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Folder Title:

Bilateral Cooperative Agreement with the former USSR [Union of Soviet Socialist Republics]

Staff Office-Individual:

Science Technology Policy-Gibbons, John

Original OA/ID Number:

CF 100

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BILATERAL COOPERATIVE AGREEMENTS WITH THE FORMER USSR

1. AGRICULTURE

TERM: 6/19/93

**EXECUTIVE AGENTS: USDA
 COMMISSION ON FOOD AND FOOD PROCUREMENT**

2. ARTIFICIAL HEART

TERM: 6/28/92

**EXECUTIVE AGENTS: HHS
 MINISTRY OF HEALTH, ALL UNION CENTER FOR
 CARDIOLOGY RESEARCH**

3. BASIC SCIENTIFIC RESEARCH

TERM: 1/08/94

**EXECUTIVE AGENTS: OSTP
 MINSCI**

SUBSIDIARY MOU PARTNERS:

**NSF-RUSSIAN ACADEMY OF SCIENCES
NIST-RUSSIAN ACADEMY OF SCIENCES
USGS-RUSSIAN COMMITTEE ON GEOLOGY
USGS-RUSSIAN GEODESY AND CARTOGRAPHY
SERVICE**

4. ENVIRONMENTAL PROTECTION

TERM: 5/23/97

**EXECUTIVE AGENTS: EPA
 MINISTRY OF ENVIRONMENT**

5. FUELS AND ENERGY AGREEMENT

TERM: 6/17/97

**EXECUTIVE AGENTS: DOE
 MINISTRY OF FUELS AND ENERGY**

6. OCEAN STUDIES

TERM: 5/31/95

EXECUTIVE AGENTS: NOAA

Record of the Meeting
of U.S.-Russian Discussions on Preparations
for the Next Session of the U.S.-Russian
Joint Commission under the Basic Sciences
Agreement and the Meeting to Discuss New
Directions for U.S.-Russian Science and
Technology Cooperation

U.S.-Russian discussions on preparations for the next session of the US-Russian Joint Commission under the Basic Sciences Agreement and the Meeting to discuss new directions for U.S.-Russian science and technology cooperation, in accordance with the charge given by the Presidents of the U.S. and Russia in the June 17, 1992, Joint Statement took place in Moscow October 7, 1992.

The Russian Federation delegation was headed by Deputy Minister of Science Z. A. Yakobashvili.

The U.S. delegation was headed by OSTP Associate Director J. Thomas Ratchford.

The sides discussed issues related to new tasks and conditions of current U.S.-Russian science and technology cooperation and noted a number of problems requiring special attention of the sides.

In particular, it was noted that at the December meeting the two sides will discuss new possibilities and areas for developing U.S.-Russian science and technology cooperation in light of the overall development of relations between the two countries. These new possibilities and areas will require agreement and specification by the sides.

The U.S. and Russian delegations in particular agreed on draft preliminary agendas for the next session of the Joint Commission under the Basic Sciences Agreement and the Meeting to discuss new directions for U.S.-Russian science and technology cooperation and agreed to formulate the details of the agendas during preparations for these meetings.

The sides agreed to exchange documents in three specific areas in preparation for the meetings. They include:

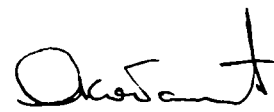
(1) Possible new or expanded areas of science and technology cooperation;

(2) Options for new or revised arrangements for cooperation; and

(3) A discussion of factors that affect science and technology cooperation between the U.S. and Russia.

The sides also agreed that the above meetings will take place in Washington December 8 & 9 , 1992.


J. Thomas Ratchford
Associate Director, U.S. Office
of Science and Technology
Policy


Z. A. Yakobashvili
Deputy Minister of Science
Higher Education and
Technology Policy of the
Russian Federation

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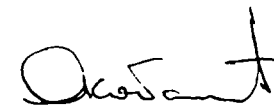
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Higher Education and
Technology Policy of the
Russian Federation

Clinton Presidential Records

Foreign Language Marker

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Foreign Language Marker

Collection: Clinton Presidential Records

Subgroup: Office of Science and Technology Policy

Series: Gibbons, John

Subseries:

Document Title Record of Meeting on Preparation for Next Session of
U.S.-Russian Joint Commission

Language: Russian

Folder Title Bilateral Cooperative Agreement with the former USSR
[Union of Soviet Socialist Republics]

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МИНИСТЕРСТВО НАУКИ, ВЫСШЕЙ ШКОЛЫ
И ТЕХНИЧЕСКОЙ ПОЛИТИКИ РОССИЙСКОЙ
ФЕДЕРАЦИИ

М И Н И С Т Р

103905, Москва, ул. Тверская, 11
Тел. 228-11-92 Телетайп 417531 „Триод“

от _____ № _____

на № _____

MINISTRY FOR SCIENCE,
HIGHER EDUCATION AND
TECHNOLOGY POLICY OF
THE RUSSIAN FEDERATION

11 TVERSKAYA STREET,
MOSCOW, RUSSIAN FEDERATION
FAX: (095)230 2660
TELEX: 411241 SU
TELEX: 411354 SU
TELEPHONE: (095) 228-4774

February 25, 1993

DEAR MR.GIBBONS,

PLEASE ACCEPT MY CONGRATULATIONS WITH YOUR NEW
APPOINTMENT ON THE POST OF THE SCIENCE ADVISER TO THE PRESIDENT
OF THE UNITED STATES OF AMERICA.

TAKING THIS OPPORTUNITY I WOULD LIKE TO ASSURE YOU THAT
WE ARE FOR FURTHER EXPANSION OF FRUITFUL COOPERATION BETWEEN
OUR COUNTRIES IN THE FIELD OF SCIENCE AND TECHNOLOGY THROUGH
THE OFFICE OF SCIENCE AND TECHNOLOGY POLICY OF THE EXECUTIVE
OFFICE OF THE PRESIDENT AND THROUGH OTHER GOVERNMENTAL AND NON-
GOVERNMENTAL ORGANIZATIONS INTERESTED IN COOPERATION WITH
RUSSIAN FEDERATION IN THIS IMPORTANT FIELD.

WE WOULD LIKE ALSO TO CONTINUE DIALOGUE WHICH WE HAVE
BEGUN SUCCESSFULLY WITH YOUR PREDECESSOR, DR.D.ALLAN BROMLEY,
PARTICULARLY, ON THE BASIS OF THE JOINT STATEMENT ON SCIENCE
AND TECHNOLOGY OF THE PRESIDENTS OF THE UNITED STATES AND THE
RUSSIAN FEDERATION OF JUNE 17, 1992 AND OTHER AGREEMENTS IN
THIS FIELD.

LOOKING FORWARD TO MEETING WITH YOU IN THE NEAR FUTURE,

SINCERELY YOURS,

B.G.SALTYKOV

MINISTER FOR SCIENCE, HIGHER EDUCATION AND
TECHNOLOGY POLICY OF THE RUSSIAN FEDERATION

MR. JOHN GIBBONS
SCIENCE ADVISER
TO THE PRESIDENT OF
THE UNITED STATES OF AMERICA
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON DC 20506
U.S.A.
FAX NUMBER : (202) 395 - 3261

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January 26, 1993

John
Jo Ann, Pls
- create file
- await results

Dear Colleague:

Enclosed for your information are the background papers, agenda, and list of participants for the conference, "Preserving Science in the Former Soviet Union," which will take place on February 8-9 at the National Academy of Sciences. As you know, this effort is co-sponsored by NAS, the American Association for the Advancement of Science, the International Institute of George Mason University, and the International Science Foundation for the Former Soviet Union.

The conference is organized around three working group sessions, each based on one of the three background papers. The purpose is to produce an Action Plan that can be used by individual organizations to chart their involvement in this effort. A Draft Action Plan, intended as a framework for discussion, will be made available to participants at the beginning of the conference on February 9 and will be presented in the plenary session that morning.

We are looking forward to seeing you at what should be a productive and valuable conference.

Sincerely,

Gary R. Waxmonsky

Gary R. Waxmonsky, Ph.D.
Steering Committee Member

Enclosures

PRESERVING SCIENCE IN THE FORMER SOVIET UNION

National Academy of Sciences
Lecture Room

February 9, 1993

AGENDA

8:00 a.m.

Continental Breakfast

8:30 a.m.

Opening Plenary Session

Welcome
Frank Press
President
National Academy of Sciences

Remarks
George Soros
Founder
International Science Foundation for the FSU

Remarks
Alex Goldfarb
Executive Director
International Science Foundation for the FSU

Presentations

Moderator
John H. Moore
George Mason University

Background Papers

"Direct Aid to Scientists"
Irving Lerch
American Physical Society

"Infrastructure Support"
Gerson Sher
National Science Foundation

"Saving The Scientific Heritage"
Robert Hoffmann
Smithsonian Institute

Draft Action Plan Overview
Richard W. Getzinger
American Association for the Advancement of Science

Charge to the Working Groups
John H. Moore

10:00 a.m. Break

10:15 a.m. Working Group Session I

Working Group I: Direct Aid to Scientists
Chair: Irving Lerch

Working Group II: Infrastructure
Chair: Gerson Sher

Working Group III: Scientific Heritage
Chair: Robert Hoffmann

12:00 noon Lunch -- Refectory

Discussions to continue over lunch

1:00 p.m. Working Group Session II

3:00 p.m. Break

4:00 p.m. Closing Plenary Session
Moderator: John H. Moore

Reports of Working Groups

Report on Revised Action Plan
Richard W. Getzinger

General Discussion

5:30 p.m. Adjournment

PRESERVING SCIENCE IN THE FORMER SOVIET UNION

February 8-9, 1993

List of Participants

Dr. William G. Aldridge*

National Science Teachers Association

Dr. Michael Artin*

Massachusetts Institute of Technology

Dr. John Bahcall

Institute for Advanced Studies

Dr. Harley Balzer*

Georgetown University

Mr. Andrey V. Baranov

Representative of Tajikistan

Dr. Craig Black

Los Angeles Natural History Museum

Dr. William A. Blanpied*

National Science Foundation

Mr. Jeffrey Boutwell*

American Academy of Arts and Sciences

Dr. D. Allan Bromley

Executive Office of the President

Dr. Felix E. Browder*

Rutgers University

Dr. John T. Bruer*

James S. McDonnell Foundation

Ms. Joan Buchanan*

American Psychological Association

Dr. Merrill Buckley

Ms. Sandra Burns*
American Association for the Advancement of Science

Mr. Malcolm Butler
Agency for International Development

Ms. Cathy Campbell*
U.S. Department of State

Mr. Norval Carey
General Atomics

Dr. Ashton Carter
Harvard University

Dr. Peter Carter*
British Cabinet Office

Dr. Charles Chambers
American Institute of Biological Sciences

Dr. Purnell W. Choppin*
Howard Hughes Medical Institute

Dr. E. William Colglazier*
National Research Council

Mr. Richard Combs
U.S Senate Committee on Armed Services

Mr. Carl J. Dahlman
The World Bank

Dr. Khadisha Dairova*
Embassy of Kazakhstan

Dr. John A. Daly*
Agency for International Development

Dr. James Decker
U.S. Department of Energy

Dr. Gerald P. Dinneen
National Academy of Engineering

Dr. Paul Doty
Harvard University

Dr. Edward Dowdy*
U.S. Department of State

Dr. William Duax*
American Crystallographic Society

Dr. Irving Engelson*
Institute of Electrical and Electronics Engineers, Inc.

Mr. Robert Etkins*
National Oceanic and Atmospheric Administration

Mr. Gilbert Fayl*
Delegation of the Commission of European Communities

Dr. Nina Fedoroff*
Carnegie Institution of Washington

Dr. Herman Feshbach*
Massachusetts Institute of Technology

Ms. Margaret Finerelli*
National Aeronautics and Space Administration

Mr. Shepard Forman
The Ford Foundation

Dr. Martin Frank*
American Physiological Society

Dr. William Freeman
U.S. Environmental Protection Agency

Dr. George Gamota
University of Michigan

Dr. Terry Garrett*
The Royal Society

Dr. Paul Gassman*
University of Minnesota

Dr. Richard W. Getzinger*
American Association for the Advancement of Science

Dr. John Gibbons
Office of Technology Assessment

Mr. Timothy Goggins*
American Mathematical Society

Mr. Alex Goldfarb*
International Science Foundation for the Former Soviet Union

Dr. Steven Goldstein*
National Science Foundation

Dr. Kenneth F. Gordon*
National Institute of Standards and Technology

Dr. Loren Graham
Massachusetts Institute of Technology

Dr. Richard Grant*
Boeing Defense & Space Group

Dr. Norman Hackerman*
The Robert A. Welch Foundation

Mr. Robert Hall
Sun Microsystems

Mr. Reno Harnish*
U.S. Department of State

Dr. L. Louis Hegedus*
W.R. Grace & Co.

