides opportunity for participation around the world and is indispensable to NASA for the collection of data on which to base a global survey of the ionosphere. Similar widespread cooperation is being organized in connection with the United States geodetic satellite program.

Ground-based cooperation is paramount in applications of great practical interest — satellite communications and meteorology. The dramatic transoceanic television demonstrations of the Telstar, Relay, and Syncom satellites required special ground terminals costing many millions of dollars both in the United States and abroad. The stations abroad, which now number nine, were constructed entirely by the cooperating countries at their own expense under agreement with NASA. One of their principal values has been the creation of informed interest overseas in a commercial communications satellite system and in frequency allocation questions.

In meteorology, NASA and the U.S. Weather Bureau invited foreign weather services to make conventional observations synchronized with cloud photography by NASA's TIROS satellites. Thus, the TIROS series has afforded foreign weather services the opportunity to conduct, at their own cost, special observations of local weather conditions, and over forty have done so. Through this program, the United

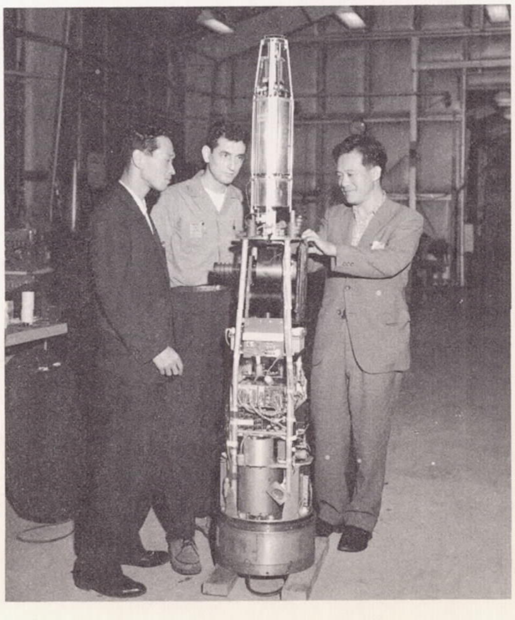
States has been able to correlate (a) the analysis of weather from cloud pictures taken hundreds of miles above the earth with (b) detailed data on the local weather below. An International Meteorological Satellite Workshop in Washington in November 1961, which foreign meteorologists attended at their own expense, instructed them in the use of satellite photographs in operational forecasting. A new form of cooperation, permitting the direct use of this information, recently became possible with the inclusion of an Automatic Picture Transmission system on TIROS VIII and on the advanced meteorological satellite Nimbus. The camera can provide continuous read-out of cloud-cover photographs. A simple and inexpensive ground station permits the direct and immediate acquisition and printing of cloud-cover photographs taken by the satellite overhead. Thirteen countries have so far acquired APT sets at their own expense and used them successfully, many reporting direct improvements in forecasting. Thus, this program is paving the way for the broad-scale international cooperation which will feature the meteorology of the future.

