

THE SPACE AGENCY FORUM (SAF) AND INTERNATIONAL COOPERATION

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Introduction

The future of international space cooperation has been enhanced by the creation of a new worldwide organization: The Space Agency Forum (SAF). National space agencies and international space organizations sent representatives to the first session in Rome, Italy, April 22-23, 1993, to formulate objectives, membership, organization and procedures to guide future space policies and programs in areas of cooperation. The terms of reference, approved on April 23, include Mission to Planet Earth, Mission From Planet Earth, space science, public outreach, human space flight and education.

This new organization emerged from the successful experience of the Space Agency Forum for the International Space Year (SAFISY). With the approach of 1992, planning began to commemorate the 500th anniversary of Christopher Columbus' voyage of discovery to the New World and the 35th anniversary of the International Geophysical Year (IGY) when the new age of outer space exploration began. SAF has deep roots formed, since the beginning of the space age, by scientists and engineers who have been concerned with using space science and technology to achieve worldwide benefits. Motivated by the prospect of improving conditions on the Earth and exploration of the Universe, they began adopting organization and management procedures directed toward achieving specific goals during the International Geophysical Year (IGY), a period from July 1, 1957 through December 31, 1958. Since that time the flow of space resources, human and technological, was

constant and accounts for the fact that they could be organized quickly and effectively when planning began for the International Space Year.

There are values stemming from the selection of commemorative days or periods of time: the attention of the scientific community and general public is focused on achieving definite goals; energy is created to attain scheduled events; funds are more easily raised for specific purposes. The remarkable point, however, is that both the IGY and ISY are highlights during a continuous process flowing from the dedicated concentration of scientists, engineers and policymakers over several generations of time. This is an invaluable natural development during the past 35 years, considering that it established an extended time-frame essential for pursuing the grand goals of space exploration.

SAF evolved naturally from SAFISY whose policies, organization, management and programs should be reviewed in order to estimate their future influence on promoting international space cooperation.

Planning for SAFISY

The International Space Year (ISY) was first proposed in 1985 by U.S. Senator Spark Matsunaga (Hawaii) as "the Launchpad for the 21st Century . . . a seminal epoch in human evolution."¹

In response to the request of the U.S. Congress for a report on establishing the International Space Year in 1992, President Reagan directed NASA to take the lead in coordinating relevant U.S. agencies to work toward this goal, stating that

A major objective of an International Space Year should be to maximize, through international cooperation, the achievements and

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benefits of the current and prospective space programs of the participating world community. Such efforts should emphasize the involvement of both the developed countries and the developing countries in ways that demonstrate the benefits to everyone from discoveries in space science and the practical utilization of space.²

A planning meeting to organize and manage activities for the International Space Year was held in Durham, New Hampshire, USA, from April 29-May 1, 1985.³ NASA supported the conference which was organized by the U.S.-ISY Association. The chairman was Dr. Hubert Curien, Minister for Research and Technology, France. Major roles were also played by Dr. Lennard A. Fisk, NASA Associate Administrator, and Harvey Meyerson, President of the U.S. International Space Year Association.

Seventeen national space agencies, or equivalent entities, sent senior representatives to work out terms of reference, organization, and a management structure for international space cooperation. Mission to Planet Earth was chosen as the major ISY theme. Protection of the global environment from threats such as the greenhouse effect and ozone depletion, was the driving force that activated nations and the scientific community to use the remote sensing capabilities of satellites to monitor developments and establish data bases at a critical time. Dr. Lennard A. Fisk said: "It will be the most complex space mission ever undertaken, and it will provide essential information for political leaders reaching decisions on major environmental issues." The Conference recognized the opportunity for coordination with the International Geosphere-Biosphere Program (IGBP) of the International Council of Scientific Unions (ICSU) in seeking solutions to worldwide environmental problems.