Dr. Ernest Henley*
University of Washington

Dr. Peter Henry
U.S. Department of Health and Human Services

Mr. Andrzej Herczynski*
American Institute of Physics

Dr. Maurice Hilleman
Merck Institute for Therapeutic Research

Dr. Robert Hoffman*
Smithsonian Institution

Mr. Jefferson S. Hofgard
National Aeronautics and Space Administration

Mr. Yukon Huang
The World Bank

Dr. John L. Ingraham
University of California, Davis

Dr. Natalya Ivanova
Georgetown University

Mr. Harold Jaffe
U.S. Department of Energy

Mr. Ernest G. Jaworski
Monsanto Company

Dr. Stanley R. Johnson
Iowa State University

Mr. Steven Kohl*
U.S. Fish and Wildlife Service

Dr. Donald N. Langenberg*
University of Maryland System

Mr. Hiram Larew*
Agency for International Development

Mr. Charles F. Larson*
Industrial Research Institute

Embassy of Latvia

Dr. Joshua Lederberg*
Rockefeller University

Mrs. Elisabeth Legrand
Ministere de Recherche et de la Technologie

Dr. Irving Lerch*
American Physical Society

Ms. Marge Hollin*
Ecological Society of America

Mr. Alan MacDonald*
American Academy of Arts and Sciences

Dr. Robert MacPherson*
Massachusetts Institute of Technology

Mrs. Lena Madsen
Danish Mission

Dr. John Malin
American Chemical Society

Mr. Serguei N. Martynov
Embassy of Belarus

Dr. Luigi Massimo*
Commission of the European Communities

Dr. Daniel Matuszewski*
International Research and Exchange Board

Dr. George Metakides*
Commission of the European Communities

Dr. John H. Moore*
George Mason University

Dr. Lev Mukhin
Embassy of the Russian Federation

Dr. Terry Myers
Agency for International Development

Mr. Garnik Nanagoulia
Embassy of Armenia

Dr. Michael Nelson
U.S. Senate Subcommittee on Science, Technology, and Space

Mr. John O'Neil
Office of Science and Technology Policy

Ambassador Roza Otunbayeva*
Embassy of Kyrgyzstan

Dr. C. Kumar N. Patel
AT&T Bell Laboratories

Dr. Joseph G. Perpich*
Howard Hughes Medical Institute

Capt. Edmond Pope*
Office of Naval Research

Dr. Frank Press*
National Academy of Sciences

Mr. Michael Quear*
U.S. House Committee on Science, Space and Technology

Dr. Peter Raven
Missouri Botanical Garden

Mr. Andrew Reynolds*
U.S. Department of State

Dr. Roald Sagdeev
University of Maryland

Mr. Robert A. Schadler*
U.S. Department of State

Dr. Doris Schenk*
Deutsche Forschungsgemeinschaft

Dr. Gerson Sher*
National Science Foundation

Mr. Atsuo Shibota
Embassy of Japan

Dr. Douglas Siegel-Causey*
University of Kansas

Dr. Brian Silver*
University of Michigan

Dr. Howard Silver
Consortium of Social Science Associations

Mr. David W. Simpson
The IRIS Consortium

Dr. I.M. Singer*
Massachusetts Institute of Technology

Dr. Benjamin B. Snavely
National Science Foundation

Mr. George Soros*
The Soros Foundations

Dr. Valery N. Soyfer*
George Mason University

Ms. Alexandra Stepanian
National Institutes of Health

Dr. Paul Stern*
National Research Council

Dr. Guy Stever*
Carnegie Commission on Science, Technology and Government

Mr. Michael Teitelbaum*
Alfred P. Sloan Foundation

Dr. John Thomas
Defense Technology Security Administration

Ms. Bonnie Thompson
National Science Foundation

Mr. Harry Tollerton*
American Association of Engineering Societies

Ms. Barbara Turner
Agency for International Development

Ms. Diana Vidutis
Embassy of Lithuania

Ms. Tania Vitvitsky*
Sabre Foundation

Mr. Yaroslav Voitko
Embassy of Ukraine

Dr. Michael Voloshin
University of Minnesota

Mr. Peter Walsh*
Kiser Research Inc.

Dr. Gary Waxmonsky*
National Research Council

Ms. Christine Wegman*
U.S. House Subcommittee on Science, Research and Technology

Dr. Albert R.C. Westwood*
Martin Marietta Corporation

Dr. William Wing*
Agency for International Development

Dr. Stan Woosley*
University of California, Santa Cruz

Dr. Salvatore Zecchini*
OECD - Center for Cooperation with
European Economies in Transition

*Confirmed attendees

INFRASTRUCTURAL ISSUES

Background Paper

by

Gerson S. Sher¹
National Science Foundation

prepared for

PRESERVING SCIENCE IN THE FORMER SOVIET UNION

A Conference

February 8 - 9, 1993
National Academy of Sciences

I. INTRODUCTION

Individual scientific and engineering researchers are of course the single most important asset of any nation's research enterprise. But these researchers work within a system of supporting relationships and facilities - the infrastructure - that defines in many ways the limits of their productive capabilities. In a broad sense, the scientific infrastructure consists of the buildings in which scientists work, the means by which they acquire and share information, the systems that produce new scientists, and the means by which the research community coordinates its efforts with other sectors of society. The extent to which these factors are important may vary from field to field; experimental equipment, for example, is generally less important for mathematicians than for engineers. But there are many needs that are common to the health of all fields, such as the need for free and efficient scientific communication. When these support systems fail, not only does science suffer but the most able and enterprising researchers find it increasingly compelling to move their work to other, more supportive environments.

¹The author is indebted to Dr. Steven Goldstein, Ms. Sandra Burns, and Dr. Kenneth Gordon for their important contributions to this paper. Several sections of a draft paper on Direct Aid to Scientists by Irving Lerch have also been incorporated. The views expressed in this paper are those of the author and do not necessarily represent those of the National Science Foundation or the U.S. Government.

The infrastructural crisis of science in the former Soviet Union (FSU) is of vast proportions, the catastrophic product of a combination of seventy years of enforced isolation, a legacy of centralized management and political control, and more recently political upheaval and economic chaos. Buildings are falling into disrepair, laboratory equipment is not just obsolescent but archaic, basic supplies and materials are virtually nonexistent, computing is for the most part primitive and spotty, telephone lines are unreliable. Access to any research resource requiring hard currency - supplies, publications, international telecommunications, journals - is beyond reach to all but the most privileged or those fortunate enough to have good contacts in the West. It is true that these commodities had for decades been severely restricted in the Soviet scientific community and rationed according to a system of privilege and political influence, rather than scientific merit. However at present the shortage of these goods is particularly acute because foreign currency, which was held by at least some elite institutions under the old system such as the military and the Academy of Sciences, has all but vanished. In no other area of scientific life is the evidence of the ravages of the new "golden curtain" more evident than here.

The dimensions of the problem in the FSU are indeed so enormous that no assistance effort can possibly "solve" it. It may legitimately be questioned whether it is the proper role of foreign assistance efforts to make major resource allocation decisions in lieu of the domestic capability to do so in the host country, including support for large-scale facilities and projects. The financial scope of the problem alone is overwhelming and beyond the capabilities of any potential donor. But even if available funding were unlimited, the collapse of the old structures for managing resource allocation, and the urgent need to develop more effective frameworks and systems in their place in the midst of a crisis situation, will limit the long-term effectiveness of any assistance effort unless it simultaneously attempts to address the financial needs *as well as* the system in which they exist.

At the same time, many of the infrastructural needs mentioned above are so basic and inexpensive, by Western standards, that even very small amounts of money strategically placed can provide tremendous leverage. Some needs are so critical to the functioning of a modern scientific community that making even a small dent in them may have a disproportionately large impact. Additionally, while some needs can easily be met at the level of support to individual investigators, others shared resources - such as telecommunication networks, journals, etc. - must be dealt with at a more general level if their use is to be reasonably efficient. Not all the problems are financial - in some cases, for example, policy issues such as export controls are involved.

Finally, it should be stressed that addressing this category of needs is not of importance only to the FSU scientific community. The world scientific community will also be a major beneficiary because the abilities of FSU scientists and engineers to communicate their findings, to be informed about developments abroad, to travel, and to identify new talent, are essential to ending the isolation of the FSU from the rest of the world, and that of the world from the extraordinary richness of FSU science and engineering.

This discussion paper focuses on four major issue areas: electronic communications, scientific literature, travel to international scientific meetings, and linkages between the research community and other sectors of society (education and industry). Each of these issues relates to the broad theme of *scientific communication*, which is an essential element of the scientific environment that has a profound impact on the very ability to function as part of a larger scientific community. It was indeed the extremely stifling quality of scientific communication that characterized the Soviet scientific establishment in the past.

Today, the scientists of the FSU are in danger of falling into even further isolation from world science than in the past because of the legacy of control, economic disruption, the collapse of internal library and other information systems, and rapid technological advances in international communications. Yet these same advances may now make it possible for many FSU scientists who might otherwise seriously contemplate emigration to consider, instead, a situation in which living in the FSU and working as a member of the world scientific community are not mutually incompatible concepts. It is in the interest not only of FSU science but also the world scientific community to ensure as vigorous a flow of information as possible in both directions and that the isolation suffered by Soviet science in the past cannot be reimposed.

II. ELECTRONIC COMMUNICATIONS

A. Background

Computer networking with access to the Global Internet, with over 1.1 million attached computers in about 50 countries, is no longer a frill but an essential need for research and higher education. Interactive computer networking permits the user to do the same things on a computer located half way around the world as could be done on a computer in the next room, providing that there is enough transmission capacity in the connecting networks. This includes exchanges of electronic mail, retrieval of information on demand from data bases, exchanges of documents and other files, remote execution of programs, multimedia conferencing among colleagues in several locations, etc. It also permits remote use of specialized computing and experimental resources, such as computers, telescopes and particle accelerators. Computer networking is thus a basic enabler of research, education, development and business activities. It is a "force multiplier" because it can enhance the effectiveness of users many-fold.

The gap between networking "haves" and "have-nots" is growing as the Internet continues to grow exponentially. Those who have access are enabled to do more and more with the networks, leaving those who do not have access further behind. This phenomenon can be observed world-wide. The FSU is especially vulnerable because it is starting from such a rudimentary position in terms of availability and quality of telecommunications systems, hardware, etc.

Access to computer networks is particularly important for domestic use when other means of communication are of questionable reliability or availability. Electronic mail often gets through when voice phone does not, for example, and it is less sensitive to time-of-day constraints because the addressee need not be present when the mail is delivered to the target machine. Also, special error correction helps the electronic mail and transferred files get through circuits full of noise that would render speech unintelligible.

Computer networking can provide substitutes for scarce or non-existent local materials, equipment or bibliographic reference materials by permitting participation in work groups in other places of the world. Remote participation in the field of high energy physics is already well known to the FSU and their collaborations with western laboratories. But collaborations in other fields, from oceanography to medicine can also provide meaningful participation for otherwise isolated and resource-poor investigators.

Computer networks also contribute to political stability. They also help maintain communities of interest in the face of shortages and other adversities, including political upheaval. By making it possible for people with common interests to share experiences and information, global communities of interest are spawned and supported by literally thousands of special mail lists, bulletin boards and "news groups." The growth of such communities helps ensure that the recent political and other changes in the FSU will be irreversible.

B. Current Situation of FSU Computer Networking

Several joint ventures with western companies provide international electronic mail and file transfer service. But, there is little or no interactive service beyond major cities or internationally because the infrastructure is scarce or non-existent, and what does exist is very expensive. The commercial services are priced far beyond the reach of state-sponsored institutes and schools, and tend to be affordable by profitable domestic businesses or local affiliates of western enterprises.

The scientific community in the FSU is served--for the most part--by two organizations: Soviet Union European Academic and Research Network/For Research, Engineering and Education NETwork (SUEARN/FREENET) and RELCOM. SUEARN/FREENET is the FSU partner of EARN and BITNET, respectively, with FREENET running under the TCP/IP protocol used by Internet. It is based on aging mainframe computers (produced in the USSR and related to old IBM designs) and is unreliable. In addition, the expansion of the user base has been slow. Most of the Moscow-St. Petersburg-Novosibirsk physics community is served by the commercial network, RELCOM, which is based on networked small machines employing the UUCP connection to Internet in Finland. The unreliability of the telephone net slows message delivery considerably, delaying transmission from 2 to 4 days. But most important, RELCOM costs are rapidly rising, making it impossible for institutions to maintain their connections.

Real-time access to the academic computing networks in both Europe and the United States is almost nonexistent thus locking FSU users out of the more important abstract and textual databases (and there has been little, if any, distribution of CD ROM subscription disks to compensate this deficiency). For the Russian physics community, there is some relief in the existence of two dedicated lines, one from DESY (Hamburg) and one from CERN. However, these are low-capacity lines (unsuited to real-time database access or high-speed data transfers) which are routed through Moscow switching stations and, as a result, connections are not reliable. Communications with some of the other republics, notably Ukraine, Georgia, the Baltic States and Armenia are usually good because the communities are small and concentrated. In particular, two direct lines are being laid which will connect Ukraine with Western Europe. The Scandinavian countries have nurtured a special relationship with the Baltic States and have subsidized direct and satellite connections.

Commercial services, including RELCOM, SPRINT and others have not been compelled to provide special fee schedules to the scientific community in Russia because the total volume of traffic is insignificant compared to commercial users. However, a new user group, **RELCOM Academic and Research Network (RELARN)** has been established in an effort to develop the non-commercial use of existing facilities and to seek resources to implement a networking plan to serve their members. There has been some movement towards coordination between RELARN and SUERN/FREENET users but a coherent set of proposals has yet to be developed.

The lack of reliable connections between Moscow and Western Europe, Japan and North America, and a reliable distribution network within the republics, remain major problems. It is clear that telecommunications needs and requirements differ from country to country and that any approach should be based on a decentralized system tailored to regional needs.

Research and academic networking in state-supported institutions was at best spotty up to a few months ago, and may be much worse off now as a result of large increases in telecommunications tariffs by the Russian state telephone monopoly. So far, the research and academic community have been unable to convince the telecommunications monopoly to provide special discounted rates for their not-for-profit sector.

Both telecommunications infrastructure and modern equipment to attach to what does exist are said to be sorely lacking. There are at least two levels of phone system services available for sale to the general public: the ordinary service which is said to be of very poor technical quality, and the ISKRA 2 phone system of former special government bureaus which can be purchased at much higher rates. Many western telecommunications companies are said to be queuing to invest and build infrastructure in the FSU, but progress is slow. Only the very lowest speed circuits can be leased for international connections, thus limiting what FSU researchers could do to the most basic of computer networking capabilities (e-mail, modest file transfer, submission of batch computing jobs). But even these limited capabilities can help to bind them to the global community and lessen the debilitating effects of isolation and deprivation.

Western government research organizations, including the U.S. Department of Energy and NASA, are working on a number of possibilities for limited networking connections to specific laboratories in the FSU, principally Russia. NSF is funding the purchase of e-mail terminals as part of its cooperative research grants and it is examining possibilities for connectivity in support of the general research and academic communities. However, U.S. government restrictions on access by FSU countries to U.S. federally-supported networks remains an important constraint. In addition, the Carnegie Corporation of New York has funded a study of the current status of telecommunications and requirements for international connectivity in the former Soviet Union and that study is nearing completion.

