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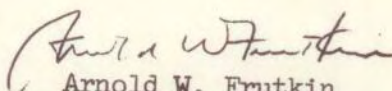
September 12, 1960

MEMORANDUM FOR DISTRIBUTION LIST

Subject: Report on NASA's International Activities

Attached is a copy of a recent response to an inquiry on NASA's international program activities. It is forwarded at the suggestion of the Administrator for your information and interest.

Attachments A and B of the response are included in this copy. The remaining attachments are not included.

  
Arnold W. Frutkin  
Director, Office of  
International Programs

Enclosures

Distribution List (attached)



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August 12, 1960

REPORT ON NATIONAL AERONAUTICS AND SPACE ADMINISTRATION'S INTERNATIONAL  
ACTIVITIES IN RESPONSE TO A RECENT INQUIRY

(Items 1, 2, and 3 of the inquiry requested the names of countries with which NASA has on-going or planned cooperative programs, the types of agreement reached, and a description of the projects or facilities involved.)

Items 1, 2, and 3: Information in response to the first three questions presented in the reference letter appears principally in two tables, Attachments A and B. Attachment A relates to programs of cooperative scientific investigation. Attachment B relates to NASA tracking and/or telemetering facilities abroad. Two additional items of information are required to supplement Attachments A and B:

1. In addition to the on-going cooperative programs listed in Attachment A, informal technical discussions are in progress in the following cases:

Argentina - Conversations with Professors Tabanera and Roederer of the new Argentine Space Commission have concentrated on the possibilities of joint programs concerned with ground instrumentation in support of NASA solar beam rocket soundings, the accommodation of Argentine scientists in NASA laboratories and, ultimately, rocket soundings conducted from a proposed Argentine range near Cordova. Immediate possibility is the establishment of a riometer station, through grant or contract with the Argentine Space Commission, to be manned and operated by the latter at Ellsworth Station in the Antarctic.

Australia - Two proposals for joint satellite programs have been received from Australia, the first relating to investigations of very low frequency emissions in regions where the geomagnetic lines of force enter the ionosphere, the second proposing investigation of primary cosmic ray particles at satellite heights. NASA has requested further specific technical information relating to the first and is evaluating the second, with the prospect that additional information will be requested in this case also.



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Japan - Discussions with the Japanese, looking toward cooperative efforts in space research, were initiated both informally and through diplomatic channels by Japanese scientists in response to the offers made by NASA in COSPAR in March 1959 and again in January 1960.\* Discussions have progressed through meetings held in Nice, Washington and Tokyo. Elements of such a program still under informal consideration include cooperative rocket soundings for meteorological and other purposes, complementary research in materials, exchange of personnel for training purposes, and, at a later date, possible use of Japanese instrumentation in rocket or satellite research.

France - Numerous discussions have been held with representatives of agencies participating in the French National Space Committee and with government officials of cognizant ministries. Further progress waits upon the formal authorization of a French space research program. Possible areas of collaboration discussed have ranged from accommodation of rocket and satellite instrumentation in NASA vehicles to training support and the use of ground-based instrumentation in support of communications satellite experiments. A French team from CNET (Centre National d'Etudes des Telecommunications) which is represented in the French Committee, has visited NASA installations and consulted with regard to the construction of a major radio telescope in France. A further visit by representatives of this agency is expected in the near future.

West Germany - Informal discussions relating to the technical content and possible modes of cooperative arrangements have been held in Germany with university scientists, with scientific advisors to the German government on space research, with members of non-governmental rocketry groups, and with the science attache of the German Federal Republic in Washington. A generalized, preliminary proposal for the preparation of a satellite and its contents for NASA launching has been made on behalf of the Deutsche Versuchsanstalt fur Luftfahrt. More recently, German interest in materials research and instrumentation has been expressed. Correspondence and further discussions are seeking greater specificity through technical discussions prior to establishment of a formal framework for a program. Further discussions will take place during September in Bonn and Washington.

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\*See paragraph (a) Item 7

It is not yet clear how German space interests will be organized and sponsored.

Norway - Representatives of the Christian Michelsen Institute have visited Washington for the purpose of considering mutual interests in initiating a Norwegian sounding rocket program directed primarily at investigations of noctilucent clouds and aurora, for which Norway is particularly well located geomagnetically. It is the Norwegian intention to acquire rockets for such purposes, in the United States or elsewhere.