Prof. Hubert Curien described the basic philosophical approach for increasing international cooperation among national space agencies by means of an ISY Forum, a concept that has been carried over to the newly-organized Space Agency Forum

(SAF). He stated that planned space programs should be ambitious but also realistic in meeting societal demands, and that there are "at least two levels of action": consultation and implementation. Consultation and coordination should take place before decisions are made, while space agencies must be responsible for implementing programs. SAFISY was organized for consultation. "That means no bureaucracy, no employed staff, but rather a forum—a place where we can discuss things very informally, very directly, very openly with representation of all the relevant agencies around the world." Informal annual meetings are strengthened by Working Groups continuously engaged with specific projects. In 1991, Prof. Curien proposed that the SAFISY type of organization and management be continued after the end of the International Space Year.⁴

The Durham Conference adopted four main principles: a solid scientific basis should be combined with attention to a broad range of space beneficiaries; developing countries should be given special attention, including technical training and access to ISY data; major emphasis on education; and "SAFISY will not compete with other existing international bodies but will seek fruitful interaction with them, including private sector and other non-governmental organizations."⁵

SAFISY immediately requested all other agencies with global environmental projects or plans to inform the scientific community of their resources for the decade 1988-1998. Information was required for spacecraft and ground station parameters, instrument lists and parameters, available data and its access, and contacts in case clarification of information might be needed. The fact that a data base was needed for a 10-year period beginning 4 years before the 1992 ISY celebration, and ending 6 years thereafter, is evidence of the continuous long-term commitment of space scientists and engineers to objectives that could be reached only on the basis of long-term perspectives. The ISY was a peak in this onward progress but was not conceived as an end in itself. Within a short time SAFISY numbered 29 full members: space agencies or official entities with space responsibilities in Ar-

gentina, Australia, Austria, Belgium, Brazil, Canada, China, Denmark, European Space Agency, EUMETSAT, Finland, France, Germany, India, Israel, Italy, Japan, Netherlands, Norway, Pakistan, Russia, Spain, Sweden, Thailand, United Kingdom, and the United States.

Ten international organizations became affiliates: the Committee on Space Research (COSPAR), European Community/Joint Research Centre (EC/JAC); International Astro-nautical Federation (IAF); International Council of Scientific Unions (ICSU); International Maritime Satellite Organization (INMARSAT); Intercosmos Program (Intercosmos Program); and four United Nations specialized entities: the Outer Space Affairs Division (OSAD), Food and Agriculture Organization (FAO), World Meteorological Organization (WMO), and the UN Educational, Scientific and Cultural Organization (UNESCO).

The organization chart indicates that the Chairman, assisted by a secretariat provided by the host country for annual meetings, was a focal point for three panels of experts. The panel of experts in Earth Sciences and Technology divided its work between two main branches: Space Data for Global Change which dealt with land and ocean data, mapping, disaster prevention, preparedness and relief; and Global Change Outreach which included an Encyclopedia, Atlas and Video.

The Panel of Experts in Education and Applications had two main divisions: remote sensing training and applications, space and education. This panel was concerned with monitoring and managing vegetation resources, geology, urban pressure on farming, and geographic information. The group on education was concerned with observation of the Earth, science, and communications.

The COSPAR/SAFISY Panel of Experts on Space Science expanded its work into some 27 science projects and 6 education and outreach activities.

The global scope of SAFISY's activities is indicated in the records of five meetings held before the World Space Congress convened in Washington, D.C., August 28-September 5, 1992.⁶

SAFISY I	29 April-1 May 1958	Durham, NH, USA
SAFISY IA	22 July 1988	Espoo, Finland
SAFISY II	2-3 May 1989	Frascatti, Italy
SAFISY III	17-18 May 1990	Kyoto, Japan
SAFISY IV	16-17 May 1991	Moscow, Russia

In addition, SAFISY endorsed a number of conferences, including the 2nd Pacific ISY Conference held in Hawaii from October 13-15, 1991. The European ISY Conference, Space in the Service of the Changing Earth in Munich, Germany from March 29 to April 4, 1992, and the Asia-Pacific ISY Conference, The Earth in Space, in Tokyo, Japan from November 16-10, 1992, following the World Space Congress.⁷

The Coordination Role of SAFISY

Protection of the global environment is a priority objective that requires continuous long-term attention of nations with experts in basic and life sciences, engineering and societal needs. Developing countries are affected and must become participants in planning and implementing projects designed to improve a variety of functions and prevent damage to the Earth as a whole.