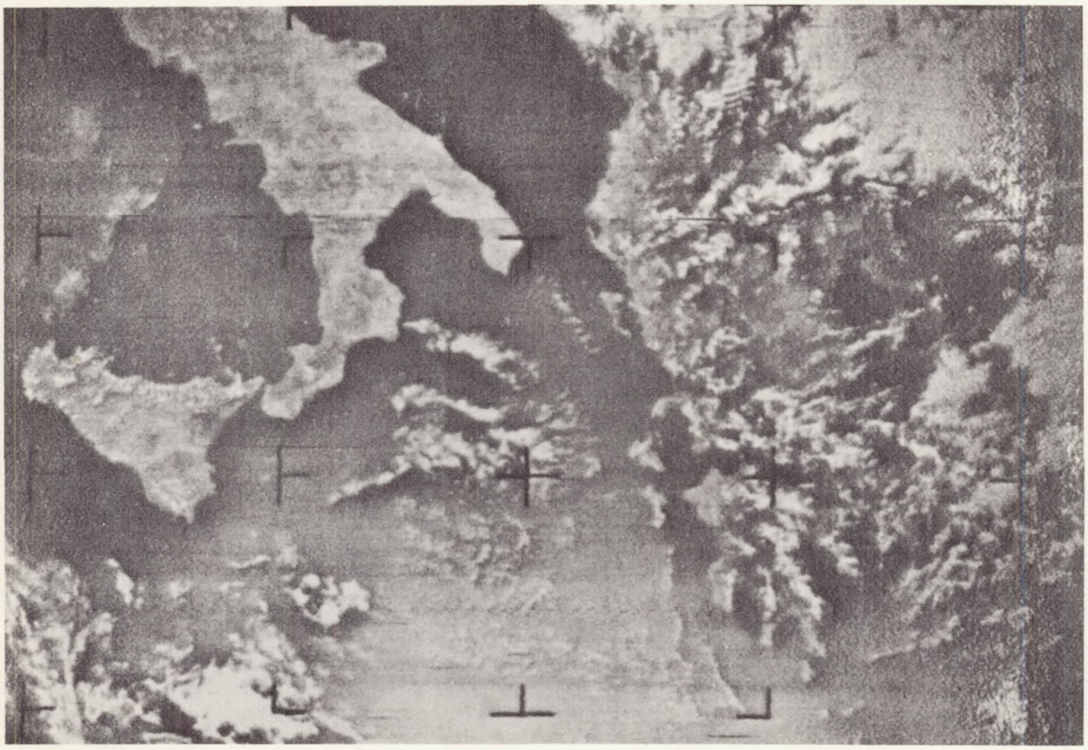
To track its satellites and to receive the data they radio back to earth, NASA needs stations around the globe. The establishment of such stations on the territory of other countries requires not only the consent of these countries but also their cooperation in the acquisition of land, the importation of equipment, the movement of personnel, and the use of radio frequencies. Beyond this, the interest of other countries in participating in the technology and adventure of space exploration have prompted them to make available their own technicians to work side by side with ours in many of the stations. At some locations, in England and Canada, the host country of its own volition has assumed responsibility for operating costs. Australia, too, makes



Brazilian engineer receiving training at Goddard Space Flight Center through an agreement between NASA and Brazilian Space Commission.

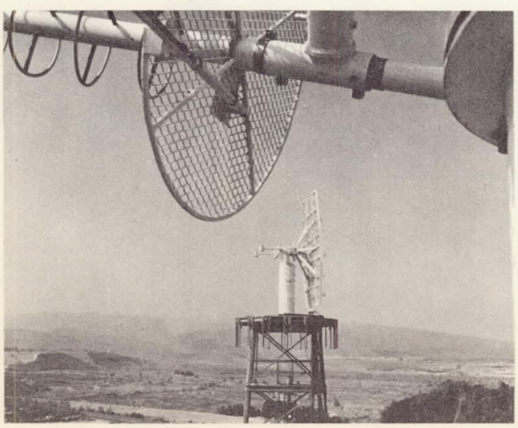
A 185 lb. electron density temperature experiment launched from NASA's Wallops Station, Va. by an Aerobee rocket. This is a joint United States—Japan project. September 23, 1963.





Automatic Picture Transmission (APT) photo taken from NASA's Nimbus I. It was received by the French Meteorological Services' APT ground station near Lannion, France on September 9, 1964.

NASA's manned space flight tracking station at Los Palmos, Canary Islands.



a contribution to the cost of operating stations on its territory. Such stations represent common efforts and centers for the continued growth of understanding and cooperation.

Personnel exchanges and training arrangements have important places in most international efforts. Opportunities have been made for senior scientists from abroad to spend a year or more in NASA centers in research or experimental work. Fellowships at the graduate level are available in American universities for foreign trainees whose travel and subsistence are paid by their own sponsoring agencies. Training directly and specifically required for the execution of cooperative projects is made available at appropriate NASA centers. The requirement for investment on the part of the cooperating country assures careful consideration of the training arrangements, the personnel selected to be sent here, and their future utilization at home.