Sweden - The situation with respect to Sweden is precisely the same as in the case of Norway above. In addition, Swedish representatives have expressed a definite desire to send two scientists to NASA laboratories in 1961 for training.

Other - Less substantive discussions have been held with several additional countries, including the Soviet Union. Arrangements for technical information and lectures have been made, or our willingness to make them expressed, at the request of agencies in Spain, Brazil, Mexico, Argentina, West Germany, Italy, the United Kingdom, Japan, and others.

Of possible particular future significance is the establishment of a European group, along the lines of CERN\*, for the purpose of mounting a multilateral space research program. This group includes the following nations: Belgium, Denmark, France, Great Britain, Italy, the Netherlands, Norway, Sweden, Switzerland and West Germany. Latest advices indicate that the group has established a Secretariat located in Paris and is now seeking formal sponsorship by the governments concerned. NASA's attitude toward its establishment and future cooperation has been informally solicited. Formation of the group has been welcomed by NASA and assurances have been given that cooperation may be established on the same basis as has been done in bilateral programs. NASA has directed the attention of Latin American scientists to this multilateral effort, noting the advantages that would attend a similar organizational pattern in South America.

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\*Centre Europeene Pour la Recherche Nucléaire (CERN)



ii. On an entirely informal basis NASA has acted to encourage participation by foreign scientists in groundbased phases of appropriate satellite experiments. Thus, technical information was widely disseminated in advance of the launching of the Echo satellite, providing a description of the experiment so as to suggest the use that might be made of it by foreign scientists on their own initiative. Possibilities include the use of the satellite as a reflector for local and long range communications experiments, either individually or in collaboration with other groups, and as a measure of atmospheric drag. Similar arrangements will be made in future in the cases of appropriate experiments (see paragraph (d) Item 7 below).

(Item 4 of the inquiry requested texts of all formal agreements together with a notation indicating whether they were negotiated by the Department of State or NASA or by both agencies working together.)

Item 4: The texts of the agreements requested are appended as follows:

Australia	Network facilities	Attachment C
Canada	Ft. Churchill launching facility*	Attachment D
Chile	Network facilities	Attachment E
Ecuador	Network facility	Attachment F
Mexico	Network facility	Attachment G
Peru	Network facility	Attachment H
Spain	Network facility	Attachment I

In all cases, these formal agreements are negotiated on a diplomatic level between the Department of State and the appropriate foreign office. In fact, the closest liaison was effected between NASA and the Department of State in these negotiations and preparatory to them. The agreements were generally prepared in draft within NASA and then coordinated between the two agencies before presentation abroad by the Department of State. In addition, in important cases, NASA representatives visited the American embassies abroad responsible for these agreements to assist in the final stages of their negotiations. This was true, for example, in connection with the Mercury site negotiations with the governments of Mexico, Australia, and Spain, and the minitrack stations in Peru and Chile.

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\*This agreement was negotiated by the Department of State and coordinated with the interested agencies generally.

(Item 5 of the inquiry requested a description of the liaison and coordinating arrangements between NASA and the Department of State and the names of the officials involved.)

Item 5: Liaison and coordination between NASA and the Department of State are effected in the following ways:

i. Principal point of contact for NASA in the Department of State is the Office of the Special Assistant to the Secretary for Atomic Energy, Disarmament and Space. This is the Office of Mr. Philip J. Farley. Principal point of contact for the Department of State in NASA is the Office of International Programs; the Director of this office is Mr. Arnold W. Frutkin.

ii. Additional coordination is effected within the Operations Coordinating Board Working Group on Outer Space, whose chairman is Dr. Hugh L. Dryden, Deputy Administrator of NASA. The State Department is represented on this working group by Mr. Philip J. Farley.

iii. Coordination has also been available through the President's Space Council on which the Administrator of NASA and the Secretary of State sit as members. Moreover, the Administrator of NASA, when the occasion requires, participates in meetings of the National Security Council, thereby making possible further coordination at the highest level.

iv. A final coordinating mechanism is the Federal Council on Science and Technology. The Administrator of NASA represents that agency on the Council; the Department of State is represented by Dr. Wallace R. Brode. The Director of the Office of International Programs represents NASA on the International Committee of the Federal Council; this Committee is chaired by Dr. Brode, Science Adviser, Department of State.