The knowledge required for this and other undertakings involves a wide range of national and international institutions, many of them organized according to various specialties of the total problem. Obviously, the worldwide forces at work, both biological and physical, are interacting and require coordination. The fact that the world's significant space agencies and entities became members of the Forum-type organization created for the International Space Year is evidence of their need for, and reliance on, coordination; furthermore, they could depend on the Forum to meet this need without interfering with the operations of its individual members.

SAFISY represented an unusual combination of informality of national and international participation and management of Working Groups charged with responsibility for specific scientific and technical programs. Those who study models of international cooperation to assist in making decisions on organizing new ventures may be

puzzled as to the reasons for the success of SAFISY. Before attempting to assess the dynamics of this mixture of informal and formal direction of international space cooperation, it is necessary to indicate the high degree of specific detailed planning for organized effort in the selected programs. The new Space Agency Forum can be expected to continue SAFISY procedures that have proved their effectiveness.

A complete record of all the subjects which concern SAFISY would require several volumes, but an example of an area can serve to illustrate the depth of research and the method whereby member nations accepted responsibility for parts of the investigation calculated to contribute to the analysis of the problem situation as a whole. The SAFISY science projects were divided into earth and space sciences. Earth Science covered Space Data for Global Change which was divided for research purposes into the following subjects:⁸

- Global consequences of land cover change was led by Australia, France and the USSR.
- Enhanced greenhouse effect detection experiment (GEDEX) became the responsibility of the United States.
- Ocean variability and climate was led by the European Space Agency.
- Polar stratospheric ozone was undertaken by Germany and the United States.
- Productivity of the global ocean, led by Canada and the European Community's Joint Research Center.
- World Forest Watch led by Brazil and the European Community's Joint Research Center.
- Global and surface temperature, Japan and the United Kingdom.
- Polar ice extend—European Space Agency and Japan.
- Global satellite image mapping, led by Austria.
- Space and disaster prevention, preparedness, and relief, the responsibility of the International Astronautical Federation and the United States.

It should be noted also that SAFISY concentrated on education and in this, as in other respects, benefited from the participation of the United Nations and its specialized agencies.

The SAF's terms of reference will enable space agencies, as well as affiliate members, to formulate an agenda which includes the broadest coverage of space activities that are significant in using and

exploring outer space.

Affiliate members have been a vital force in space cooperation and coordination, especially organizations within the United Nations' structure with space and space-related activities. The UN General Assembly endorsed participation in the International Space Year (UN-ISY) by resolution 44/46 on December 8, 1989. Member States were requested to make voluntary contributions to finance ISY activities in three areas: "(i) management of the resources of the Earth and its environment; (ii) long-term education programmes; and (iii) public education." All countries, particularly developing countries were to be involved.

Examples selected from a long list of programs with co-sponsors participating within the United Nations System include acquisition and transfer of remote sensing data to developing countries (USSR/UNESCO, WMO, FAO); Center for Space Science and Technology-Education (Member States/WMO, FAO, UNESCO); Second UN International Training Course on Remote Sensing Education (Sweden); Regional Workshop on Space Technology Resource Development and Environmental Management (Ecuador, Japan); International Seminar on Space Communications (Greece).