C. Opportunities for High-Leverage Intervention

1. General:

- o provide technology, promote speedy export licensing, and obtain permission to route FSU interactive traffic in U.S. Federal networks
- o influence Russian telecommunications policy-makers to provide affordable services for research and academic communities
- o install an interoperable, standard telecommunications plant to increase both domestic and international connectivity options

2. High-Leverage Steps for Donors:

- o find incentives for FSU institutions to prioritize affordable telecommunications services for research and academic communities
- o finance high-visibility demonstrations of practical solutions. These might require large startup investments (~\$1 million) and high sustaining contributions for limited period (several hundred \$K annually). Such projects might also entail matching or in-kind contributions from the FSU States - maybe a way to accomplish the preceding task!
- o bring FSU telecommunication decision-makers to western countries to educate them as to the need for, and benefits from, computer networking
- o energize and support competing service providers that might help to drive down prices

3. Steps for Professional Societies, Universities, and Other Institutions:

- o provide low-cost packages of basic computer equipment suitable to function as e-mail terminals - PC's, modems - to as broad a range of FSU partners as possible, with

special attention to institutions in FSU cities outside Moscow and St. Petersburg and to universities

- o develop and share lists of e-mail addresses of the U.S. science and engineering communities with FSU colleagues. Develop electronic bulletin boards to facilitate long-distance discussion, both internationally and within the FSU.
- o offer remote access to scientific databases at reduced cost

III. SCIENTIFIC LITERATURE

The attached paper by Sandra Burns of the AAAS entitled, "The Distribution of Scientific Journals in the Former Soviet Union," is a report on a feasibility study conducted by AAAS for the MacArthur Foundation concerning the distribution of Western scientific journals to the FSU. The original purpose of the study was to examine the feasibility of instituting a program to reinstate lapsed journal subscriptions. However, it was found that this approach was impractical for a variety of reasons to carry out through a single, central effort; as a result, AAAS has resorted to focusing on several central scientific libraries in Russia, Ukraine, and Belarus. The paper also describes other efforts of professional societies, including the American Astronomical Society (with partial support from the Sloan Foundation), the American Institute of Physics and the American Physical Society, the Sabre Foundation, the American Chemical Society, the American Psychological Association, and the AAAS in this area.

Prior to the collapse of the USSR, state operations such as *Mezh Kniga* negotiated directly with scientific publishers to provide archival and research journals to Academy, university and institute libraries. Thus, most scientific publishers had no knowledge of who received their publications. This was true for both learned society publishers such as the American Physical Society and the commercial science publishers. For APS, over a two-year period, institutional journal subscriptions dropped from 428 in 1990 to essentially 0 in 1992. In cataloguing all research and archival journal subscription needs in physics for the academy libraries of the natural sciences in Belarus, Armenia, Kyrgyzstan, Kazakhstan, Estonia, Azerbaijan, Latvia, Lithuania, Tadzhikistan, Uzbekistan, Ukraine, Georgia and Russia, we find almost all West European journal subscriptions lapsed, with 365 titles missing from the Russian Academy library alone. Institutional and university libraries are equally bereft, although the problem is mitigated by subsidized personal subscriptions.

In response to the decline in institutional library subscriptions, the APS has responded with a continuously increasing number of Matching Memberships. The APS Matching Membership program provides memberships for physicists in currency-poor countries, with costs being shared between APS and a U.S. sponsor. Such members (and/or their sponsors) can subscribe to APS journals at member rates. Twenty of these Matching Memberships for the FSU are sponsored by the American Institute of Physics and consist of the Russian editors of

AIP publications. Numerous APS members and NSF funds sponsor more than 200 in the western republics.

The American Academy of Arts and Sciences has received a grant from the United Parcel Service (UPS) for air shipment of journals to the FSU. The program was targeted at Russia and will probably not continue. By means of this program, the APS has shipped complete yearly sets of *Physical Review* and *Reviews of Modern Physics* to key institutions in Moscow, St. Petersburg, Novosibirsk, Tallinn, Vilnius, Kiev, Yerevan, Tbilisi. These will be made broadly available throughout the FSU. This distribution program supplements the Matching Membership subscriptions which target individual colleagues for receipt of specific journals.

The Soros Foundation has--and the MacArthur Foundation is expected to have soon--offices in the Republics. The APS has an agreement with the Soros Foundation to use their offices as shipping destinations for equipment and journals and is using their banking facilities for the disbursement of funds. In some areas, this will enable the APS to avoid some of the current tax and import duties levied on incoming funds and equipment. The problem has been raised with UN, UNESCO and IAEA officials in an effort to determine whether the UN system can provide a solution as well. UN and UNDP offices are being set up in Moscow, Kiev and Minsk, and we may use these facilities for the disbursement of hard currency, if needed.

An inexpensive method for shipping journals and equipment into the Baltic States, the republics and East-Central Europe is managed by the Sabre and Brother's Brother Foundations. They send bulk shipments by surface transport 4 times each year at a cost of 35 cents per pound from warehouses on the eastern seaboard.

The above referenced study of this issue by Burns, as well as the experiences of the APS, suggest the following generalizations which may be used to guide the thinking of donors and professional societies in devising responses:

1. General Issues

- o Mail and other distribution systems have broken down in the FSU, both internally and externally. The unreliability of delivery systems for hard-copy publications increases the importance of other communications technologies, especially electronic.
- o The disarray in the postal system even further isolates researchers in remote regions (i.e., outside Moscow and St. Petersburg) and in the non-Russian republics. Special attention should be given to ensuring that these locations are included in programs to address these issues.
- o The holdings of university libraries are significantly weaker than those of Academy of Sciences organizations. Linkages need to be established between these facilities and special attention should be devoted to university libraries.

- o Technologies such as CD-ROM for making available large amounts of information would be very effective; however, the appropriate hardware must also be purchased and put in place.
- o The collapse of communications with the FSU, and of journal subscription lists within the FSU has generated a need for directories of FSU scientific institutions and individuals. In this respect the assistance of FSU partners and support recipients would be extremely valuable.

2. Steps for Donors

- o Grants to professional societies to fund journal subscriptions and CD-ROM databases to libraries, institutes, and universities and to subsidize remote access to scientific databases such as MEDLINE
- o Support for procurement and installation of CD-ROM equipment in selected FSU S&T facilities

3. Steps for Others

- o Programs by professional societies to solicit membership contributions for journal subsidies
- o Subsidy of subscriptions by individual U.S. scientists participating in cooperative activities
- o ...

IV. TRAVEL TO SCIENTIFIC MEETINGS²

Closely related to the issue of access to scientific literature is that of participation in scientific meetings; both are central to the flow of information in the scientific professions. Yet participation of Soviet scientists in meetings held abroad, a rare enough phenomenon before the fall of the Soviet Union as a result of political controls, has now become even more problematic because of the drastic devaluation of the ruble and the total financial inaccessibility of international travel to all but a very few. The inability to participate in such meetings compounds the isolation of FSU scientists and denies them a means of keeping current in their field that most scientists elsewhere in the world take for granted. The presence of scientists from the FSU at such meetings is of value not only to them but also to

²See also the accompanying paper on Direct Assistance to Scientists by Lerch and Blanpied.

the discipline as a whole which is otherwise deprived of timely information about important developments in the field taking place in FSU laboratories.

Little systematic information is available on the extent to which special support has been available to FSU scientists and engineers wishing to travel to scientific meetings in the United States. Some meeting sponsors have been able to reduce or eliminate registration fees for FSU guests, but defraying their travel and subsistence costs is usually beyond the capacity of societies or organizers. FSU visitors participating in independently sponsored cooperative activities sponsored by NSF, NAS, or other programs, have often been able to take advantage of their stay to attend major scientific meetings, but cooperative programs do not generally fund participation in such meetings as a sole objective.

Possible Steps:

1. A portion of membership contributions collected by professional societies in support of FSU scientists might be set aside in a special fund for support of FSU scientists attending professional meetings sponsored by the society or in its discipline.
2. Foundations and other organizations might consider requests from professional societies for support of special assistance for FSU scientists seeking to attend scientific meetings.

(In both of the above cases, mechanisms would have to be devised to disseminate information about such opportunities to FSU scientists and to filter and select requests for assistance.)

3. Consideration might be given to siting certain smaller meetings in the FSU, either as bilateral workshops or special sections of society activities.
4. Grants programs for support to individual FSU scientists should include support for travel to international scientific meetings as a key component. The creation of a well-provided-for but still isolated scientific community would only repeat past problems.

V. LINKAGES WITH OTHER SECTORS

Just as the linkages between the scientific research enterprise of any country with that of the world scientific community are important to the health of both, the linkages of that country's effort within its own society are of critical importance to its ability to sustain itself and to attract internal and external resources for its long-term development. While FSU emergency S&T relief efforts may properly devote the greater part of their attention to support of individual researchers and their immediate needs (including the infrastructural needs described above), they must also do so with the knowledge that these efforts are of only limited duration. Unless emergency relief programs also devote some effort to addressing the underlying problems of the FSU R&D establishment, their medium- and long-term

impact may be only superficial or worse once the outside supporters leave the scene and the policy-makers and researchers of the FSU are left to work out where to go from there.

Of special concern are the linkages with education and industrial development. These are central to the health of any nation's scientific enterprise. One of the hallmarks of the Soviet Union's S&T organization and policy for sixty years were the gaps between the research sector - particularly its elite establishment in the Academy of Sciences system - and education, on the one hand, and industry on the other. The roots of this arrangement are complex with their origins deep in the history of the Stalin Revolution of the 1930's, but their result was an artificial - and deliberate - separation of these sectors, a separation so profound and even enforced that in any other society it would be seen as an extreme handicap to the health of science and technology. Indeed the history of Soviet S&T policy consisted largely of a series of largely unsuccessful efforts to redress the inefficiency and waste imposed by this basic structural arrangement, brought about more by political exigency than by scientific or economic rationality.

The preferential access to resources of researchers and institutions in the Academy system, as compared with university and industrial research laboratories, has been remarked upon widely by visitors.³ There is a temptation to draw from this comparison the overly simplistic conclusion that assistance efforts should go primarily to leading institutions and researchers in the Academy system and that the universities can be dealt with later. And of course support should go only the best people and facilities. But support for university science must not be neglected by assistance programs, because it is essential to the long-term health of the research enterprise to have a healthy pipeline of young scientists and engineers. While it perhaps cannot be the goal of such programs to create new educational institutions (although some foundations have done just that elsewhere in Eastern Europe), it is appropriate and important for them to make special efforts to seek out and support deserving research groups in universities and to give priority to activities that are characterized by partnerships among researchers from the Academy and university sectors.

Much the same can be said of the industrial R&D sphere. Here, the profound disjunction between the relatively high-quality basic research carried out in Academy institutes and the poor in-house capability of industrial ministries to innovate is widely perceived as a key source of Soviet technological backwardness. There is also no doubt that there are researchers and laboratories of very high quality in the industrial sector, in many cases the beneficiaries of military R&D funding that has now all but disappeared. But these researchers typically have limited understanding of the cycle of turning ideas into technologies and products in a competitive market environment, and a key element in

³To be sure, there are important exceptions. One educational institution often cited as being of exceptional quality in terms of research and linkages to other sectors is the Moscow Physico-Technical Institute (MFTI). Another exception is the entire area of defense-related production, which had been well endowed. The fact, however, that these examples are exceptional (and arguably irrelevant, in terms of the military-industrial complex now that defense R&D funding is virtually nonexistent) and not typical simply illustrates the problem.

learning these skills is to build close ties with the academic research sector, on the one hand, and with the consumers of the technology on the other. Again, while assistance efforts cannot create these structures outright, they can judiciously promote their growth by offering special incentives to potential grantees to build these linkages into their activities from the beginning.

To address these concerns, special priority should be given to programs that support:

1. High-quality researchers at university institutions, with special allowances for instrumentation.
2. Activities that involve young investigators, graduate students, and undergraduates.
3. Activities that involve cooperation between academy, university, and/or industrial laboratories.
4. High-quality applied research with potential industrial or commercial application, with linkage where possible to implementing organizations such as commercial enterprises.
5. Assistance in implementing training opportunities (e.g., workshops, internships) in university administration and commercial application, S&T marketing, intellectual property rights, and technology transfer.

In addition, the following steps should be taken:

1. Ensure that information about all funding opportunities is broadly disseminated among and within the FSU university community.
2. In any information dissemination program, make use of U.S. corporations and foundations currently active in the FSU.
3. Make effective use of the expertise of U.S. government agencies involved in supporting and conducting industrially oriented research and technology development in the U.S.
4. Assist FSU successor states in the development of technology policy, including topics such as the government role in technology development, methods of transferring technology from research laboratories into commercial products, and strategies for obtaining technology from other countries and arranging joint ventures with other FSU successor states.
5. Especially in applied and industrial research, include U.S. researchers - universities, government laboratories, or corporations - as active partners for improved leverage and research performance.

**THE DISTRIBUTION OF SCIENTIFIC JOURNALS IN THE
FORMER SOVIET UNION**

Feasibility Study Seminar Report

Sandra M. Burns

November 1992

INTRODUCTION

The economic situation in what was formerly a 15-republic Soviet Union is dismal, making it extremely difficult for scientists to conduct research and to keep abreast of the latest developments in their respective fields. One vital link with the world scientific community involves foreign scientific journals, yet the formerly Soviet scientific community has not been able to renew subscriptions in recent years due to the shortage of hard currency. This could have dire consequences for scientists in the FSU, just emerging from decades of isolation, and already facing problems ranging from unemployment, to scarcity of research material, to food shortages. The journals problem is particularly acute for younger FSU researchers attempting to publish results of their work in prestigious international journals in their respective fields. Their lack of access to western journals means that they have no examples of articles selected for publication nor a complete picture of what journals exist to which they could submit manuscripts. More importantly, it is crucial that researchers keep abreast of research results elsewhere in the world. If the serious lack of journals continues, the survival of the FSU scientific community is in jeopardy, and it could take years for FSU science to recover.

The US scientific community is well aware of the threat to FSU science, and has convened several meetings in an effort to identify problem areas and compare notes about specific steps being taken to assist colleagues in the FSU. Examples of such sessions include the March 3, 1992 meeting at the National Academy of Sciences on "The Future of Basic Research in the FSU"; the August 13, 1992 session at the White House Office of Science and Technology Policy, part of planning for an Autumn 1992 meeting between Presidential Science Adviser D. Allan Bromley and Russian Deputy Premier Boris Saltykov; and an October 28, 1992 meeting convened by the American Academy of Arts and Sciences, "Saving Soviet Science." Time and again, the need for journals and for financial support of researchers are at the top of the lists of priorities emanating from these meetings.