(Item 6 of the inquiry requested a report on any international programs or projects involving coordination between NASA and the Department of Defense and the extent to which the Department of State is brought into such arrangements.)

Item 6: There are no current international programs or projects involving coordination between NASA and the Department of Defense. NASA has, however, agreed to inform the DOD of new operating requirements overseas for tracking or other facilities. In addition, in order to



ensure maximum cooperation with DOD, NASA has prepared a policy guide for its headquarters and overseas tracking stations establishing procedures for extending the services of its overseas facilities to DOD on a routine or emergency basis. This guideline, which has been forwarded to Dr. York's office, is appended as Attachment J. The agreement between the United States and Canada for the use of the Fort Churchill facility for sounding rocket programs should also be noted (Attachment D). This agreement, negotiated by the Department of State, provides for use of the facility for independent rocket launching programs by NASA and various agencies of the Department of Defense. The Department of the Army acts as the agent for U. S. agencies in the use of the facility.

(Item 7 of the inquiry requested an account of plans for future international cooperation.)

Item 7: NASA's basic program for international cooperation calls for the aggressive promotion of substantive scientific projects and exchanges as rapidly as the following factors will permit:

- i. The organization of government-sponsored space activities abroad.
- ii. The state of the art abroad.
- iii. The assignment of foreign budgets adequate to the mounting of space research programs.
- iv. Political factors.

NASA's specific programs are as follows:

(a) Satellites: NASA's offer to make space available for foreign experiments or complete payloads in U. S. rockets and satellites was made in March 1959 at a COSPAR Assembly and has been frequently reaffirmed. The offer is now well known in scientific circles abroad and has attracted considerable attention in the international press. (As noted in Attachment A, several such programs are now in preparation or are under consideration.)



NASA's Office of Space Flight Programs has earmarked three Scout vehicles, in addition to one Thor-Agena, for use in connection with international satellite programs. In general, the long lead time required for the preparation of satellite experiments after they have been proposed and agreed upon should allow for the provision of additional suitable launching vehicles without earlier advance planning. Moreover, as payload weight capability increases materially in the next two years, and as payloads become more standardized, space for individual experiments may become available on a piggyback basis in orbiting astronomical or geophysical observatories.

In the case of satellite application systems, the launching of communications and weather satellites promises broad opportunities for foreign participation. The relatively narrow capability for utilizing the Echo satellite in long range transmissions should improve considerably over the next two or three years by the addition of new radio telescope facilities abroad (see section below on Tracking and Telemetry). It is planned to make the fullest use of such increased capability in cooperative programs as it becomes available. A means of utilizing meteorological satellites in cooperative programs is described below in the section on Ground-based Cooperation.

(b) Rocket Soundings: While extensive cooperation in rocket soundings appears to be in prospect with a number of foreign countries, a further period is required before these prospects will have crystallized sufficiently to permit precise planning. Thus far, virtually full reliance has been placed upon foreign scientists to identify areas of collaboration which reflect their own interests. However, lack of background and knowhow, as well as limitations in the state of the art abroad, tend to hamper foreign scientists in making such decisions in some cases. Accordingly, an effort is now underway to earmark suitable scientific areas in which cooperative (or independent) efforts might be particularly constructive. The upper air experiments utilizing grenades and chemical reagents are particularly suitable for foreign scientists entering the field of rocket sounding since they do not require telemetry but utilize relatively simple optical or radio ground instrumentation. NASA is also welcoming programs of synoptic value or special geographic significance.



All of the scientific areas and experiments listed below are presently being carried out or are under consideration for inclusion in our program. There is room for more work in all of these.

Aeronomy - Investigations over a range of altitudes of density, temperature, composition, and winds using:

- Pressure gauges
- Mass spectrometers
- Spectrometers (using the sun as a source)
- Air glow photometers
- Reagent releases (NA, etc.)
- Grenade experiments
- Drag spheres, chaff

Astronomy and solar physics

- UV and x-ray spectrometers and photometers

Energetic particles and fields

- Particle detectors for primary and secondary cosmic radiation auroral particles
- Composition of the radiation belts and gamma rays
- Magnetometers and emulsions

Ionospheres and plasmas - Investigations of particle population and distribution by means of:

- Propagation experiments
- Probes
- Ion mass spectrometers
- Reagent clouds

Special experiments

- Micrometeorites
- Noctilucent clouds
- Photography of lower altitude clouds
- Testing satellite experiments

(c) Training and Technical Guidance: (see Item 8 below.)