Other SAFISY affiliates assumed responsibility for a variety of space projects whose time-frame extends well beyond the International Space Year.⁹

SAFISY and Space Law

The Space Agency Forum will be subject to international and national space laws in the same ways as SAFISY. The connection of SAFISY with space law is indicated by the fact that all its members ratified the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies. All except Spain ratified the 1968 Agreement on Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space. All except Norway and Thailand ratified the 1972 Convention on International Liability for Damage Caused by Space Objects. The 1976 Convention on the Registration of Objects

Launched into Outer Space was ratified by all SAFISY members except Brazil, Finland, Italy, Norway, and Thailand, while Argentina signed this convention. The European Space Agency (ESA) a member of SAFISY, declared its acceptance of the legal rights and obligations of the 1968, 1972 and 1976 treaties. All SAFISY members ratified the INTELSAT treaty and EUMETSAT, and all except Thailand ratified INMARSAT. Additional ratifications can be expected as SAF increases its membership. Such statistics are always subject to being updated, but the trend is sufficiently established to ensure that the new Space Agency Forum will observe the principles established in the international legal regime to which their countries belong.¹⁰

Knowledge and coordination of national space laws is essential, especially for contracts covering different legal situations. SAF will prove helpful in this regard.

Creation of the Space Agency Forum

The Space Agency Forum emerged from SAFISY with no loss of time. A firm foundation had been laid in policies, programs and implementation leading to the International Space Year, and consistently with an eye for the future in continuing projects and practices which enhance international space cooperation. The first meeting in Rome, Italy, April 22-23, 1993, resulted in agreement on the Terms of Reference governing objectives, membership, organization and procedures. The second meeting, scheduled for Montreal, Canada, November 8-9, 1993 adopted the theme of Science and Exploration.

Three focus groups were established for the Montreal meeting: (1) NASA, NOAA and the Canadian Space Agency were given responsibility for Space Education with the task of compiling an inventory of educational resources; (2) Japan became the lead nation to study Awards and Public Outreach; and (3) the Italian Space Agency proposed increasing assistance to developing countries in connection with Earth Observations.

The terms of reference adopted by SAF-1 em-

phasize in the Preamble the significance of space activities for mankind: that all nations can be involved; national agencies, while autonomous, can benefit from communication and cooperation; specific space functions are already being promoted by such organizations as the Committee on Earth Observation Satellites, the Coordination Group for Space Science; and there is need for an informal forum for national civil space agencies to provide a focus for exchange of information on space matters requiring international cooperation and coordination.

Highlights of SAF objectives include attention to creativity and cost effectiveness in exchanging information on Policies and Programs in Space, Mission to Planet Earth, Mission from Planet Earth, Human Space Flight, Public Outreach and Education. The Forum will offer an opportunity to interact with international non-governmental and private sector organizations and will suggest that members also give attention to appropriate groups involved with international space cooperation. By adding Mission from Planet Earth, SAF expanded its coverage beyond SAFISY's terms of reference to include all aspects of space exploration.

The following membership of national space agencies and international organizations, or equivalent government agencies, was agreed upon in Rome. They are funded from public sources and the head of each Member delegation must be "a senior official with broad management responsibilities." Additional members may be added by consensus. The list is the same as that for SAFISY except that four more national space agencies have been added to represent Indonesia, Kozakhstan, Korea and Ukraine.

Space Agency Forum Membership

Argentina	National Commission for Space Activities (CONAE)
Australia	Australian Space Office
Austria	Austrian Space Agency (ASA)
Belgium	Recherche et Technologie Spatiale
Brazil	Instituto de Pesquisas Espaciais (INPE)
Canada	Canadian Space Agency (CSA)
China	State Science and Technology Commis-