In light of this, and with the support of the MacArthur Foundation, AAAS recently completed a feasibility study to determine how best to address the situation. The original plan was to identify journals subscriptions, going to the FSU from AAAS affiliates, which had lapsed due to the shortage of hard currency in the FSU, and then determine the cost of reinstating the lapsed subscriptions. This turned out to be problematic, however, for a number of reasons, as reflected in the results of the initial feasibility study funded by MacArthur.

FEASIBILITY STUDY

Launched by AAAS in early 1992, the feasibility study had two major components: a survey of publishing societies; and a study of library and research facilities in the FSU. Many requests to AAAS for journals were generated by the contacts made through the

feasibility study and by a short article appearing in the newspaper *TRUD* via Voice of America reporting on our efforts to secure journals for FSU researchers.

The Survey

To conduct the survey, AAAS sent questionnaires to 16 affiliated societies, requesting information on the journals they publish and trends in subscriptions going to the FSU in recent years. Through this survey, AAAS aimed to accomplish several tasks:

- identify societies most likely to have subscriptions going to FSU;
- determine the number of subscriptions going annually to the FSU;
- ascertain the cost involved given the number of subscriptions;
- get a break down of institutions and individuals to whom the journals are addressed;
- determine the publishing societies' willingness to continue the subscriptions at cost for two years;
- examine other journals projects underway, to avoid the duplication of efforts.

The results of the survey indicated that it would be both very difficult and quite costly for any one funding organization to attempt to reinstate current and recently lapsed journal subscriptions for several different societies and associations. In fact, in the course of conducting this study it became apparent that several factors complicate a journals project of this magnitude, three of which deserve special attention.

- First, precise information on journal recipients in the FSU republics was kept at a Soviet institution, *Myezhkniga*, a central governmental organization in Moscow through which all foreign book and journal orders were processed in the former Union. The US scientific societies had no access information as they often used subscription services to fulfill journal subscriptions foreign recipients. With the breakup of the USSR, *Myezhkniga (MK)* underwent a major transition, losing its hard currency accounts in the process, and reports are that remaining staff members at *MK* are attempting to enter the business world, offering to sell various types of information on the FSU. Accurately identifying former recipients of the US journal subscriptions would therefore amount to an immense, if not impossible, task.
- Second, given the breakup of the USSR, distribution channels used previously, including surface mail and air mail, are no longer viable and new reliable ones must be found. The situation is particularly bad for distributing materials through Moscow to non-Russian republics.
- Third, since the majority of those subscribers we have been able to identify were individuals, not libraries or institutes, reinstating these subscriptions

ultimately would have a minimal effect on FSU science since the journals would only be targeted to a small segment of the FSU research community.

For these and other reasons, rather than attempting to reinstate the journal subscriptions, we have devised an alternative approach to make select journals available at major scientific libraries which are accessible to the majority of researchers in Russia, Ukraine, and Belarus.

Library and Research Facilities

During the feasibility study, the AAAS project director made site visits to Russia, Ukraine, and Belarus where she met with researchers, librarians, administrators, government officials, and university representatives. As is well known, the situation for scientists is extremely difficult, especially since individual research institutes are in flux, as supplies and salary support dwindle. Discussions revealed that the scientific community as a whole is well-acquainted with the several science and technology (S&T) libraries for different sectors of the research community located in major cities. These generally include a library affiliated with the Academy of Sciences, a public S&T library, and a university library. The main Academy of Sciences library also maintains smaller branches throughout the city, primarily at research institutes. There is also a library affiliated with the Academy of Medical Sciences in each of the former USSR republics.

All major libraries have a foreign acquisitions section headed by a director whose English language skills tend to be quite good. Library affiliates or branches also have a foreign acquisitions or journals librarian who works closely with the foreign acquisitions director at the main branch. This network of foreign acquisitions librarians will be an important component of the AAAS plan, as library personnel are very capable, would be cooperative in conducting the journals project, and are in an advantageous position to encourage equitable usage of journals.

AAAS has chosen to target four centers of scientific research: Moscow, St. Petersburg, Kiev, and Minsk. A sample of libraries to be involved in the AAAS project includes the following:

Library of Natural Sciences of the Russian Academy of Sciences/Moscow. The 300 institutes of the Russian Academy (RAN) look to the Library of Natural Sciences as the central source of fundamental scientific information. At one time, the library had 3,000 foreign journal subscriptions, but this has decreased to about 10% of that. The most recent journals on the shelves date from December 1991. The institution is only for Academy-related researchers, however, which is one reason AAAS believes it is important to work with university and other libraries as well.

Jakub Kolas Library for Science and Technology/Minsk. Most of the scientific material in Belarus is located at this library, affiliated with the Academy of Sciences

in Belarus. University, Academy, and industry researchers utilize the library which formally subscribed to \$1.5 million of foreign journals, and also received 1,200 titles via international exchanges; this has decreased substantially. The library has devised a system of intra-library loans with its branches elsewhere in Minsk to facilitate the sharing of journals.

Moscow State University Library. Formally, the library had 1,500 titles of journals, and only about half as much hard currency for foreign subscriptions as other libraries. The library system at Moscow State consists of some 20 individual department libraries. University libraries in Minsk and Kiev face a similar lack of resources. The university system is clearly in poorer shape than the Academy system, and the university infrastructure would profit greatly from S&T assistance.

Each library is struggling to obtain journals in any way possible. One interesting alternative to foreign subscriptions does seem to have arisen -- some libraries are considering engaging the services of the Moscow-based enterprise "AS Plus." An advertisement for "AS Plus" obtained in Minsk indicates that the group offers to send photocopies of entire journals to libraries in former republics. Payment is made for three months only. Most of the library personnel with whom AAAS has been in contact expressed skepticism as to whether such a system would work, finding it potentially very costly and unreliable. They also had serious doubts as to the idea's viability given the severe shortage of paper in the FSU.

Related Journals Projects

The survey also revealed other US efforts underway to provide journals to FSU researchers, several of which complement the proposed AAAS effort. These include the following.

American Astronomical Society (AAS): The membership of AAS set up a program to provide journal subscriptions and support for small grants program. Funding came from personal donations in response to solicitation by electronic mail and the Society's Newsletter. By October 1992, contributions had reached \$54,000, which has been augmented by matching funds of \$70,000 from the Sloan Foundation. A shipment of journals has reached the FSU through a grant from the United Parcel Service to the American Academy of Arts and Sciences.

American Institute of Physics (AIP) and American Physical Society (APS): AIP has established two separate journal donation programs to the FSU. The first supplies US journals to the editors of the 20 Russian language physics journals with which AIP works. Each editor receives *Computers in Physics*, and two journals of the editor's choice from among all physics journals published by AIP and its Member Societies. In addition, AIP cosponsors with the American Physical Society (APS) memberships in the APS for all of the editors, which provide them with the monthly *Physics Today*

as one of the benefits. Under the second program, 100 free subscriptions to AIP journals and magazines are sent to other scientists in the FSU.

Sabre Foundation: Under the Sabre Foundation's "Scientific Assistance Project," books and journals solicited from scholarly publishers in the US and abroad are distributed to targeted libraries in Eastern Europe and in the former Soviet republics. Within the FSU, Sabre has had most extensive contacts in Ukraine, and in the Baltics; a Russia project is slated to begin by 1993.

American Chemical Society (ACS): ACS has earmarked \$30,000 to support journals for the FSU over three years. Recipients will arrange for overseas shipment. ACS has provided 800 kg. of back issues, shipped to Moscow, for distribution to research institutes via a special Aeroflight, in cooperation with the Science Office of the Russian Embassy in Washington, D.C.

American Psychological Association (APA): APA provides 57 institutional subscriptions to the FSU on a complimentary basis. APA also sends back issues of psychological journals and books to Estonia and Novosibirsk, and plans to earmark some journals for the FSU under its program to provide journals to developing countries.

American Association for the Advancement of Science (AAAS): The AAAS Board of Directors voted unanimously to send 20 subscriptions to *Science* to several FSU republics, at the Association's expense. At the same time, recipients are being contacted to verify the subscription information, to confirm receipt of the magazine, and to inquire as to its use and how it is made accessible to researchers.

The major obstacles cited in all of these endeavors include the need to find a reliable delivery system as well as to avoid the perception of the journals as "charity" by both the recipients and by the membership of participating US societies.

**DIRECT AID TO SCIENTISTS IN THE SUCCESSOR
STATES OF THE FORMER SOVIET UNION: A CASE STUDY
OF THE PHYSICS COMMUNITIES**

Background Paper

by

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Preamble

It is difficult to generalize from the experiences of one scientific community in the former Soviet Union to characterize the problems, find potential solutions, develop operations and formulate the rules applicable to conditions in other disciplines. This paper is, therefore, a case study based on experiences of the US physics community in dealing with its counterparts in the FSU. Although the paper makes no claim to applicability beyond physics, the authors are grateful to colleagues in the American Astronomical Society (AAS) and American Mathematical Association (AMA) who have also established significant programs with their FSU counterparts and have generously shared their experiences with us. Our colleagues in the European Physical Society are also undertaking extensive efforts to support colleagues in both the FSU and East-Central Europe and have surveyed the status and needs of both research and academic institutions there. Several of the recommendations at the end of this paper are based on their experiences and expectations.

The reasons for the difficulties faced in generalizing beyond one community are inherent in the nature and history of Soviet science. Whereas the life and social sciences were subject to direct political intervention, the mathematical sciences were insulated from such control because atomic and nuclear physics especially were seen as instruments of state policy and a source of state power. Thus the elite physicists occupied a position of privilege in the Soviet State. Despite the emergence of seeds of dissidence in the market of freely circulated ideas which flourished in many of the most important physics institutes, the Academy and institutional structure maintained the strictest controls over the scientific establishment which was distinguished by a large measure of passivity and acquiescence to central authority.

Diminished productivity was often compensated by bloated and inefficient organizational structures. Upon the collapse of the Soviet State these centers of excellence were deprived of essential resources and services and, tragically, self-management did not immediately emerge owing to the legacy of central control. In addition, the separation of the research institutes and the universities has left the latter in a depleted state, incapable of supporting major research initiatives.

The problem now is to assist FSU science to preserve its best endowed communities and traditions so that it will find the time and resources needed to restructure itself. This paper focusses on the quantitative sciences as a case-study of one approach for solving the broader problem of preserving science in the former Soviet Union. It will examine the background, existing and potential approaches for solving problems, and recommend a general action plan. It will seek to examine the immediate and longer term needs of the scientific community in the FSU in the context of the ultimate objective of achieving self-management with an investigator-initiated peer-review system.

The reader is alerted to the fact that this paper concentrates on the Russian Federation since the bulk of the scientific community is located there. However, large and important scientific groups are found throughout the FSU, particularly in Ukraine, and it will be important to develop an awareness of the special needs and circumstances of each nation. The scope of this paper is unfortunately far too limited to take into account the many important details which differentiate each of the successor states.

1. Background:

The overriding principle of direct aid programs is to bypass the inefficient bureaucratic structures of the Academy, the institutes, and those few universities that conduct viable research, and to provide aid directly to the working scientists. It is feared that if aid is funneled through the directorates of the Academy, the institutes, or the universities, most funds will be dissipated in preserving the bureaucracies. It is important to note that in physics, however, not all of the institutes are managed by the Academy. The Institute for

Theoretical and Experimental Physics in Moscow, for example, is a branch of the Ministry of Atomic Energy. Traditionally, then, the institutes have served as isolated units, often in competition with each other.

While many of the successor states have been slow to reform the apparatus of centralized science management by the Academy and ministries, Ukraine put into effect an investigator-initiated peer-review program modeled on those in the West.

Another important principle is reliance on personal and professional relationships rather than institutional ties to develop the mechanisms for soliciting, evaluating and administering aid. Personal trust is the currency for all such transactions. Nonetheless, the APS and our colleagues in the FSU find institutional affiliations both viable and desirable since the most productive work is centered there. For the American Mathematical Society (AMS) this is not true. Academic failure and social corruption--usually manifest in exclusionary ethnic and anti-semitic policies--have made the institutional and university departments unsuitable as vehicles for transformation and renewal. Thus, the AMS seeks to couple its aid programs to promoting the development of new mathematical institutions.

There is the further problem of infrastructure integrity. For if there is no heat or light and if the walls and roofing fall into disrepair, science is still endangered. Even more important, such essential central services as libraries and telecommunications are rapidly failing.

1.1 Dimensions of the Problem (Programmatic and Contextual)--

1.1.1 Libraries--Adequate technical libraries with current copies of world scientific literature are obviously essential to the work of scientists in the FSU. The general problems of libraries is considered in the accompanying paper on Infrastructural Issues by Gerson Sher. That paper includes a brief note on the special needs of physicists in the FSU, and on APS programs to help meet those needs on an emergency basis.

1.1.2 Computer-moderated telecommunications--Next to libraries, a high priority need for physicists in the FSU is for adequate telecommunications capabilities. The accompanying paper by Sher discusses the overall problems in those countries, including experiences of the APS in dealing with individual scientists. It also proposes several possible short- and long-term solutions to the telecommunications problem.

1.1.3 Salaries, Research Funds, and the Brain Drain--Salaries are low and paid intermittently. Monthly wages range from 2,500 to 10,000 rubles (\$6 to \$25 based on current exchange rates). Some institutions in Moscow have voluntarily foresworn monthly payments in order to make funds available to colleagues in regions distant from the capital. The collapse of the ruble, the low and intermittent salaries and a crumbling scientific infrastructure, have driven scientists at all levels to leave their posts, sometimes temporarily, often permanently. Up to 10% of the elite scientists from the major physics institutes have emigrated to Western Europe and the US and those remaining are forced to travel constantly

to continue their work and to obtain sufficient hard currency to meet their domestic needs. Some institutes, such as the famous Landau Institute in Chernogolovka, almost ceased to be viable owing to the emigration of many senior scientists. However, the institute has been reinvigorated by a newly appointed director, Vladimir Zakharov, who also holds an appointment in the Department of Mathematics at the University of Arizona. Funds for equipment, journals and consumables are non-existent, doing great injury to experimental physics. Those younger scientists who cannot easily emigrate are often forced to seek employment in other sectors of the fledgling market economies. This "internal" brain-drain is of great concern to many senior scientists since they see the loss of their best junior associates as threatening the future of FSU science. There is no appreciation within the scientific community for the role that these "displaced" physicists play in the transformation of FSU society. But a growing problem is the loss of technicians and artisans. FSU institutes have always had to rely on manpower to make up for deficiencies in commercial equipment availability and services. This has accelerated the decline in institutional infrastructure as technical support staff has been lost. At the Institute for Theoretical and Experimental Physics in Moscow, for example, there is only one plumber left to service the needs of a staff of 2,500. The decline in experimental high-energy physics has been underway for the past 20 years and has accelerated precipitously over the past decade. Major projects have failed or been abandoned and such facilities as the Serpukhov accelerator are all but forsaken. In Ukraine, where the situation has developed somewhat differently, 1.5 billion coupons (approximately 2.5 million dollars) have been allocated thus far to investigator-initiated peer-reviewed proposals; a sum equivalent to the resources provided by the Ukrainian Academy for the support of research institutes and universities. A ministerial officer, Serhey Ryabchenko (Chairman of the State Committee for Science and Technology in Ukraine), is administering this program and has agreed to provide matching funds to the laboratories of APS grant recipients, similar to an agreement reached with Deputy Premier Boris Saltykov in Russia.