(d) Ground-based Cooperation: An arrangement to facilitate foreign utilization of appropriate NASA experiments was described in the case of Project Echo in Paragraph ii (page 4) above. Similar activities and any necessary documentation are now planned in conjunction with two future satellite experiments: the Ionospheric Beacon and Tiros II. In both cases, the efforts will be framed so as to avoid giving rise to expensive foreign preparation prior to successful launching. The lifetime of the ionospheric beacon satellite, for example, should be adequate to permit entering upon substantive preparations after launch. Waste and disappointment which might follow from preparations in advance of an unsuccessful launch would thereby be spared. In the case of Tiros II, it is anticipated that a very valuable program of standard and special meteorological observations extending to balloon and aircraft-borne activities may be mounted in coordination with passes of the weather satellite. Valuable complementary data and aids to the interpretation of satellite data may be hoped for.

(e) Tracking and Telemetry: As Attachment B indicates, about half of NASA's global network benefits from the participation of foreign nationals in the operation of the stations. Efforts are underway to train additional nationals of the host countries in order to increase their degree of participation and facilitate advances in the state of the art, locally. For example, two Chilean nationals are here undergoing advanced Minitrack training.

Very considerable interest in establishing radio telescope programs is now being shown abroad, particularly in France, Australia, Japan, and Germany, while the existing advanced program in Britain is to be extended still further. One element in all of this activity is the hope that some participation may be had in U. S. satellite and space probe programs.

In addition to the instrumented global network, NASA supports, through grant to the Smithsonian Astrophysical Observatory, volunteer visual satellite tracking groups (Moonwatch) which operate in 19 countries abroad.

(f) Working interrelationships: NASA plans to arrange, where on-going programs warrant, small working level interchanges on an international basis. Thus, in connection with the TIROS II ground-based cooperative program (see (d) above), a working meeting of the cooperating



weather services will be convened, if warranted, to facilitate the review and analysis of the satellite and ground-based data.

(g) Technical information and exhibits: In addition to exchange of space research results through COSPAR and other mechanisms, NASA is planning the establishment of suitable media for the dissemination abroad of publications and/or documents which result from NASA programs. This program is designed to improve the state of the art abroad and encourage useful exchange of information. Similarly, NASA's Office of Technical Information and Education has provided and will provide suitable exhibit material for technical and public inspection abroad in consultation with USIA.

(Item 8 of the inquiry requested a summary of programs involving the use of foreign scientists and the exchange of personnel between the United States and other nations.)

Item 8: NASA conducts two programs involving training of foreign scientists. The first is an associateship program funded by NASA and administered by the National Academy of Sciences. (Up to \$350,000 may be provided over a three-year period.) It provides liberal stipends to senior postdoctoral scientists for extended periods of space-connected research in U. S. laboratories. Six senior foreign scientists have been at work under this program in the United States with another due shortly. Attachment K lists these personnel. Attachment L is a flyer presenting the associateship program.

The second program grows out of conversations and discussions with scientists abroad as summarized in the comments on Items 1, 2, and 3 above. In these discussions NASA has offered to provide laboratory support to younger scientists desiring training in the space sciences. It is expected that the cooperating country will ordinarily provide travel and subsistence for such trainees, but some flexibility may be anticipated. Thus far, arrangements have been made for a scientist from the United Kingdom to work at the Goddard Space Flight Center. Sweden, as noted above, has specified its desire to nominate two scientists for such training, beginning in 1961. Argentina has expressed its desire to send a single scientist to NASA beginning in the late fall of 1960. Other nominations may be considered by Japan, Italy, France, West Germany, Belgium, and Norway.

Information is being solicited regarding identification of the trainees, their backgrounds, fields of interest and number. When such information has been developed, it will be determined whether

training should be on an assembled basis, be confined to NASA laboratories or should, in addition, utilize university and industry facilities.

NASA has participated in a very broad program of visitation exchanges with foreign scientists and engineers. In 1959, some 500 visitors from 25 countries inspected NASA facilities and discussed technical subjects. Over 100 NASA staff members went abroad for parallel purposes, including advisory consultation.