US/USSR RELATIONSHIPS

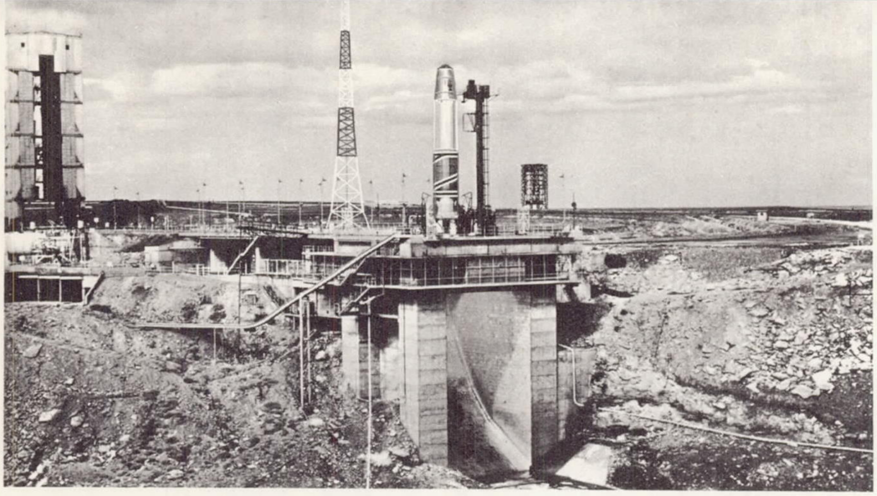
Space cooperation with the Soviet Union stems from an exchange of correspondence between President Kennedy and Chairman Khrushchev after the successful flight of John Glenn in February 1962. In his message of congratulations, Mr. Khrushchev observed that it would be a fine thing if the two nations could pool their efforts in space. President Kennedy promptly made specific proposals for such cooperation and suggested that negotiators be designated. The resulting talks between Dr. Hugh L. Dryden and Academician Anatoly A. Blagonravov produced the bilateral space agreement of June 8, 1962. The first part provides for coordinated launchings by the two countries of experimental meteorological satellites, for the exchange of data thus obtained, and for the exchange of conventional meteorological data, prior to, and on a secondary basis during, the exchange of satellite data. The second part provides for the launching by each country of an earth satellite equipped with absolute magnetometers and the subsequent exchange of data. The third part provides for cooperative communications experiments by means of the U.S. passive satellite Echo II.

The communications project is the first to be completed. In February and March 1964, the facilities of the Jodrell Bank Observatory of the University of Manchester in the United Kingdom were used to transmit radio signals via Echo II to the Zimenki Observatory of the State University of Gorki in the USSR. These transmissions included radio teletype messages, photograph transmissions using facsimile equipment, and voice messages. While the technical benefits from this project should not be overemphasized, it was a useful exercise in organizing a joint undertaking with the Soviet Union.

Exchange of magnetic field data obtained by ground-based instruments has begun and will provide a basis for analysis of satellite data. In the meteorological project, a twenty-four hour communications link has been established on a shared-cost basis between Washington and Moscow to prepare for the exchange of satellite data. Daily two-way transmissions of data are now taking place over this link under temporary arrangements which are conditioned upon achievement of the prime objective, the exchange of satellite cloud cover data.

The United States has no desire to establish a bipolarity in space matters with the Soviet Union. Rather, it wishes to insure that these initial cooperative projects are, from the outset, open to other countries and will serve the general interest. Thus, British capabilities were essential to the Echo II communications tests. The coordinated mapping of the geomagnetic field by satellite is designed essentially to contribute to a World Magnetic Survey. And other countries will be able to tap into the weather satellite data exchanges which may materialize between Washington and Moscow.

The United States is ready to explore any and all possibilities for meaningful cooperation with the Soviet Union in the exploration and use of outer space. In some areas, cooperation might be fruitfully carried out by means of the coordinated approach that characterizes those joint efforts already agreed. We might share the many tasks of exploration of our spatial environment by instrumented satellites and other means of observation necessary to assemble knowledge vital to the planning and execution of manned flights beyond earth orbit. In other projects involving engineering techniques and spacecraft and vehicle design, though questions of national security might be encountered, the United States has set no arbitrary limits to cooperation with the Soviet Union.