1.1.4 Heterogeneity and Isolation within the Scientific Community--The physics community has two major components: the Academy and Ministry Institutes which are the homes of the elite physicists, and the universities. Most of the significant research is done in the institutes and both the Academy and government ministries have traditionally provided the resources needed for these scientists to establish and maintain communications among themselves. The universities have been responsible for training large numbers of students and have, in effect, become teaching "factories." The faculties have focussed on teaching and have traditionally done a credible job at the undergraduate level. But, lacking a high-quality research environment, the best graduate students must be recruited into the institutes. Thus, the universities are weak and reside well outside the mainstream of elite physics research. Industrial research is also weak, and in some critical specialties, nonexistent. The exception is military research which had been isolated and pampered by the *ancien regime*. Many institutes were so self-contained that there was little interaction between them and, in some cases, open competition prevented scientific collaboration. The second tier physics communities (those primarily associated with the universities and smaller, less well endowed institutes) have turned to a multiplicity of competing societies to satisfy their

professional needs. In Russia alone there is the Russian Physical Society, the Moscow Physical Society, the St. Petersburg Physical Society, the Nizhny Novgorod (Gorky) Physical Society and numerous others. Some of these organizations view their role as finding commercial partners for technology transfer schemes. And while the Russian Physical Society is attempting to unify the regional and urban societies, there is both resistance and suspicion. In some of the other republics, however, the organization of such societies has met with some success. In Ukraine, for example, a significant portion of the physics community has rallied to the Ukrainian Physical Society, in large part because science in Ukraine became specialized under the Soviet Government with most of the resources and basic research institutes located in Russia. Thus, there is closer association among university and institute physicists, with much good science done in the universities. Nonetheless, there are centrifugal forces at work in some countries where ethnic and other rivalries disrupt unity among scientists. Particular concern has been expressed at conditions in the Baltics where government policies appear aimed at excluding ethnic Russians and other minorities. There have been examples of brutal repression in the East Asian republics.

1.1.5 The Academy, The Ministries and The Government Circus--Russian government actions may be promulgated by parliament or decreed by the President but they remain moot unless "enacted," a process as mysterious as it is rare. It is clear that the apparatus of government, the bureaucracies, are elephantine labyrinths which swallow resources while mandating programs. Thus, the telecommunications ministry has established corporate bodies that extort resources from commercial and academic ventures alike--often turning a blind eye to regulations prescribing cost limits--without regard to the consequences for Russian science. The Ministry of Science, Technology and Higher Education has requested that external assistance to Russian science be exempt from taxes but it was not until well after Presidential and Parliamentary action that the Finance Ministry agreed to support this policy (and only with some reluctance and then somewhat ambiguously). Nor is this characteristic only of Russia. Similar problems plague programs in each of the republics. Negotiations with ministers and even deputy premiers are usually inconclusive, and in the current political climate, somewhat dubious since changes of regime (which must be regarded as inevitable) will almost certainly be followed by the abrogation of old policies. In Russia, where much of the bureaucratic apparatus remains intact, even ministerial policies can languish in the netherworld of administrative indifference or outright opposition. Nonetheless, some of the new leadership recognizes the need for structural change and have pursued policies which directly attack the power and prerogatives of the Academy and the ministries. In Ukraine as in Russia, government policy has been enunciated in support of science and technology with senior cabinet officials assigned to coordinating programs: Saltykov in Moscow and Ryabchenko in Kiev.

1.1.6 Inflation, Shortages, and The Less-Than-Perfect Banking Industry--The collapse of the ruble has been alluded to earlier and the lack of funds has led to shortages of consumables. The scarcity of paper and other resources has resulted in an almost complete breakdown of scientific publishing with the subsequent disappearance of new textbooks, journals and bulletins. Many scientific communities have turned to commercial

publishers in the West and have obtained little support or encouragement. Publishers often ask for total distribution and copyrights in exchange for a few hundred printed volumes. In addition, the decline of the scientific enterprise has threatened those important FSU publications whose English translations have an international audience. Attempts to transfer funds in support of these and other activities have been frustrated by antiquated or nonexistent banking facilities and ambiguous tax laws (a problem which hampers the wider effort to support scientists). Many groups in the West have taken the expedient route of bringing cash into the FSU and physically distributing it to the recipients. More extensive distribution schemes are hampered by confiscatory fees, cumbersome procedures and regulations and uncertainty about the status of intellectual property rights. Some individuals and institutions have attempted to circumvent these problems by acquiring Western bank accounts.

1.1.7 The Collapse of Shipping and Mailing--In many parts of the FSU, mail and parcel shipment are unreliable. While this is not true for a number of the smaller republics, the problem is particularly acute in Russia. Some foundations have established facilities for occasional bulk shipments, but needed mail and journal shipments often disappear into the postal machinery.

1.2 Existing Short-Term Programs--

Programs fall into two categories: short- and intermediate-term, both of which are geared to an ultimate goal of creating a self-sufficient, investigator-initiated, peer-review system of science self-management. This objective is obviously dependent upon the economic and political recovery of each nation. For the most part, the programs of the learned societies are constructed around short-term needs since they do not have the resources to tackle longer term goals except in an abstract, preparatory way (by studying the objectives, structures, organization and operations of longer-term programs with a view to advising other institutions on how to develop and administer such programs).

The APS short-term emergency program consists of the distribution of back-issues of journals directly to institutions and libraries, the provision of limited resources for the repair or replacement of small pieces of equipment, the awarding of scholarships and small grants to exceptional researchers, the sponsorship of colleagues in the FSU as Matching Members by APS members and other organizations so that they may receive literature subscriptions, support for regional summer and winter schools for both researchers and graduate students, travel support to enable colleagues to participate in major meetings and the organization of advisory committees in the republics to serve as conduits for information and program management. Several of these components of the program are discussed in more detail in Sections 2.3 and 2.4

The program is financed from APS funds, donations from our members and from funds and services provided by foundations. In particular, the Alfred P. Sloan Foundation has awarded the APS a matching grant of \$100,000 in support of the appeal for donations from our members (who have so far provided in excess of \$100,000). The Soros Foundations have

provided an additional \$525,000 to supplement the APS small grants and fellowship programs. The Meyer Foundation has made an award of \$100,000 to be disbursed as emergency grants. The NSF has awarded the APS a two-year \$100,000 grant in support of summer schools and workshops, journal distribution, and administrative travel. Some urgent literature shipments have been supported by a joint American Academy of Arts and Sciences -- United Parcel Service program.

We are currently negotiating with other foundations for additional funds and we are preparing to collaborate or have entered into collaboration informally with the American Mathematical Society, the American Astronomical Society, the American Association for the Advancement of Science, the American Academy of Arts and Sciences, the European Physical Society and other institutions such as the University of California which is providing funds for collaborative research with Russian institutional laboratories.

Information essential to the APS program has been provided by knowledgeable colleagues who have extensive experience and wide contacts in the FSU, and from expatriate colleagues currently resident in the US, especially through the instrumentality of a major forum of expatriate colleagues, distinguished senior scientists, government officers and foundation representatives held in Washington on April 22, 1992.

We met with our European Physical Society (EPS) colleagues in Budapest May 25-27, 1992 (and subsequently in Amsterdam the following October) for an EPS-APS workshop on the crisis in basic science in east-central Europe and the republics of the former Soviet Union. We have agreed to participate in a series of coordinated actions in communications, regional self-help, support of libraries, peer review, centers of excellence, data bases, equipment distribution, and summer schools and workshops. We have also tentatively agreed to join with the European physics community in supporting a UNESCO-UNDP initiative aimed at strengthening the universities in ECE and which will rely on grants from various development banks.

We conservatively estimate that of the approximately 2,000 grant and fellowship applications (representing more than 5,000 scientists) which our Moscow committee has received, 80% merit support on the basis of scientific excellence and competence. This would require resources in excess of 2 million dollars per year (for Russia alone--3 million dollars per year taking into account all of the republics), excluding all expenditures for journals, equipment, consumables and travel (assuming average disbursements of \$500 for the year for each recipient). Our present resources of \$800,000 can accommodate no more than 640 group applications--from all republics (on average there are 2½ physicists per application)--of the estimated 1,600 which merit awards. The advent of the numerous *ad hoc* programs has had an immediate, enormous impact on both the morale of our colleagues in the FSU and on their governments. Thus, with these funds and with Russian commitments to support basic science, we may be able to hold the core of the physical sciences together during the immediate crisis.

2. The APS in Action:

2.1 Early Actions--In the beginning of March, 1992, in response to growing concern about the crisis in basic science in the Republics of the former Soviet Union, APS President Ernest M. Henley asked William Blanpied (National Science Foundation), then Chair of the APS Committee on International Scientific Affairs, to chair an *ad hoc* Task Force on the crisis. The Task Force consists of Kurt Gottfried (Cornell), Herman Feshbach (past APS President, MIT), George Gamota (Mitre Corporation), Anthony Fainberg (Office of Technology Assessment), Pierre Hohenberg (AT&T Bell Labs), Herbert Berk (University of Texas), Yuri Orlov (originally a Task Force member and now advisor, Cornell) and Lev Okun (advisor, Institute for Theoretical and Experimental Physics, Moscow) with Henley serving *ex-officio* and Irving Lerch (APS Director of International Scientific Affairs, New York University) as APS Liaison Officer. Staff liaison and administrative support is provided by Amy Halsted of APS. Many of the Task Force members have extensive personal and professional associations in the FSU or have broad experience in international scientific affairs. At the same time, Henley sent letters to Allan Bromley and Walter Massey recommending immediate action to supplement NSF grants to support collaboration with colleagues in the FSU and to find additional funds for new programs. By the end of March, the Task Force recommended 2 immediate steps: the distribution of surplus issues of complete annual sets of *Physical Review*, *Reviews of Modern Physics* and other journals to responsible physicists in the USSR who will assure their access by colleagues throughout the Republics, and a Presidential appeal distributed by e-mail, limited bulk mailing (to APS Fellows and Department Chairmen of Ph.D. granting institutions), and as news announcements in *Physics Today* and *APS News*.

2.2 Journals--Efforts to provide APS journals to physics libraries in the FSU are discussed in the accompanying paper by Gerson Sher on Infrastructural Issues.

2.3 Development of International Schools and Workshops in the Republics of the former Soviet Union--Many of the elite institutions of the former Soviet Academy developed an extraordinary educational system that discovered and nurtured scientific talent and promoted a unique intellectual culture of physics. This is particularly true of the Lebedev, Ioffe and Landau institutes, for example. The opportunity of the moment is to open these unique schools to the world by providing for the exchange of faculty, the recruitment of students from the region and the US and the development of regional and international summer schools and workshops. The program was begun in 1991 with the St. Petersburg High-Energy Summer School (supported, in part, with an NSF award to APS). The St. Petersburg Nuclear Physics Institute has organized an international winter school in theoretical physics which took place at the end of January, 1993 and which was attended by 10 carefully selected US graduate students. It consisted of intensive lectures and seminars. In addition, many of the other Republics, notably Ukraine, are seeking to establish their own regional summer schools and workshops. The APS program will support the establishment of one summer school in Ukraine and one in Russia and one winter school at the St. Petersburg Nuclear Physics Institute. The Ukraine program will develop a series of

workshops which would eventually lead to the organization of "Gordon-like" annual conferences.

Faculty exchanges are made by agreement between the local institutes and cooperating US institutions. Similarly, in all these schools FSU and US counterpart institutions coordinate among themselves the selection of participants, both students and lecturers.

2.4 Small grants and fellowships--Policy and oversight for the APS small grants and fellowships program is provided by the Task Force appointed by President Henley in March 1992 (see Section 2.1) and is administered by the Society's Office of International Scientific Affairs. Initial policy guidelines were developed in Washington, DC on April 22 as described above. Subsequently, a US-FSU advisory committee was established to support the deliberations of the Task Force and national advisory committees were organized in Moscow, Tallinn, Kiev, Tbilisi, Yerevan and Vilnius. Efforts continue to organize committees in the other republics.

2.4.1 The function of the national advisory committees to the APS Task Force is to solicit emergency grant proposals from small groups, to organize disciplinary and, if necessary, regional subcommittees to assist in the evaluation of proposals, and to perform a preliminary evaluation of the submissions to assure accuracy and determine relative merit. When appropriate, the proposals are then forwarded to the Task Force. The proposals are sent to review panels in the appropriate APS disciplinary Division or Topical Group and graded. The Task Force determines how funding is provided on the basis of these grades. No proposal recommended by a national committee has yet to be declined. Rather, those not immediately funded are being held for further review pending a determination of available resources. This procedure has been adopted on the grounds that provision of funds based on a competitive, peer-reviewed process is very new -- and very unsettling -- to most FSU scientists. Funds are provided on the basis of \$500 per group member per year, with groups not exceeding six physicists. Where group members have access to hard currency and significant travel, they are excluded from receiving emergency funds but they are encouraged to apply so that their group members will benefit from their participation. This is meant to assure that the best physics is represented in the application process. Funds may be used by the recipients as they see fit so long as they continue their scientific work. They are asked to prepare an article for submission to an appropriate peer-reviewed journal (within one year for theorists and two years for experimentalists).

2.4.2 The disciplinary Divisions and Topical Groups of APS are encouraged to develop their own system of advisory committees and panels to promote their own scientific interests. For example, the Laser Science Topical Group (LSTG) has organized laser science advisory subcommittees to work inside the FSU with their respective national advisory committees to solicit and review proposals. In addition, the LSTG uses its own review panels to critically appraise proposals forwarded by the national advisory committees to the Task Force. The LSTG also raises funds in support of the general APS program.