(Item 9 of the inquiry requested information on any contracts with foreign nations and organizations and the amount of the cost by projects.)

Item 9: A table of NASA contracts and grants overseas is appended as Attachment M. A listing of additional contracts implementing existing international programs at the construction or procurement level is now being prepared and will be provided as a supplement to this report as soon as it is ready.

(Items 10 and 11 of the inquiry requested information on cooperation and contacts by NASA with international organizations.)

Item 10 and 11: Cooperation by NASA with international agencies is summarized as follows:

i. United Nations: On February 5, 1959, the Secretary of State named NASA Deputy Administrator Dr. Hugh L. Dryden as an alternate U. S. Representative to the United Nations Ad Hoc Committee on the Peaceful Uses of Outer Space, established the previous year. This committee began discussions early in May 1959 and reported to the General Assembly on July 14, in Document A-4141. With the formal establishment of the UN Committee on the Peaceful Uses of Outer Space, Dr. Dryden was appointed as Technical Advisor to the U. S. delegate of that committee.

In general, NASA support for the U.S. interest in this United Nations activity is effected through the Department of State, the cognizant agency. NASA is consulted by the Department in communications with the US UN delegation on the subject of the Outer Space Committee and very satisfactory liaison exists. Thus, NASA was consulted by the Department on the occasion of the Soviet proposal for a UN-sponsored space conference. NASA advised that the U.S., in accepting the proposal, urge that such a space conference extend beyond the limits of the usual scientific symposium to embrace the elements of space technology.



NASA has acted promptly to support the UN, in the event a space conference is scheduled, by establishing an office to organize the US participation in such a conference.

ii. NATO: Extensive support of NATO is provided by participation of key NASA officials, as individuals, in the activities of AGARD, the Advisory Group on Aeronautical Research and Development, an agency of NATO. Dr. Dryden is one of the two U. S. delegates to AGARD. Other NASA officials are members of the six panels of AGARD and technical contributions are made on a broad scale.

iii. World Meteorological Organization: NASA has no direct relationship with the World Meteorological Organization (WMO). However, items of WMO interest in the on-going NASA meteorological satellite program have been conveyed to NASA through the U. S. Weather Bureau. All requests by the Bureau for authorization to provide the WMO with data on Tiros I, for example, have been honored. It is anticipated that current planning for enlisting foreign scientists' participation in coordinated meteorological observations related to Tiros II and future meteorological satellites may require recourse, at an appropriate time, to the World Meteorological Organization.

iv. COSPAR: The Committee on Space Research of the International Council of Scientific Unions (COSPAR) is the successor of the World Committee for the International Geophysical Year in the space research area. NASA has on several occasions made clear its intention to continue to support that activity through the free exchange of information on satellite launchings and observations as well as on the results of satellite research itself. Implementing these assurances, NASA has taken over the support of the U. S. elements of the SPACEWARN network (formerly AGIWARN) which was established during the IGY to provide satellite launching and orbit information as well as exchange notices of solar phenomena. In support of the conventions for exchange of space research data, NASA has agreed to forward such data to the World Data Centers. To facilitate this exchange, NASA has developed a rocket flight summary report form which has been adopted under the aegis of the National Academy of Sciences for use by the United States in reporting to the World Data Centers.

NASA relationships with COSPAR are not, of course, direct, but are carried out through the National Academy of Sciences which is the adhering body in the United States. Coordination for the purposes of this relationship is assured through liaison membership by the Director,

Office of International Programs, in the International Relations Committee of the Space Science Board (National Academy of Sciences). Dr. Homer E. Newell, Deputy Director of the Office of Space Flight Programs, is also a member of this committee. These and other NASA officials have served repeatedly as advisors to the National Academy's delegate to COSPAR and, as individuals, have participated extensively in the organization of COSPAR working groups and the documentation governing the scope and operation of those working groups. In addition, NASA officials are members of the working groups. Considerable additional support is given the activities of COSPAR. For example, at the reunion of COSPAR in Nice in January 1960, 17 NASA officials participated in the First International Space Science Symposium conducted at that time.

v. International Telecommunications Union: The International Telecommunications Union (ITU) was formulated to maintain and extend international cooperation for the improvement and national use of telecommunication of all kinds, and toward this end, to effect apportionment of the radio frequency spectrum in an internationally acceptable Table of Frequency Allocations.