	sion (SSTC)
Denmark	Danish Research Administration
ESA	European Space Agency
Eumetsat	European Meteorological Satellite Organization
Finland	Finnish Space Committee (FSC)
France	Centre national d'Etudes Spatiales (CNES)
Germany	Deutsche Agentur für Raumfahrtangelegenheiten (DARA)
India	Indian Space Research Organization (ISRO)
Indonesia	National Institute for Aeronautics and Space (LAPAN)
Israel	Israel Space Agency (ISA)
Italy	Agenzia Spaziale Italiana (ASI)
Japan	Institute of Space and Astronautical Science (ISAS)
	National Space Development Agency (NASDA)
	Science and Technology Agency (STA)
Kazakhstan	Kazakhstan Space Agency
Korea	Korea Aerospace Research Institute
Netherlands	Netherlands Agency for Aerospace Programs (NIVR)
Norway	Norwegian Space Center
Pakistan	Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)
Russia	Russian Space Agency
Spain	Centro para el Desarrollo Tecnológico Industrial (CDTI)
Sweden	Swedish National Space Board
Thailand	Ministry of Science, Technology and Energy
Ukraine	National Space Agency of Ukraine
United Kingdom	British National Space Centre (BNSC)
United States	National Aeronautics and Space Administration (NASA)
	National Oceanic and Atmospheric Administration (NOAA)

The official text of SAF's international agreement:

SPACE AGENCY FORUM Terms of Reference

I. Preamble

Assembled representatives of national space agencies and international space organizations throughout the world:

Understanding the value of space activities for mankind;

Acknowledging that nations in all stages of development can contribute to and benefit from space activities and

their applications;

Considering the autonomy of national agencies responsible for space activities;

Realizing the advantages of promoting communication and cooperation among governmental space agencies;

Noting the valuable role played by existing mechanisms dedicated to specific fields of space activity such as the Committee on Earth Observation Satellites, the Coordination Group of Meteorological Satellites and the Inter-Agency Consultative Group for Space Science;

Recognizing the need to provide a forum for expression of views and informal coordination of activities by national civil space agencies in support of international cooperation, so as to enable the agencies to take these views and activities into account while planning their individual programs;

Have agreed to establish the Space Agency Forum (SAF).

II. Objectives

2.1 SAF will seek to enhance creative and cost-effective international cooperation among the space agencies by exchanging information on programs and plans, and by discussing policy issues, in the areas of Space Science, Mission to Planet Earth, Mission from Planet Earth, Human Space Flight, Public Outreach, and Education.

2.2 SAF will provide a forum for interaction with international, non-governmental, and private sector organizations in order to identify opportunities to coordinate the work of SAF members with such organizations.

2.3 SAF encourages its members to maintain communications as appropriate with other groups and organizations involved in international cooperation through relevant channels within their respective governments.

III. Membership

3.1 Members of SAF are national space agencies, international organizations, or the relevant government organization responsible for space activities that are currently conducting space-based activities, focus on research and development, and whose primary funding comes from public sources. The head of the delegation for each Member shall be a senior official with broad management responsibilities. The addition of

Members will be with the consensus of the current SAF Members. Requests for membership should be addressed to the Chairman of the next scheduled SAF plenary meeting. Such requests will be considered by the Members at the meeting.

- 3.2 Affiliates of SAF are publicly-funded, national agencies or international space organizations that have plans for future space-based activities and are currently conducting space-related research or applications. Affiliates will be represented by personnel with broad management responsibilities. The addition of Affiliates will be with the consensus of the current SAF Members. Requests for Affiliate membership should be addressed to the Chairman of the next scheduled SAF plenary meeting. Such requests will be considered by the Members at the meeting.

IV. Organization and Procedures

- 4.1 SAF will convene once per year in plenary session. Additional meetings may be convened at the request of any Member, provided that written notification is made available at least two months in advance and a majority of the Members agree to such a meeting.
- 4.2 SAF meetings will be organized and chaired by the host organization, which shall provide an agenda to Members at least one month in advance of the scheduled meeting. At each SAF meeting, the time, place and host for the next meeting will be established.
- 4.3 The SAF Chairmanship and Secretariat will rotate annually. These responsibilities will begin immediately following the plenary meeting and will transition to a new Chairman and Secretariat representing the host organization of the next plenary meeting.
- 4.4 SAF may seek to schedule its meetings to be contiguous with other meetings involving a plurality of Members, as appropriate.
- 4.6 SAF may establish ad hoc Focus Groups to advise SAF and its member organizations on specific topics related to implementing international cooperative activities.
- 4.7 SAF will establish links with other independent space-related coordination groups and scientific or governmental bodies that are international in nature and currently have space-related pro-

grammatic activities that support SAF objectives by inviting them to communicate their current programs, plans, and policies at the SAF plenary meetings as well as to participate in the Focus Group activities.