2.4.3 Oversight is provided by 1) the Task Force which is responsible to the APS President, 2) the APS Executive Board which reviews expenditures and 3) the APS Council which approves program parameters and funding levels recommended by the Task Force.

2.4.4 As of December 31, 1992, 179 group awards totalling \$223,500 have been transferred for disbursement to Russia and Ukraine. Fifty group awards totalling \$42,000 are awaiting transfer to Armenia, Belarus, Estonia and Ukraine pending verification of the setting up of personal dollar accounts for the recipients in these countries. In addition, \$9,600 was provided as travel grants to 8 physicists to enable them to attend the International Atomic Energy Agency (IAEA) Fusion Physics Conference in Würzburg in September. These account for a total commitment of \$275,100 and we are currently processing an equal number of grants. In addition, \$15,000 has been set aside to finance travel to the FSU to facilitate organizational and administrative functions.

2.4.5 In June, 1992, Herman Feshbach, a former APS President and member of the Task Force, and Irving Lerch met with Deputy Premier Boris Saltykov to negotiate tax exemption for grants of funds, equipment and journals. In addition, and with the assistance of the Moscow Advisory Committee, Saltykov was encouraged to provide matching funds to the small laboratories of the grant recipients. The purpose was to insure Russian government participation in the program and to assure that those technicians and scientists associated with award winners (but who were not members of the research group) benefitted. Thus, the program provides funds to those who do the research and payments completely bypass bureaucratic structures. Tax exemption was presumably formalized by the Finance Ministry in October, although documents attesting to this have not yet been received. However, all disbursements are made under the presumption of tax exemption and statements to this effect are issued to each recipient. In December, Task Force advisor Yuri Orlov went to Russia to review the status and operations of the program, to advise the Moscow Committee on their activities, and to give guidance and counsel to the Task Force concerning needed changes. In Ukraine, a member of the APS Task Force, George Gamota (Mitre Corporation), met with Serhey Ryabchenko (see 1.1.3), Pavel Kislyi (Head of the Supreme Rada of Ukraine) and I. Yukhnovskii (First Deputy Prime Minister) to explore different aspects of the APS program. In general, there was agreement on tax exemption for stipends and matching funds to the laboratories of grant recipients.

2.4.6 Disbursements are currently arranged through the Soros Foundation offices in each country. Funds are transferred by APS to a holding bank in Finland and are subsequently transferred into dollar accounts in the names of individual recipients in local banks by Soros Foundation officers. The national advisory committees and Soros Foundation officers are notified of the names of the award winners and letters of disbursement are sent to the national advisory committees for distribution. The committees, Foundation officers and recipients coordinate with each other to arrange for the pickup of funds. No monies are given to the national advisory committees for disbursement. Recipients sign bank receipts which are returned to the APS Office of International Scientific Affairs.

2.4.7 Program review is the shared responsibility of the national advisory committees and the Task Force. The national advisory committee will request work reports from experimentalists after the first year and pre-prints of manuscripts from theorists after their first year and from experimentalists after their second year.

2.4.8 Lists of awards and program evaluations are made public and given to funding agencies and other societies (in order to detect multiple awards, program bias and other problems).

3. Action Plan (in order of priority): While most recommendations will be sufficiently general to apply to any number of programs, a few should be addressed to the ISFFSU Board, or to a consortium of funding agencies, where appropriate. While a few recommendations may overlap those contained in the accompanying papers on Infrastructural Support by Gerson Sher and on The Global Scientific Heritage of the FSU, we can discover no serious inconsistencies.

3.1 Emergency Short-Term Programs--

3.1.1 Organization--Each scientific community, presumably through its learned societies, academies and, perhaps, with foundation and government funding, should seek to organize coordinating and advisory committees nationally, internationally and within each of the successor states of the FSU. The purpose of these committees will be to develop plans, mechanisms, procedures and principles for the development of assistance programs. **It should be a clearly stated objective of all efforts that the purpose of such aid is not to pursue an imperial program to acquire cheap talent for the benefit of the West, but to make it possible for each scientific community to survive the current crisis so that each will contribute to the recovery of their nation. This policy is in the best tradition of free and open inquiry and exchange and benefits all mankind.**

3.1.2 Library support¹--The APS program only provides limited numbers of APS publications. And while these journals are important to the FSU physics community, there is urgent need for other US, European and Japanese research and archival publications. The need is far too great to be addressed by any single, existing funding agency, since this would cost from \$12-\$13 million/year for Russia alone.

A possible strategy is as follows: 1) select several central institutional libraries in each nation capable of assuring the circulation of all journals, 2) survey all journals available in these libraries in 1990, 1991 and 1992 to determine which back-issues are needed, 3) determine the minimum number of issues needed to promote wide availability (to include photocopying of relevant issues where necessary). The selected institutional libraries will be charged with

¹See also recommendations in the accompanying paper on Infrastructural Support by Gerson Sher.

distributing copies to outlying institutional and university regional libraries to assure wide accessibility to all communities. Such a program is estimated to require an expenditure of approximately \$4 million over 2 years for the physical and life sciences.

3.1.2.1 A title survey for all physics journals, total numbers of copies, by discipline, for each academy library in each republic was made for 1991 and 1992. A similar survey is currently underway in the Russian Academy Library for the Natural Sciences in Moscow (and in institutional and university libraries in some of the sciences). The numbers of multiple copies needed is part of this survey.

3.1.2.2 Representatives of the European Physical Society have initiated negotiations with European publishers to secure discount subscriptions². The APS position is that back issues of physics journals (both U.S. and foreign) should be provided free and that all current and future subscriptions should be provided at the "runoff" or "last copy" price, approximately 10% of the library subscription price. The final cost will obviously determine the total numbers of journals to be purchased. Our European colleagues have negotiated a price of approximately 800,000 ECU for all physics journals which represents 50% of the institutional library subscription price. This is most certainly too high and will be negotiated further.

3.1.2.3 It is recommended that a consortium of foundations provide support of not more than \$4 million over a two-year period to replace as many journal issues as possible in select institutional and university libraries for the natural sciences in the FSU. (If additional funds are needed, a multidisciplinary panel would return with a fully substantiated request.) It is further recommended that a multidisciplinary commission be established to negotiate with European and US commercial publishers an appropriate fee for the provision of all scientific journals. These negotiations should include access to electronic databases.

3.1.3 Emergency travel to attend international meetings--The Russian physicist Lev Okun has requested that funding authorities take note of the need to provide travel funds for FSU scientists to attend meetings in the United States and Europe to which they have been invited and will make presentations. In view of the fact that the learned societies organize a significant proportion of scientific meetings and actively participate in others, it is proposed that the societies coordinate their requests for such travel support requested by meeting organizers in order to insure against multiple awards. It is recommended that participating societies consider the question of the appropriate size of these awards (APS FSU travel grants have varied from \$750 to \$1,200 depending on the support provided by conference organizers and sponsors).

²Unlike the situation in the United States where the principal physics journals are published by the APS and AIP, the most important European physics journals are published commercially and are considerably more expensive than their U.S. equivalents.

3.1.4 Computer Moderated Telecommunications³--Numerous proposals have been made and many programs implemented to provide needed computer telecommunications support to the scientific community in the FSU. At present, we have concentrated on Russia and Ukraine. In general, the communications capabilities of the physics community is most advanced, with the highest capacity enjoyed by the high-energy physics community. But these capabilities are wholly inadequate and are threatened by numerous problems. It is urgent that approximately \$3 million be made available over a 2 year period to arrest the decline in computer moderated telecommunications and to extend these capabilities to the whole of the scientific community. The immediate need is to provide secure and reliable connections with the Moscow scientific community and to develop the network to include all other regions within the Russian Federation. Support for telecommunications facilities within the other republics should be coordinated with other providers within the international community. **It is recommended that a consortium of private donors be asked to set aside no more than \$3 million over a 2 year period as emergency funds to purchase needed equipment and provide operating costs to expand telecommunications within Russia.** The details outlining the use of these funds will be a high priority to be developed early in 1993. An immediate allocation of approximately \$170,000 will be needed to provide satellite capacity through the ground link at either the Institute for Space Research in Moscow or the new station installed at the Russian Academy Presidium. With respect to the other successor states, funding should be set aside to provide computers, servers, modems, optical disk readers and other suitable equipment to help scientists exploit the existing facilities.

3.1.5 Emergency Grants and Fellowships--Numerous learned societies have demonstrated their capability to organize distinguished panels in the FSU for the purpose of developing and managing programs in support of scientific activities. The objective is to introduce self-management as a means to efficiently allocate resources based on investigator-initiated peer-review mechanisms. This process should be expanded and supported by the ISFFSU and other major programs. There may be cases where some communities in some countries are not sufficiently well organized to insure rapid notification, solicitation and processing of proposals. In such a case, an automated system of soliciting and grading incoming applications may be undertaken, with emphasis placed upon publication records and research associations. **Thus, we propose that the learned societies be provided with sufficient funds to continue the emergency grants program. Such action will conserve the resources total available resources and assure the survival of the "bott m-up" approach.** This will further enable other programs to pursue the organization and development of intermediate and longer-range programs. As expert panels and site teams are organized to implement reviews for longer-term programs, the learned societies should be relied upon to provide lists of qualified nominees for panels and committees.

³See also the accompanying paper on Infrastructural Support by Gerson Sher.

3.1.6 Alerting the Scientific Communities--To alert all of the scientific communities in the FSU to the existence, criteria, and form for requesting support under the emergency and longer duration programs of the ISFFSU, it is recommended that the journal *Argumentii i Facti* should be used (along with other suitable publications). Forms for emergency grant applications to include information for grant proposals may be published and widely distributed (circulation is 26 million). The various scientific communities, their advisory boards and review panels will subsequently be provided with the forms and information needed to guide applicants through the process of applying for funds. The use of journals or other communications means will not be adequate as the physics community learned at the inception of its program. **It is recommended that the editors of *Argumentii i Facti* and/or other suitable broad-distribution media be requested to make their journals available as preliminary fora for alerting the Russian community to the existence and requirements for all aid programs. It will be important to find equivalent organs for contacting scientists in the other republics.**

3.1.7 Information Clearing House--It is urgent that the February 9 conference establish the mechanism and means to widely publicize grants, to insure that resources are not dissipated in multiple awards. **It is recommended that an open, accessible mechanism be established for tracking and managing awards and that this mechanism include disbursements made by other foundations, learned societies, governmental and international programs.**

3.1.8 Promoting Collegial and Institutional Collaboration--It is important to consider promoting international collaboration through the exchange of faculty and junior research staff. **We request that funds be found to provide sufficient resources to support joint Western-FSU institutional and university appointments, the routine, short-duration exchange of key scientists and to continue the development and support of regional schools and workshops.**

3.2 Intermediate and Longer-Term Programs--Intermediate and longer range programs should shift focus from stipend and subsistence to actual support of research, didactic and professional activity. This will provide greater support for experimental research than was available in the emergency program since the small funds available were disproportionately of value to theorists. Grants to individual scientists must also address the issue of "overhead" or infrastructure support. But to avoid the obvious complication of contributing to a corrupt or ineffectual bureaucracy it will be necessary to impose strict fiduciary restraints on all such aid and to monitor grants with appropriate tracking mechanisms and performance requirements.

3.2.1 Endowed Professorships--Scholars of international stature and outstanding achievement usually reside in the institutes although many have university associations. It would strengthen university programs to name distinguished scholars to endowed chairs with a view to bridging the gap between the great research institutions and the universities.

3.2.2 Postdoctoral Fellowships--It will be important to establish Postdoctoral Fellowships to be awarded for a two-year period, with the possibility of an extension for a third year if funds are available. Each two-year fellowship should consist of a stipend and a conference travel allowance.

3.2.3 Independent Investigator Awards--Such Investigator Awards will provide salary support for independent junior and middle-level investigators (equivalent to assistant and associate professorships in the US).

3.2.4 Research Grants--Such grants should be awarded to investigators heading leading major research programs. Each grant will be funded for a period of two years with the possibility of an extension for a third year if supplementary funds are made available. The levels of support will vary with discipline, institution, group size and needs, but will be sufficiently large to support the work of independent groups and laboratories. Support will be for salaries, supplies, essential small equipment, travel, communication and other allowable needs. Support of PIs' graduate students will be an important element of the budget. An institutional allowance or overhead will be provided from the grant based on demonstrated costs. The overhead rates may not exceed 15% and will be negotiated with each institution after careful review of the efficiency of administration and management.

3.2.5 Other Projects--

3.2.5.1 Short-duration and Regional Schools and Conferences

3.2.5.2 Undergraduate Science Education Grants

3.2.5.3 Publication Support Grants

THE GLOBAL SCIENTIFIC HERITAGE OF THE FSU

Background Paper

by

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PRESERVING SCIENCE IN THE FORMER SOVIET UNION

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Foreword

The global scientific heritage of the former Soviet Union is both historical and contemporary. It includes the great scientific traditions outlined in the first part of this paper as well as unique and irreplaceable collections of specimens, data, and documents. The paper does not pretend to be a systematic or comprehensive report on this heritage. Rather, its purpose is to suggest by illustration the importance of this heritage and to stimulate discussion and extension of the subject. It contains a number of concrete recommendations for action, but these mostly pertain to the specific examples given. The intent here is to generate discussion that will produce more general recommendations. One of these might be to develop a more comprehensive survey of the collections extant in the FSU so that a rational plan of action could be developed.

Historical Background

The scientific heritage of those republics formerly comprising the Soviet Union is inextricably bound to the history of imperial Russia. For three centuries, Russia has in various times and to various degrees dominated its neighbors militarily, politically, and culturally. This historical period seems now to be drawing to a close, but it forms the background of the development of modern science in the region. And since modern science grows out of, and in a broad sense is a part of a people's culture, we must consider the development of the scientific heritage as a part of the cultural heritage.

One must first note that early Russian culture developed within the context of Eastern orthodoxy -- theological dogma maintained a strong hold over Russian intellectual life, and western scientific thought was condemned; "the discoveries of Copernicus, for example, were labelled.. 'satanical craft'..." (Vucinich 1956).