NASA was invited to send a representative to the 1959 ITU Conference, held in Geneva, Switzerland. NASA's delegate gave the United States the only "space" representative at the Conference. The U. S. delegation as a whole secured 13 international frequency bands for space research purposes. In addition, the U. S. recommendation for an Extraordinary Administrative Conference in 1963 was accepted. This Conference is to consider further allocations for space use including frequency areas for operational satellites, i.e., satellites operated for meteorological, communications, and navigation purposes.

Consultative to the ITU is the International Radio Consultive Committee (CCIR). The United States National CCIR Organization assists and advises the Secretary of State regarding matters pertaining to U. S. participation in the International CCIR. Study groups are formed, to examine the technical phases of international allocations problems, and recommendations are made to the International CCIR and in turn to the ITU. NASA is well represented in the US CCIR, especially in Study Group IV, "Space Telecommunications". NASA holds the group chairmanship, and heads some of the subcommittees. Likewise, NASA is well represented throughout the committee as a whole.

vi. International Civil Aviation Organization: NASA has no direct dealings with the ICAO. NASA does, however, provide limited assistance to the FAA and the CAB on ICAO business by loaning technical personnel to act as staff advisers to these agencies at international meetings.



(Item 12 of the inquiry requested an evaluation of participation by USSR and Soviet Bloc nations in international scientific cooperation.)

Item 12: Participation on the part of the Soviet Bloc in international scientific activities related to space began with the International Geophysical Year. During that period, the Soviet Union was the only member of the Bloc which played a significant role. Two aspects of Soviet activity should be mentioned in this connection. First, with regard to organizational participation, the Soviet Union repeatedly demonstrated its desire to minimize the obligations imposed upon participating countries for the exchange of data. The final resolutions of the CSAGI (Comité Spécial de l'Annee Géophysique Internationale) Assembly in Moscow in August 1958, carried footnotes indicating Soviet views since they could not be fully reconciled with those of the other participating nations. Second, with regard to the actual exchange of scientific results, the consensus is that the Soviet Union did in fact provide results of its space research and exploration in considerable volume. However, this material is differentiated from that provided by the United States in that the Soviet Union's input was not generally accompanied by such supporting data as would permit independent evaluation.

In the period since the IGY, the current COSPAR period, Soviet representatives have devoted themselves to gaining a larger role for the Communist bloc in the activity of this and other organizations. Thus, the progress of COSPAR was obstructed until agreement was reached assuring the Soviet Union of one of the two Vice-Presidencies and two additional seats (for Czechoslovakia and Poland) on the Executive Council. This pattern was then repeated in the continuing deliberations over the organization in the United Nations of the Outer Space Committee and its sub-committees. Most recently, it is reported unofficially that Soviet representatives are seeking to modify the Constitution of the International Astronautical Federation (IAF) in order to assure that the USSR and the US share the presidency and vice-presidency each year and obtain what amounts to a veto power over actions of the Federation.

Other signs of the interest of the Soviet Union in playing a larger role in international activities related to space may be found in the fact that Sedov, President of the Soviet Interplanetary and Space Commission, was elected last year (1959) to the presidency of the IAF and is reported unofficially to desire re-election. For the first time, a Russian scientist, V. V. Belousov, was elected to the presidency of the IUGG in 1960. (While the International Union of Geodesy and Geophysics



is not centrally devoted to space research and exploration, it exercises more influence than any other international scientific union on ICSU activities in this field. Like other unions, it is organizing a committee to maintain liaison with COSPAR, and many of its activities overlap with those of COSPAR.)

In sum, while Soviet Bloc activity in international scientific circles devoted to space research and exploration is still rather narrow and restricted in terms of the numbers of personnel participating, certain key positions have been achieved and a new order of interest is evident. Together with this belated desire to participate, there is apparent also a necessity to provide for a political framework believed by the Soviets to be required to protect their "status" in the field. Thus, a sharp issue has been presented to the international scientific community-- whether to maintain the traditional disregard of overt political factors or to provide systematically and organizationally for them.