- 4.8 Conclusions resulting from SAF plenary sessions or the findings and recommendations of the ad hoc focus groups are non-binding and will be acted upon at the discretion of each SAF Member.
- 4.9 SAF will not supersede current or potential agreements or arrangements by Members or Affiliates. Participation in SAF activities shall not be construed as being binding upon governments, or as restricting their right to develop and manage programs according to their needs and resources.

Can SAF Become the Nucleus for a World Space Agency?

The question of establishing a World Space Agency was analyzed by the United Nations beginning in 1957-58. The Ad hoc Committee on the Peaceful Uses of Outer Space was established by UN Resolution 1348 (XIII) on December 13, 1958 and directed to report on "future organizational arrangements to facilitate international cooperation." The Technical Committee sought to define what programs the United Nations could undertake that would continue IGY-type research, "mutual exchange and dissemination of information, and coordination of national research in outer space." Their conclusions were summarized by this author as follows:¹¹

1. An international agency for outer space is not yet needed, but international cooperation and coordination of existing resources, facilities, and personnel should be encouraged and supported by the United Nations.
2. Immediate international action is required in the allocation of radio frequencies for space vehicles. This should be accomplished by the International Telecommunication Union and the states which are members of the 1959 Administrative Radio Conference in order to assure adequate band-

widths for the next 3 years. The ITU should also study such problems in connection with communications satellites.

It was decided that there should be a focal point within the United Nations for space activities and the United Nations should review programs and plans in approximately one year. As we know, the Outer Space Affairs Division was established as a focal point, as well as coordination arrangements within the UN system. Many of the UN specialized agencies developed space or space-related programs to improve their functional responsibilities.¹²

A number of studies and recommendations appeared through the years on creating a World Space Agency. Some were concerned with using remote sensing by satellites for arms control and disarmament. Others involved civil space programs but did not explain realistically the relationship to international organizations already operational for communications and weather information. The approach apparently varied between those authors who are philosophically inclined toward centralization as distinguished from writers who favor decentralization.

The original United Nations report identified four component parts that required attention: international cooperation, exchange of information, coordination, and the continuation of IGY-type research. The problem was how to organize and manage the variety of uses of outer space to benefit mankind.¹³

The concept of a world space agency with a building, staff, statutes, and funding has never worked out. The reason is implicit in the report that identified the International Telecommunication Union as the institution in charge of radio frequencies, and later as having responsibilities for space uses of the geostationary orbit. The same type of situation was evident in functions relating to the weather, already institutionalized by the World Meteorological Organization, and within nations by their weather agencies. Satellites were a new technological tool, producing information to improve functions that were already operational. New national and international space organizations

developed along specialized lines. Some were intergovernmental, others combined government and the private sector. Some were organized for profit while others concentrated on space exploration to increase knowledge of the Universe regardless of monetary concerns—except for sources of funding.

As a practical matter, communications cannot be divorced from the International Telecommunication Union, the weather cannot be deleted from the responsibility of the World Meteorological Organization and the network of national/international operations that have developed through the years. While these are the two major institutions that illustrate the impracticability of being placed under some overall directorate, the same point can be made about other space applications.

A limited number of experts manage specialized space functions and it would be difficult, if not impossible, to find for each subject additional experts who could be placed administratively over those who are now operating the communications and meteorological institutions. If a world space agency did not have jurisdiction over communications, meteorology and remote sensing, what claim would it have to be called “world”?