The emperor Peter I provided the catalyst to initiate change in the rigidly conservative culture of Russia. Having personally experienced western attitudes and accomplishments during his youthful years of travel in western Europe, Peter the Great planted western traditions and institutions in Russian ground. In 1724 he called for the establishment of a scientific forum in the western style, and the next year the Imperial Academy of Sciences was founded. Although his personal interest in western science was initially mainly utilitarian, he came to value basic scientific research. However, the new academy was established not simply as a scientific research institute but was also to organize Russia's system of secondary and higher education. Peter died that same year, and since Russia did not have her own scholars, its first members were recruited from western Europe by his successors, in particular by Elizabeth and the two Catherine's (I and II). Among the most notable of these were the mathematicians Hermann Euler, the natural scientists Bernoulli and Bayer, and the philosopher Büllfinger.

For the first quarter century of its life, the Imperial Academy lacked a governing statute and was run directly from the imperial court. In 1747 it received from the empress Elizabeth a statute dividing it into the Academy proper and the university, and began to achieve a degree of stability.

The second half of the eighteenth century saw the members, although still predominantly western European in training, open their ranks to more native Russian scholars (Mikhael Lomonosov was named in 1841), including such eminent natural historians as Peter Pallas, who organized the first expeditions to study the geography, geology, biology, and ethnography of Siberia, which was now under Russian control.

In the early years of the nineteenth century the Academy began to show some changes. It gradually began to relinquish its educational responsibilities to the growing universities, and its monopoly on scientific research was broken by the establishment of independent learned societies such as the Moscow Society for the Study of Nature, founded in 1805. At the same

time, the Academy established, under the statute of 1803, departments of history, economic and political science, and Oriental studies. This was followed by a third statute (1836) which explicitly relieved the Academy of any educational duties and proclaimed it to be the "primary scientific body of the Russian empire." Shortly thereafter, it absorbed the Imperial Russian Academy founded by Catherine the Great in 1783, thus absorbing language and literature into its domain. For nearly a century thereafter, the academy had three principal divisions: physical-mathematical sciences; Russian language and literature; and historical and political sciences and philology.

Throughout the remainder of the nineteenth century and into the twentieth, the Russian Academy of Sciences functioned much as did similar academies in western countries. Ties with those institutions were strengthened, foreign scholars elected to membership, and Russian scientists regularly studied in western laboratories. Nevertheless, in contrast to the increasing democratization seen in the west, the Russian Academy worked within a strong autocracy.

During this period as well there were striking parallels between scientific developments in the United States and Russia that were driven by similar historical events. The nineteenth century colonization and conquest of the American West was a partial reflection of the earlier, but continuing colonization and conquest of Siberia, Middle Asia, and finally the Caucasus region. In the vanguard of both of these efforts was scientific exploration directed by the Russian Academy, and in the United States by a combination of military expeditions and the newly founded Smithsonian Institution. This was of obviously great importance in shaping the study of the natural sciences in both countries, both of which developed strong traditions in these areas of science.

An essential element of those traditions was the collection and preservation of object of the natural world--specimens of individual animals and plants; samples of rocks, soils, and water--that could later be examined, described and analyzed in museums, herbaria or botanical gardens, or laboratories of research institutes. These objects constituted the concrete foundation of those biological and geological sciences that are as much historical as experimental in their natures, and as such the specimens are both essential and irreplaceable. Museums and associated institutions in Russia were founded early (Peter the Great's Kuntskamera, for example), and developed steadily under both imperial and Soviet patronage.

These collections include scientific specimens, rare publications, unpublished or nontraditional scientific resources (e.g., maps, notebooks and diaries, photographs) collected from times and regions now recognized as critical to understanding present-day problems such as global change, biodiversity, and environmental perturbation. They now constitute an important part of the world's scientific patrimony, but the holdings generally have been unknown to the international community.

The first World War and its aftermath created a watershed in Russian science that was not initially apparent. For the first decade after the October 1917 revolution, the new authorities, while asking the academy to undertake a variety of practical investigations and creating a series of new commissions, did not directly interfere in most cases with the internal functioning of the academy, which continued to be administered under the terms of the statute of 1836. All that changed in 1927, when a series of organizational changes effectively Sovietized, and Bolshevikized, the academy by 1929. In that year occurred the first mass purge of the academy, to be followed by many others. This story has been told well and in great detail by a series of authors. It should be noted, however, that the traditions of Russian science that had been growing and maturing in the two centuries since the Imperial Academy of Sciences was established provided a resilient framework which could in many cases absorb the distorting stresses placed upon it by the Communists. That these stresses did sometime produce a breakdown in important areas of science is widely recognized -- politicization of genetics under Stalin, through the influence of Prezent and Lysenko is a well known tale -- but similar fates were accorded to applied mathematics and statistics, ecology and conservation (Weiner, 1988), and virtually all of the social sciences. Although driven underground, these sciences survived in the form of private seminars and in samizdat, only gradually emerging after Stalin's death.

The scientific communities that we see today in the republics of the former Soviet Union exhibit a range of health. The basic physical sciences are intellectually strong, as are what may be called the "field sciences," those natural sciences that depend upon direct observations of nature, such as the many branches of biology, geology, and geography, as well as the museums and similar institutions preserving the voucher specimens that validate these sciences. Genetics, and with it molecular biology, have made a remarkable recovery from Lysenkoism. The social sciences as a group remain more problematic. However, the infrastructure of most of these sciences is seriously deficient. At present, lack of adequate equipment, including computers, imposes great limitations, but simple items such as high quality microscope slides, alcohol to preserve specimens, and even such common supplies as paper are in short supply or absent. Coupled with this is the problem that the organization and direction of scientific research in most academy institutes and universities remains essentially unchanged since the collapse of the Soviet Union and the dismantling of the Communist Party. The vast majority of scientists are constrained by the existing bureaucracy and organization to continue almost as though the party still controlled the academy. In addition, and in some respects most important, FSU scientists are among those segments of society that have suffered most from the economic breakdown that is occurring in Russia and its sister republics. Rapid inflation has eaten away most of the buying power of scientific salaries, to the point that the average scientist must spend much of his time searching for life's necessities, or else earning money outside of his scientific profession.

Given this scientific heritage and those factors, both historical and economic, that now control the behavior of scientist in the FSU, what does this suggest concerning possible approaches to alleviating the afflictions of science? The following broad generalities might be considered:

1. Support those sciences that have been traditionally strong.
2. Encourage greater democratization of the academy system.
3. Encourage greater diversification in active research by those institutions that have traditionally conceded that role to the academy, such as universities and other public or private organizations.
4. Encourage collaborative research between FSU and western scientists, in order to foster democratization and diversification.

Evolutionary and Environmental Biology

More specific actions must be tailored by specialists to meet the needs of their particular disciplines. We will speak here only for evolutionary and environmental biology, and particularly those fields that depend upon scientific collections of specimens and associated data from nature.

The number of such specimens in museum, herbarium, and institute collections in Russia and other republics of the former Soviet Union numbers in the millions. Unfortunately, estimates of collection size are available for only a few of the major institutions. The largest is the collections of the Zoological Museum of the Academy of Sciences, which houses some tens of millions of animals; the largest plant collection is at the Komarov Institute of Botany--both are in St. Petersburg. In Moscow, the Zoological Museum of Moscow State University, and the Main Botanical Garden of the Academy are much smaller, but nonetheless of great significance. Other collections of major regional significance are located in Siberia, in the Far East, and in the several republics.

Some of the scientific collections were initiated for specific regional issues, such as documenting the history or biota of a particular autonomous region. In most case, however, the scientific tradition represented by the various Academies of Sciences controlling these collections has meant that scientific collections in the FSU, regardless of age, size, or locality, are of high scientific value and comparable to modern collections elsewhere. Such a claim cannot be made, for example, for many regional collections in the U.S., where data standards are minimal or lacking, or specimen preparation, maintenance, and storage are inadequate. Some of the regional scientific collections in the FSU comprise holdings of specimens and early publications unduplicated anywhere else, including the larger collections in Moscow and St. Petersburg.

Until recently, these collections have been carefully conserved by dedicated curators and scientists. Dedication is the watchword here -- during World War II, some scientists in the Zoological Museum in Leningrad refused to be evacuated from the besieged city and remained to protect the collections from destruction, and the devotion of the staff of the Vavilov Institute to their unique seed collections is legendary. By Western standards, some curatorial practices appear suboptimal; cardboard boxes are used to house bird and mammal specimens, rather than dust- and insect-proof metal cases, for example. These reflect

economic realities, however, rather than lack of expertise. Similarly, most collections are housed in old buildings (in Moscow and St. Petersburg, some are 18th century in age), where temperature and humidity controls cannot be brought up to Western standards.

Nevertheless, those who have worked with the collections know that they remain generally in good shape, with properly recorded associated data. The new problem facing the scientists is that the basic level of support formerly available for building maintenance, heating, and for essential preservatives such as alcohol, is no longer there. Temperature in buildings sometimes falls to 10° C or below, and some fluid-preserved specimens are slowly drying up, due to lack of sufficient funds. Important field research sites and scientific preserves (zapovednik) no longer can maintain staffs to patrol their territories, and poaching has become a very serious problem in many.

To address the most serious problems in this discipline; the following steps might be considered:

1. Identify those scientific collections of objects and data (including libraries) that are of international importance.
2. Establish small (2-4) teams of disciplinary specialists to visit those collections, to assess their current condition and urgent needs.
3. Prioritize, by importance and need, those institutions which should receive emergency assistance (funding, expertise).
4. Determine the safest and most efficient means of delivering the assistance, and ensuring that needed repairs, supplies, etc. are obtained.
5. Prepare for international publication descriptions and summaries of the prioritized institution collections, listing the scope and extent of the holdings, and the basis for status as international resources.
6. Support computerization of holdings and creation of accessible databases.

*Oceanography*¹

In the field of oceanography, according to NOAA, large quantities of irreplaceable data that are of great potential value to the world's scientists are in danger of being lost forever. For example, NOAA estimates that the volumes of bathythermographs and hydrocasts held by the Russian National Oceanographic Data Center are 30% and 50%, respectively, of the corresponding holdings in the U.S. These data frequently supplement U.S. holdings, since they are from areas where the U.S. has not collected data (e.g., water column data from FSU peripheral seas, the Arctic Ocean, the Indian Ocean, and the Southern Hemisphere. The data are considered to be of good quality, and to form the basis for fruitful collaborations

¹Based on material provided by NOAA.

between U.S. and Russian scientists. Table 1 reproduces a summary of oceanographic holdings in the FSU that was prepared by NOAA.

NOAA has developed a plan for a collaborative program with institutions of the FSU. The plan would:

1. Digitize large quantities of manuscript and atlas data into common formats;
2. Perform data continuity analyses;
3. Merge U.S. and FSU data to create a global database available without restriction to the international scientific community;
4. Reanalyze the merged database and recompute ocean climatologies.

The program would be carried out through one-to-one pairings of U.S. government organizations and FSU counterparts; the FSU organizations selected are the Russian National Oceanographic Data Center at Oboresk (physical oceanographic data), the Geological Institute of the Academy of Sciences in Moscow (bathymetric data), and the Arctic/Antarctic Research Institute in St. Petersburg (sea ice data). This program does not directly involve U.S. university researchers and may leave out Russian scientists who are not affiliated with the selected Russian organizations. Thus there may remain a significant role for private sector activity in the field of oceanographic data and research.

Seismology²

The FSU's collections of seismic data are also at risk. According to IRIS, seismic stations that have recorded data for decades are being shut down and archives of data will soon be destroyed. Not only would this mean the loss of data important for developing scientific understanding of earthquake propagation, it would result in inability of the former Soviet republics to monitor seismicity and to carry out coherent programs of earthquake hazard assessment. Furthermore, the station shutdowns threaten loss of coverage over a significant portion of the earth's surface, a development that would be disastrous for global seismology should it occur.

The problem in seismology has a particular geographic twist, since two of the most important threatened observing stations are in Kazakhstan and Tajikistan. In most other sciences, the key people and facilities are in Russia.

IRIS identifies three action items:

²Based on information provided by IRIS.

1. Maintain the infrastructure for seismological observations and research; rescue the data from threatened observing stations and ensure the survival of the "national" seismic network.
2. Coordinate and provide facilities for joint research projects (IRIS could provide the necessary facilities base for such a program).
3. Support key CIS scientists and key research programs, particularly those involving younger scientists who have not yet achieved international recognition.

The assessment of the problem with seismological data, the diagnosis of the problem, and the specific actions that would be appropriate may be a subject for further elaboration.

Mathematics³

Mathematics presents a unique situation. Russian mathematicians, sometimes despite occasional opposition by the political authorities and central scientific organizations, have developed one of the world's most successful systems of mathematics education. The system is an orally transmitted cultural tradition, and its survival depends on the survival and continued activity of those who understand and practice it. According to the American Mathematical Society, the system includes the following components:

1. A pyramid of mathematical Olympiads for high school students, formerly culminating in the all-Union Olympiad.
2. "Mathematical Circles," held outside school hours under the guidance of research mathematicians, where high school students learn to solve problems.
3. Special high schools for mathematics and physics staffed by research mathematicians and university students as well as high school teachers.
4. A series of books, and the journal Quant, for high school students, written by research mathematicians.
5. A particular style of mathematical seminars at universities which mixes undergraduate teaching with research exposition in a unique way.

The organizations that developed this approach did so under adverse circumstances, without official support. They survived and even prospered in these circumstances, perhaps because the adverse conditions afforded them the aura and spirit akin to that of samizdat. In the process, they developed an independent, intellectually pure style.

Now, however, they are in danger, because their authors and practitioners are suffering the same deprivations as are other Russian scientists. Their disappearance would be a serious blow to world science. It would mean the loss of future top mathematicians, since the

³Based on information provided by the American Mathematical Society.

Russian system has produced a large number of such people. We would lose a source of important ideas for our own educational system. Finally, the Russian system produces an approach to mathematics whose practitioners are a source of mathematical ideas for the entire world.

Some aid programs have been launched in this area. The German Volkswagen Stiftung has started a program to help save the university seminars. The Mathematical Association of America is working to provide back issues of Quant for high school students. The AMS is providing support to individual research mathematicians through grants. But these programs are directed at individual segments of the Russian mathematics education system; a more systematic, holistic approach is thought to be needed.