Direct Soviet participation in international scientific symposia in the space area still remains restricted. In contrast to the U. S. delegation of 65 to the COSPAR reunion in Nice, the Soviets sent four persons, only two of whom presented papers. At the Second International Space Science Symposium of the Japanese Rocket Society in Tokyo, May 1960, no Soviet scientists participated. There has been no Soviet activity in the world at large comparable to the international program now being pursued by NASA. A French spokesman at the COSPAR symposium in Nice did ask a Soviet representative whether foreign experiments could be accommodated in Soviet rocket launchings. The reply suggested that a specific proposal be made before an answer could be given. To our knowledge, no such proposal has been made or was intended. The general belief in the West is that Soviet scientists could not provide the close and intimate coordination required between scientists and technicians for the preparation of space research experimentation compatible with rocket systems. The alternative, an iron curtain between the experimenter and the systems engineers, would not be regarded as adequate by the scientific community.



August 9, 1960/Rev. 1

INTERNATIONAL COOPERATIVE SCIENTIFIC PROJECTS  
(ROCKETS AND SATELLITES)

<u>Cooperating Country and Agency - Project</u>	<u>Type of Agreement</u>	<u>(a) - Arrangements (b) - Status</u>
<u>Australia</u> - Department of Supply- Mapping of ultraviolet in the southern hemisphere sky by means of rocket soundings.	Formal	(a) - NASA to provide British Sky- lark rockets, for which Woomera range fitted, and payloads instru- mentation. Australia to launch rockets and obtain data.  (b) - Under negotiation; project scheduled for 1961.
<u>Canada</u> - Defense Research Board- Preparation of one satellite with its payload, consisting of a sweep frequency ionospheric sounder, by Canada for launching by NASA in 1962.	Informal- exchange of letters be- tween DRB and NASA.	(a) - Each agency to fund its own portions of the project; coordi- nation through a joint working group. Tripartite responsibility for ground observation phases shared among U.S., Canada, and U.K.  (b) - Project progressing; several meetings of joint working group already held; supporting investi- gation of background galactic noise already conducted.
<u>Italy</u> - Italian National Space Commission - Joint sounding rocket program to contribute to synoptic investigation of upper atmosphere winds, temperature, density, and composition.	Informal memorandum of under- standing be- tween Italian National Research Council and NASA.	(a) - Italy to provide six Nike-Asp rockets by purchase, ground instru- mentation, launching range in Sardinia and acquisition and analysis of data. NASA to provide sodium payloads, rocket launchers, and technical guidance.  (b) - All materials purchased, and under preparation for transport to Sardinia by first week of September, 1960. Italian project team visited NASA for observation of similar launchings in May 1960. Technicians from NASA and commercial contractors for rocket vehicles and payloads about to depart for Sardinia.



Cooperating Country and Agency - Project

Type of Agreement

- (a) - Arrangements  
(b) - Status

United Kingdom - The British National Committee on Space Research chaired by Sir Harrie Massey - Preparation of three satellite payload experiments, by U.K. university groups; shells, telemetry, and launching by NASA.

Formal - exchange of government-to-government notes.

- (a) - The two cooperating agencies assume responsibility for, and fund, their portions of the project. Coordination is achieved through a joint working group.
- (b) - Formal agreement under negotiation. Agreement reached on experiments for first satellite (solar radiation, electron temperature and density, cosmic radiation). Joint working group established and has met three times. Work going forward. First launching 1961-62.

NASA OVERSEAS TRACKING AND GROUND INSTRUMENTATION FACILITIES

<u>Location</u>	<u>Type of Facility</u>	<u>Status</u>	<u>Operation</u>	<u>Capital Cost (1)</u>	<u>Annual Oper. Cost (1)</u>	<u>Foreign Contrib. to Cost</u>
Antigua	Minitrack	Operating	U. S.		\$339,000	
Argentina Villa Dolores	Baker-Nunn Camera (SAO)	Operating	U. S.	\$125,000	\$100,000	X (4)
{ Australia- Woomera	Minitrack	Operating	Foreign	\$500,000	\$89,000	X
{ Australia- Woomera	Baker-Nunn Camera (SAO)	Operating	Foreign	\$125,000	\$100,000	X
* { Australia- Woomera	85' Antenna	Construction	Foreign	\$4,000,000	\$290,000	X
{ Australia- Woomera	Project Mercury	Construction	Foreign (8)	\$1,250,000	-- (2)	X
{ Australia- Perth	Project Mercury	Construction	Foreign (8)	\$1,800,000	-- (2)	X
* Bermuda	Project Mercury	Construction (In negoti- ation)	U. S.	\$6,200,000	-- (2)	
* Canada - St. Johns, Newf.	Minitrack	Planned (In negoti- ation)	Foreign	\$500,000	\$85,000	X
* Canton Island	Project Mercury	Construction (In negoti- ation)	U. S.	\$1,750,000	-- (2)	
{ Chile- Anto- fagasto	Minitrack	Operating	Joint	\$500,000	\$320,000	X (4)
* { Chile- Santiago	Minitrack	Operating	Joint	\$500,000	\$359,000	X (4)
Curacao, N.W.I.	Baker-Nunn Camera (SAO)	Operating	U. S.	\$123,000	\$100,000	X (4)