First stage of Europa I on pad at Woomera, Australia, in position for test firing.

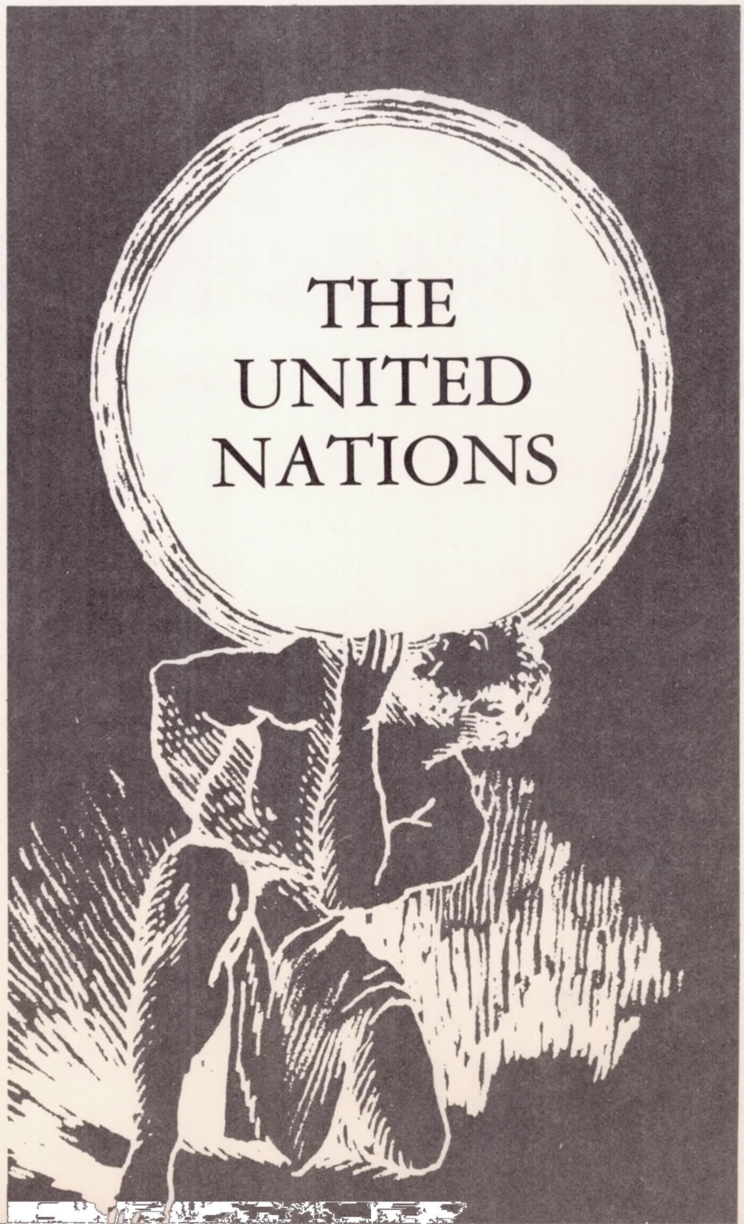
EUROPEAN REGIONAL ORGANIZATIONS

NASA's cooperative programs could not have developed without strong interest abroad. Leadership even in developing countries has seen that involvement in space projects can contribute to the creation or expansion of a scientific and technical community, spread an awareness of the character and techniques of the outside world, and stimulate young people to follow badly needed technical careers. Advanced countries have recognized that participation in the space age is mandatory. No other peacetime activity has demonstrated an equivalent capacity to stimulate national scientific and engineering communities, educational systems, industries, and governments to new capabilities, standards, and the combined effort which strengthens societies.