What has actually happened is the growth of a World Space System composed of organizations developed for specific purposes, interacting and international in character, depending for maximum efficiency on cooperation, exchange of information and coordination. Because of the international nature of satellites that quickly orbit the Earth while disregarding national boundary lines, nations cooperate to obtain information needed for societal functions. The main control for order in this process is the necessity of conforming to the technical requirements for successful space operations. To be effective, satellites must be launched in prescribed ways, and some can be launched only at certain times. Exact calculations must be complied with in using the geostationary orbit. Such factual technical imperatives induce nations to cooperate in order to benefit from the peaceful uses of outer space. These scientific and technical factors are much more controlling of attitudes and behavior than

regulations issued by agencies engaged in non-scientific and non-technical pursuits.

The Space Agency Forum is a logical and effective development in the history of space organizations since 1957. Its terms of reference are just the opposite of a comprehensive world space agency attempting to be an umbrella over all space activities. The contours of SAF as an institution—the informal forum and the formalized workings groups—have evolved with tested practices which ensure continuing international space cooperation.

Conclusions

International cooperation for studying the Earth, oceans, atmosphere and outer space has been a continuous process since the launching of the first satellite on October 4, 1957. Space research was one of the subjects included in the program the scientific community planned for the 67-nation International Geophysical Year (IGY) (July 1, 1957 - December 31, 1958). The historical precedents for worldwide scientific studies of the global environment date from 1875.¹⁴ As 1992 approached, it was logical to select the two great events of discovery and exploration—Christopher Columbus' voyage of discovery of the New World, and opening outer space for developing beneficial uses and expanding knowledge of the Universe.

Environmental studies require the collection of data from many scientific disciplines over extended periods of time by means of the latest technology. The global nature of environmental problems, the number of disciplines required for analysis and the time-frame essential for collecting data, all combine to form a solid basis for international cooperation among scientists, engineers and their supporting governments, academic institutions and industrial components. Given these conditions, international space cooperation is inevitable and can be expected to continue.

International space cooperation has taken many forms of organization and management to attain specific objectives. As a policy concept it is embedded in national and international laws to guide nations in conducting space activities. The main

characteristic of the space institutions that have developed to take advantage of opportunities arising from access to outer space is that they defined jurisdictions according to specific functions. Thus we have the International Telecommunication Union expanding its jurisdiction over space communications while the International Telecommunications Satellite Organization developed as a new institution; the World Meteorological Organization and cooperating national agencies using space technology to improve weather information; creation of the International Maritime Satellite Organization for maritime problems; and a variety of organizations, public and private, for reaping the benefits of remote sensing, etc. We can definitely conclude that the trend for the past 35 years has been toward functional organizations to meet specific purposes while simultaneously engaging in coordination as circumstances required.

This trend is evident not only in institutions devoted entirely to outer space activities but in those that have significant space-related functions such as agriculture, education, transportation, medicine, etc. It is not realistic to propose a world space agency as an institution with jurisdiction over all major functional organizations that are operational. If an organization called world space agency developed for arms control and disarmament, it would be classified as a functional entity and could not be called "world" because it could not take over the management of space communications, meteorology, etc. An international arms control institution might be combined with the International Atomic Energy Agency but would still have to coordinate its efforts with functions now performed by military and civilian remote sensing organizations.

We have developed a World Space System composed of a variety of institutions organized along functional lines. The global nature of space technology and its uses create the requirement for coordination and the Space Agency Forum has evolved to meet this need. In 1957, when future patterns of international cooperation were being discussed, SAF would have seemed an improbable development because of its lack of a permanent

location with budget, employed staff, and authority to enforce compliance with statutory provisions. But the adherence of national space agencies and significant international organizations to SAFISY, and their eagerness to continue ISY practices, leads to the conclusion that there are unusual strengths in combining an informal international forum with formalized working groups.

The strengths of SAF as a coordinating mechanism are:

1. Selection of the most sustainable long-term international projects for present and future activity: protection of the global environment which requires unending vigilance, and space exploration with projects scheduled by stages for reaching objectives that can take decades to achieve. Any other space matters may be placed by agreement on SAF's agendas.