<u>Location</u>	<u>Type of Facility</u>	<u>Status</u>	<u>Operation</u>	<u>Capital Cost (1)</u>	<u>Annual Oper. Cost (1)</u>	<u>Foreign Contrib. to Cost</u>
* Ecuador- Quito	Minitrack	Operating	Joint	\$500,000	\$415,000	X
Germany- Heidelberg	Telemetry	Operating	Foreign	\$20,000	\$25,200	(5)
India- Naini Tal	Baker-Nunn Camera (SAO)	Operating	Foreign	\$123,000	\$100,000	X
Iran- Shiraz	Baker-Nunn Camera (SAO)	Operating	Joint	\$123,000	\$100,000	X (4)
Japan- Mitaka	Baker-Nunn Camera (SAO)	Operating	Foreign	\$123,000	\$100,000	X
Japan- Tokyo	Telemetry Receiving	Operating	Foreign	\$20,000	\$25,300	(5)
* Mexico- Guaymas	Project Mercury	Construction	U. S.	\$2,200,000	-- (2)	X (4)
* Nigeria- Kano	Project Mercury	Construction (In negoti- ation)	U. S.	\$2,200,000	-- (2)	
* Peru- Arequipa	Baker-Nunn Camera (SAO)	Operating	U. S.	\$123,000	\$100,000	X (4)
* Peru- Lima	Minitrack	Operating	Joint	\$500,000	\$386,000	X (4)
* S. Africa- Vic. of Johannesburg	85' Antenna	Planned (In negoti- ation)	Foreign	\$4,000,000	\$500,000	X
* S. Africa- Vic. of Johannesburg	Minitrack	Operating (In negoti- ation)	Foreign	\$500,000	\$89,000	X
S. Africa- Olifants- fontein	Baker-Nunn Camera (SAO)	Operating (In negoti- ation)	Joint	\$123,000	\$100,000	X

<u>Location</u>	<u>Type of Facility</u>	<u>Status</u>	<u>Operation</u>	<u>Capital Cost (1)</u>	<u>Annual Oper. Cost (1)</u>	<u>Foreign Contrib. to Cost</u>
Spain-Cadiz	Baker-Nunn Camera (SAO)	Operating	U. S.	\$123,000	\$100,000	X (4)
* Spain-Canary Islands	Project Mercury	Construction	U. S.	\$2,750,000	-- (2)	X (4)
UK-Jodrell Bank	Radio Telescope	Operating	Foreign	-- (7)	\$179,000	-- (6)
* UK-Winkfield, Slough	Minitrack	Construction (In negotiation)	Foreign	\$500,000	\$234,000(6)	X
* Zanzibar	Project Mercury	Construction (In negotiation)	U. S.	\$2,200,000	-- (2)	

NOTE: All Baker-Nunn Camera facilities are operated under grant through the Smithsonian Astrophysical Observatory.

- (1) All cost figures are rounded approximations.
- (2) \$25,000,000 has been allocated as one year's operating cost for the 16 Project Mercury stations. The operating costs of the individual stations will vary and it is not now practicable to give estimates of these costs.
- (3) Bracketed items refer to existing facilities of the cooperating countries.
- (4) Foreign contribution primarily land/or roads.
- (5) NASA grant.
- (6) NASA contract.
- (7) University of Manchester equipment with small U.S. supplementation.
- (8) Supplemented by NASA technicians during specific exercises.

\* FORMAL AGREEMENTS.