Recognition in Europe of the inherent values of space activity, combined with a realization that the high costs of space activity require the smaller nations to pool their resources, has led to the establishment of two European regional organizations—the European Space Research Organization (ESRO) and the European Launcher Development Organization (ELDO). ESRO, devoted to scientific endeavor only, is expending over $300 million over an eight-year period. ELDO, committed to booster development, budgets over $200 million in five years.

ESRO has undertaken a balanced space program featuring sounding rocket experimentation, small first-generation geophysical satellites, stabilized astrophysical satellites, a large astronomical satellite, a tracking and data acquisition network, and technical and data analysis centers. The United States welcomes this development, and NASA has agreed to launch an ESRO ionospheric satellite and an ESRO solar and cosmic radiation satellite. Both are expected to be ready for flight in 1967. Since ESRO is making its tracking and data acquisition stations compatible with NASA's, the possibility of cooperation in this area is open. Meanwhile ELDO has tested the first state of Europa I, a three-stage launch vehicle designed to develop 365,000 pounds of thrust and to put a ton-and-a-half spacecraft into low earth orbit. The test flights will eventually incorporate French and West German second and third stages and culminate in a 1966 launching of an Italian test satellite. ELDO is already studying a second-generation booster with high-energy upper stages. It is in this area of advanced technology that projects of mutual interest are conceivable as the basis for cooperative efforts between the U.S. and ELDO.

The movement to establish space programs on a regional basis in Europe illustrates the unifying forces which are brought into play by the requirements and the promise of the massive technologies of the future.


THE
UNITED
NATIONS

Nike-Apache sounding rocket posed in launch position in preparation for launch from the Equatorial Rocket Range, Thumba, India.

The United Nations quite naturally mirrors the concern among all countries that space activity be directed to peaceful purposes. For two years, efforts to explore a proper role for the UN were snarled in political maneuver. Then in December 1961, the way was cleared for constructive action by the Committee on the Peaceful Uses of Outer Space. The General Assembly asked the Committee to provide for the exchange of information on space activities, to study measures for the promotion of international cooperation, and to report on the legal problems that might arise from the exploration and use of outer space. At the same time, the General Assembly called on all states to provide the Secretary-General with information on objects launched into orbit or beyond. This call resulted in the early establishment of a UN public registry.

At its first regular working session in March 1962, the Committee on the Peaceful Uses of Outer Space concluded that its proper role was to support and encourage existing agencies competent in space activity and to assist in coordinating the work of such bodies. It further decided to establish two subcommittees, one to concern itself with scientific and technical matters, the other with legal matters.

The efforts of the Scientific and Technical Subcommittee have resulted in the publication of a biennial collection of reports on national and international space activities, on training opportunities, and in a formal recommendation that the UN sponsor the Thumba Equatorial Rocket Launching Site in India. Thumba had its origin in a NASA/Indian Committee on Space Research cooperative project and has since benefited by equipment loans from France and the Soviet Union as well as the United States. With such support, General Assembly confirmation of UN sponsorship is assured. One of the Subcommittee's current concerns is to have the UN serve as a clearing house for information on space-related education and training opportunities. The record of the past three years leaves no doubt that the Scientific and Technical Subcommittee has succeeded in placing greater emphasis on cooperation among nations.

The work of the Legal Subcommittee led to a draft declaration of legal principles to guide the exploration and use of outer space which was adopted by the General Assembly on December 13, 1963. Among the more significant of these principles are those declaring that outer space and celestial bodies are not subject to national appropriation, that international law and the United Nations Charter apply in outer space, that states bear responsibility for all activities of their nationals in space, that they are liable for damage done by the objects they launch, and that they shall render astronauts all possible assistance in the event of accident, distress, or emergency landing. The Legal Subcommittee is now drafting international conventions to specify in detail the responsibilities of states in the areas of liability and of assistance to and return of astronauts and spacecraft.