2. Membership composed of space organizations that recognize the need for coordination: national space agencies represented by senior officials with broad responsibilities, newly-elected space agencies, and affiliates which represent the major international space institutions.

3. The SAFISY practices of allocating responsibility for annual meetings to the host country and rotating the office of chairman, have proved effective and can be expected to continue. SAF has flexibility and will not be in the position of international organizations that are dependent upon annual appropriations from national legislatures.

4. We can expect a continuation of SAFISY's successful practice of dividing functions between the informal forum where policies and programs are discussed, and the more formalized working groups which give continuous attention to research and the solution of problems arising from the uses and exploration of outer space. Scientists and engineers have a history of dedication to significant programs, often as volunteers. They are mission-minded, disciplined, and naturally in favor of international cooperation. The scientific community is made up of individuals who are drawn like magnets to the psychological "center-of-gravity" of their projects.

5. The Forum enables officials to exchange

information, benefit from the experience of other countries, plan to extend the uses of space technology to developing countries, standardize methods and concentrate on education of space professionals and the general public. Progress can be made and unnecessary duplication avoided when space officials have opportunities to meet and exchange information on national laws, organizations and programs.

Recommendation

SAF should establish a central computerized data bank for maintaining up-to-date space records to which all members have access. For this purpose, it will be necessary to choose a permanent location for equipment and some personnel. Current exchange of information will be facilitated and the accumulation of data will constitute SAF's history which is necessary for officials responsible for space projects in different stages of development, and especially considering the fact that we can anticipate turnovers of personnel during long-term projects. Although published annual reports are necessary for various purposes, they cannot take the place of a comprehensive scientific data bank. As SAF begins its work, an official Historian should be appointed to head a Working Group to plan for the preservation and use of SAF records.

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⁷ Space Agency Forum on International Space Year: Panel of Experts on Earth Science and Technology. Report, February 27-28, March 1, 1989. Abingdon, England. 36 p.

⁸ ISY-International Space Year: 1992 Activities. US-ISY Assn., Washington, D.C. April 1991. 20 p.

⁹ UN-ISY 1990-The Participation of the United Nations in the International Space year. New York, 1992. 25 p.

¹⁰ Böckstiegel, K-H. and Marietta Benko (Eds.) *Space Law: Basic Legal Documents*. 2 vols. London, Dordrecht, Boston, Martinus Nijhoff publishers, 1990. This loose-leaf publication contains

the statutes of all international and regional organizations; Vol. I includes the texts of the treaties formulated by the United Nations. See also *Space Law and Related Documents: International Space Law Documents and U.S. Space Law Documents*. 101st U.S. Congress; 2d Session. Committee print 101-98. U.S. Senate Committee on Commerce, Science and Transportation, June 1990. U.S. Government Printing Office, Washington, D.C. 605 p.

¹¹ *International Cooperation and Organization for Outer Space*. Staff report by Eilene Galloway. U.S. Senate Committee on Aeronautical and Space Sciences. Senate Document No. 56, 89th Congress, 1st Session, 1965. 580 p. (See pp. 183-193).

¹² *International Cooperation in Outer Space: A Symposium* edited by Eilene Galloway. U.S. Senate Committee on Aeronautical and Space Sciences. Senate Document No. 92-57, 92nd Congress, 1st Session, 1971. 732 p. This document covers the space activities of UN specialized agencies, intergovernmental international organizations, international scientific community and professional associations, and U.S. agencies involved with international space cooperation.

¹³ See reference no. 11.

¹⁴ *Annals of the International Geophysical year*; vol. IX. New York, Pergamon Press, 1959. Report on the International Geophysical year. National Science Foundation, National Academy of Sciences. Hearings before the Subcommittee of the U.S. House Appropriations Committee, 86th Congress, 1st Session. Testimony by Dr. Joseph Kaplan. February 18, 1959. p. 6.