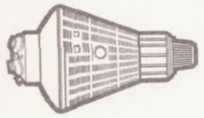
Other UN agencies have been asked by the General Assembly to play a role in space. The World Meteorological Organization has made a start in evaluating and planning requirements for a world weather system including satellite systems. Significant economic and human benefits are inherent in the prospect that international weather centers near Washington and Moscow and somewhere in the southern hemisphere will acquire data from satellites which will provide twenty-four-hour weather service on a global basis. In the fall of 1963 an Extraordinary Administrative Radio Conference of the International Telecommunications Union allocated frequencies and established international regulations for the use of radio in space communications and research, including meteorological, communications, and navigation satellites. The convention embodying these arrangements, already ratified by the United States, represents an orderly approach to one of the central problems of the space age.

GLOBAL COMMERCIAL COMMUNICATIONS SATELLITE SYSTEM

The United Nations has reflected the strong interest of countries throughout the world in the potential of communications satellites. In 1961 the General Assembly resolved that "communication by means of satellites should be available to the nations of the world as soon as practicable on a global and non-discriminatory basis." It returned to the subject again in 1962, when it stressed "the importance of international cooperation to achieve effective satellite communications which will be available on a world-wide basis." Eleven countries, including the United States, took a giant stride toward the goal reflected by these resolutions on August 20, 1964, when they signed two agreements for the establishment of interim arrangements for a global commercial communications satellite system. These agreements—one an intergovernmental agreement setting forth principles and basic organizational arrangements and the other between designated communications entities of the signatory countries and covering commercial, financial, and operational details—remain open to accession by all member states of the International Telecommunications Union. Thirty-five additional countries have already adhered to the agreements, making forty-six in all, but it is not necessary to do so or to invest in these arrangements for a nation to have access to the system being established. Access will be open to all as it becomes technically feasible.

The Global Commercial Communications Satellite System became an operational reality in April 1965, when the "Early Bird" synchronous satellite took its station 22,300 miles above the Atlantic. In the fall of 1965 the international policy committee established by the agreement will decide on the basic operational system, and actual deployment of that system will start in late 1966. The system will utilize the most advanced communications satellite equipment currently available. Voice, telegraphy, high-speed data, facsimile, and television communications service will be developed as rapidly as technically and economically practicable on a global and non-discriminatory basis.

Communications traffic is expanding in all areas of the world. Over the North Atlantic, for example, the rate of growth is about 20 per cent a year. While the North Atlantic is the heaviest traffic area at present, traffic will undoubtedly increase rapidly elsewhere. All areas will profit through the use of satellite communications facilities. It is clear that improved communications can contribute significantly to increased international trade and investment, travel, educational and cultural opportunities, and the exchange of ideas among people, thus furthering world peace and international understanding.



A LOOK AT THE FUTURE

A year before his death President Kennedy asserted his faith "that space can be explored and mastered without feeding the fires of war, without repeating the mistakes that man has made in extending his writ around this globe of ours." The international cooperation already achieved in space confirms that faith.

But the time is not yet to indulge in congratulations. Nineteen sixty-four witnessed a surge of space activity abroad—the energetic programs of France, the demonstrated competence of Canada and Italy, the entry of the British aircraft industry into spacecraft engineering, the formal establishment of ESRO and ELDO, the successful flight test of the ELDO booster. These events were harbingers of a broader and deeper technical capability and interest that will be present in Europe, Canada, and Japan five years from now. This increased activity will make possible either new opportunities for cooperation or a repetition of older patterns of competition.

The challenge that the United States faces during International Cooperation Year is to keep the hope and promise of cooperation alive. We cannot do it alone, but we must do our part. If we are to realize the technical and political advantages of cooperation, for ourselves and for others, we must continue alert to more considerable and advanced cooperative efforts with our present partners. Otherwise we will offer foreign engineers and scientists no more than is available in their domestic and regional programs. Beyond that, we must continue to search with infinite patience for meaningful and truly reciprocal ventures with the Soviet Union. If imagination and enlightened self-interest prevail, we *will* cooperate significantly. Our efforts will continue to stimulate constructive activities abroad, supplement our own resources of brain and purse, further the common destiny in space, and reduce—in some measure—the political and economic strains that divide us here on earth.

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