The AMS makes the following recommendations for action in this matter:

1. Provide direct support for the mathematics Olympiads.
2. Provide modest pay for high school teachers who teach the "mathematical circles" and for university students who volunteer to teach in mathematical high schools.
3. Provide support for existing seminars for teachers.
4. Provide funds to support publication of mathematical books and journals.
5. Give direct support to mathematical researchers and University seminars.

In providing aid to Russian mathematics, the AMS makes several procedural recommendations,

1. Avoid using institutions that previously hindered the development of the instruction system to administer the funds.
2. Take steps to insure that aid provided to mathematics teachers does not cause resentment among teachers not so favored. Payment on an "overtime" basis for special work will alleviate this problem.
3. Do not attempt to interject American educational ideas into the program.

Glaciology⁴

The World Data Center A for Glaciology (WDC-A) has identified a number of targets for the rescue of environmental data. Snow cover data from 38 regions of the FSU are available in Orlinsk in rare hard copy reports from the 1930s to 1965 and in monthly publications since then. Besides snow cover data, the tabulations include data on depth, thickness of crust, snow water equivalent, snow topography, and snow type, as well as other atmospheric and

⁴Based on information provided by the World Data Center A for Glaciology [Snow and Ice].

surface data. These hardcopy records are rare and would provide validation of passive microwave observations. Digitization is needed.

A second data set consists of 69 published volumes inventorying 14 percent of the world's glaciers. These data are needed to complement and interpret available FSU data on glacier fluctuations, a key variable in the IPCC 90 and 92 reports. WDC-A also proposes to provide support for digitization of data from the Soviet North Pole manned stations on ice floes. A final effort involves the digitization of records from the Institute of Arctic and Antarctic Research in St. Petersburg, which includes sea ice data for the Eurasian Arctic and tables of surface and air reconnaissance of ice and snow conditions in the Arctic and Antarctic. These data are important to understanding the flows of polar sea ice.

In the non-Russian states, the Central Asian Regional Research Hydrometeorological Institute (SANIGMI) in Tashkent has extensive holdings on snow cover, avalanches, glaciers, and runoff in the mountains of Central Asia. They have maintained a glacier research station at 4000m on the Abramov Glacier in the Pamir-Alai Mountains since 1969. Extensive data sets exist at SANIGMI as a result of these activities. In addition, the other Asiatic republics (Kazakhstan, Kirgizia, Tadzhikistan) have archived data at SANIGMI. There is concern now, however, that these states may discontinue archiving their data at SANIGMI and may even recall those which are there now.

**USG Bilateral S&T Agreements
with Russia**

- o Agreement on Cooperation in the Field of Basic Scientific Research
 - USGS-Russian Committee on Geology Memorandum of Understanding on Cooperation in Geoscience
 - NSF-Academy of Sciences Memorandum of Understanding on Cooperation in the Field of Basic Scientific Research
 - USGS-Russian Geodesy and Cartography Service Memorandum of Understanding on Cooperation in the Mapping Sciences
 - NIST-Academy of Sciences Memorandum of Understanding on Cooperation in the Physical, Chemical and Engineering Sciences
- o Agreement on S&T Cooperation in the Field of Fuels and Energy
- o Agreement on Cooperation in Artificial Heart Research and Development
- o Agreement on Cooperation in Ocean Studies
- o Agreement Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes
- o Agreement on Cooperation in the Field of Environmental Protection
- o Agreement on Cooperation in Transportation Science and Technology
- o Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy
 - Memorandum of Cooperation in the Field of Civilian Nuclear Reactor Safety
 - Memorandum of Cooperation in the Fields of Environmental Restoration and Waste Management
 - Memorandum of Cooperation on Magnetic Fusion Energy
 - Memorandum of Cooperation on the Fundamental Properties of Matter
- o Agreement on Cooperation in the Field of Agriculture
- o Memorandum of Understanding on the Participation of the USSR in the Ocean Drilling Program as a Regular Member
- o Memorandum of Understanding on Scientific and Technical Cooperation in the Fields of Standards and Metrology between the U.S. National Institute of Standards and Technology and the Russian Federation Committee for Standardization and Metrology

?
Jane - Staff Mtg. Wed or
Thurs. at 1030 as sched.

1/ Peg N. - 1 car - parking or not? -

2/ NCS - Sandwiches:

Frank VH - Iced Tea

Whole Wheat, mayo, Let + Tom

Turkey

Gibbons - Iced tea

Whole Wheat

Turkey, mayo, Tomato (no lettuce)

Skip - Iced Tea (or anything diet)

Rye Bread

Pastrami / Corned beef

Lettuce / mustard

Chips or fries

Wales - Diet ^{Coke} Pepsi or Bottled

Turkey, pump, mayo + lettuce

3/ Wales will / will not attend

John - X 1048

Jeff S.
Mulle
586 9479

Fabio Saturni 202 647-3701

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
NATIONAL SECURITY AFFAIRS
572 OLD EXECUTIVE OFFICE BUILDING
WASHINGTON, DC 20500

DATE: 9/24

NO. OF PAGES (INCLUDING COVER SHEET) 2

TO: Peg Newland
NCS

PHONE: 703-692-8506
FAX: 703-692-7682

FROM: JoAnn Ward
OSTP

PHONE: 202-395-7326 OR 3272
FAX: 202-395-1572

SPECIAL INSTRUCTIONS:

Peggy -
Just in case "1" happens, here are
the lunch choices. Please give a copy
to Jo Cavalcante. Thanks - J

MINSKI

7. PEACEFUL USES OF ATOMIC ENERGY TERM: 6/01/95

**EXECUTIVE AGENTS: DOE
 MINISTRY OF ATOMIC POWER & INDUSTRY**

8. SPACE TERM: 6/17/97

**EXECUTIVE AGENTS: NASA
 RUSSIAN SPACE AGENCY**

9. TRANSPORTATION TERM: 5/31/93

**EXECUTIVE AGENTS: DOT
 MINSKI**

FACTORS AFFECTING COOPERATION

From both the governmental and private sector perspectives on the U. S. side, we have identified the following factors which inhibit current, and could limit expanded, S&T interaction between the U. S. and Russia. The factors identified seem to fall into seven general groupings as represented below.

BUREAUCRACY. Factors in this category seem to reflect extraordinary slowness or difficulty with functions recognized as necessary.

Customs--unusual delays are reported, as well as poor handling of sophisticated equipment required for scientific programs. Delays, of course, impede our interaction, something both governments are committed to facilitate. However, poor handling of equipment, such as unnecessary exposure to the elements of weather, could actually place that interaction in jeopardy.

Requirement for Russian government approval in some cases of cooperation/joint ventures--government approval is still required before some aspects of a particular projects, or the project itself, can be undertaken. The concern is that as changes occur in Russia, appropriate changes be made expeditiously to government procedures and regulations so that our S&T interaction is facilitated by the benefits accruing from the changes in Russia.

Taxes--in the past, the Russian government has taxed funds transferred to Russian collaborators. The rate was considerable and placed a considerable damper on the planned cooperation. Thanks to the efforts of your ministry, the situation apparently has been alleviate for cooperative activities, however, taxation is still a problem with S&T activities involving the U. S. private sector. The critical issue here is that a given project, whether governmental or private sector, costs more if taxed, and, therefore less interaction is available, and in fact some projects become uneconomical and are not undertaken.

COMMUNICATIONS. This is cited continuously by American participants as a hindrance to S&T activities with their Russian colleagues and covers the spectrum of reliable, accessible, and cost effective communications, including telephone, fax, postal, and e-mail service. The problem affects coordinating proposals and research, exchanging data and information, providing materials to Russian colleagues, and knowledge by Russian personnel of current events in S&T. An additional dimension of this problem is Russian-to-Russian communications. Many participants are no more knowledgeable of work being done in their own country than they are of international work.

- Telephone service between the U. S. and Russia is not adequate to support the breath of S&T interaction today, nor is internal Russian telephone service.
- Facsimile service is closely related to telephone service since facsimiles use telephone lines. Additionally, fax equipment used in both countries are not fully compatible.
- International postal service between the two countries is expensive, slow, and unreliable.
- E-mail is the coming medium of communications. This is especially true of scientific and academic activities, as well as large organizations, and increasingly of business activities as well. Only limited e-mail connectivity exists for Russian participants and the international colleagues. But the situation is even more limiting within Russia, both for foreigners attempting to communicate with Russian in cities outside of Moscow, and for Russians trying to communicate with their fellow countrymen. Given the inherent advantages of e-mail, namely store and forward capabilities, packet switching, and higher data rates, e-mail is an even more important, and potentially more beneficial, aspect of the communications situations.

The end result of these problems is that the flow of information is slowed and cooperative activities do not produce the results possible.

COORDINATION. American participants perceive a lack of coordination within Russia, including with, and within, the government. There are great changes occurring in Russia, and under such situations coordination is difficult, and in some cases unavoidable. In part this situation is highlighted simply to identify the situation. But in some respects, coordination could be improved. For example, American researchers find that colleagues in distant locations are unaware of cooperation initiated and under way in Moscow. Lack of coordination of this type limits the benefits of joint work.

COST BENEFIT ANALYSIS. Before undertaking a business venture or cooperative activity, each side should evaluate the cost of the program against the potential benefit. For cooperative government activities, we seem able to do this analysis. Likewise, some in the private sector can do this. However, there are members of the U.S. private sector who have expressed difficulty with such analyses when evaluating opportunities in Russia. Essentially, in some areas the problem is that there is insufficient information upon which to base an analysis. This may become a significant problem as the S&T

interaction between the U. S. and Russia matures and more is undertaken by the U. S. private sector, specifically, the business part of the private sector.

In a different sense, the lack of available information about capabilities has a broader effect. Some interaction is never even considered because the existence of some S&T institutions remains anonymous to foreigners, and because the capabilities of an even larger number of institutions are not known to foreigners interested in collaboration.

FINANCIAL. Financial matters are perhaps the most commonly cited areas affecting S&T interaction between the U. S. and Russia. Aside from the ever present situation of insufficient funds, both for the long and short terms, there are several other items worthy of mention. Both cooperating scientists and business persons mention the fact that the Russian banking is simply not set up to handle conveniently transfers of funds and conversion of currencies, both to and from rubles. Once funds are safely in a financial institution in Russia, it is very difficult to disburse the funds into the hands of the people intended to receive them. Part of this situation is the necessity to involve another bureaucracy, for example an institute, in the transaction in order for the funds to get to an individual.

The business sector finds the rate of inflation, interest rates for borrowing money in Russia, along with the difficulty of converting the ruble as particularly limiting.

INFRASTRUCTURE. American scientists, engineers, and businessmen have reported that in their dealings, infrastructure has a direct effect on joint undertakings. Their findings may be grouped into three areas: administrative, managerial, and logistical support; transportation; and, accommodations and habitability.

There is cooperation occurring today under present conditions. However, existing cooperation would be enhanced and facilitated and new cooperation could be expected if these areas of the infrastructure were improved. For example, the professional societies and associations experience difficulty sustaining their programs once those programs are set up because there is no administrative and management structure to sustain them. Health and safety issues, as well as the availability of supplies and equipment for research, also affect joint interactions. Transportation availability, specifically Aeroflot, is a major factor. Since Aeroflot is often the only option for travel within Russia it has a major effect, and in some cases cost and dependability frustrate American travellers and may actually prevent interaction. Finally, accommodations for visiting scientists and engineers, including availability of rooms and hot water, is a key consideration in cooperative undertakings.

OWNERSHIP. Of course, the issue of ownership is fundamental to the changes taking place in Russia. Just as Russians are wrestling with this issue, American scientists, engineers, and businessmen are trying to understand the ways in which ownership is developing. This is key to understand with whom they should deal. From the U. S. perspective, there are several aspects of this issue which bear directly on our S&T interactions. Among the them are:

- The types of ownership, that is Intellectual Property Rights (IPR), personal, and commercial.
- What do these types of ownership mean in practical terms to a Russian and to a foreigner?
- What do these types of ownership mean in philosophical terms to a Russian and to a foreigner? Are the meanings the same?
- Who has the legal and bureaucratic authority to commit to a business deal or cooperative program or project? This is not always apparent to the American participant.
- In situations where a technology already exists in Russia a question often confronts the American as to with whom one should proceed in commercializing the technology.
- Following joint development of a technology, who should the Russian partner be?

POSSIBLE AREAS FOR EXPANDED COOPERATION

There is considerable interest both in government and in the private sector to expand U.S.-Russian S&T interaction. In preparing for the December 1992 meeting, the U. S. government has reaffirmed its desire to continue S&T cooperation now underway.

Further, some preliminary interest has been shown in expanding cooperation in several areas. The areas identified below offer a basis for discussions on expanding cooperation. I should point out, to be absolutely clear, that these are areas of interest for possible cooperation in the future. Whether or not real cooperation will result in these areas will depend on three factors: first, the result of our bilateral discussions of these areas; second, further assessment to determine the feasibility and desirability of additional cooperation in a given area; and, third, whether there are sufficient funds available to undertake additional cooperation in these areas. These factors would seem to affect both sides. Additionally, some of the factors that affect cooperation may impact on the desirability of expanding cooperation into certain areas.

Finally, there is firm interest to expand cooperation to include all regions of Russia, particularly the Far East.

The areas identified for possible future cooperation are:

- **Aviation, maritime and surface transportation.**
- **Health, biomedical, and behavior research on the effects of environmental pollution, including Chernobyl and Chelyabinsk; radiological health studies; drug development; and scientific and technical information systems.**
- **Biological, engineering, and social sciences.**
- **Geosciences; assessment and management of energy, mineral, and water resources.**
- **Energy, fusion research, environmental restoration and waste management, radiological health studies, fossil energy technologies, nuclear safety, and energy conservation.**
- **Materials science.**

There is also interest in offering limited project-related training, seminars, and equipment in some of the areas cited above, subject to availability of funding.

The private sector has expressed interest in expanding cooperation in S&T to achieve a more normal US-Russia S&T relationship. Development of such a relationship will depend heavily on many of the factors identified as affecting cooperation, but, in the long term, would be the healthiest and most constructive type of S&T interaction between our two countries.

POSSIBLE NEW ARRANGEMENTS FOR EXPANDED COOPERATION

To permit, facilitate, and enhance current and expanded future S&T cooperation between the United States and Russia, a number of ideas can be suggested. Several ideas are provided below. They are not necessarily mutually exclusive, but rather represent a continuum. Some would overlap and be mutually supportive. It is believed that this list provides the grist for healthy and potentially fruitful discussions in December.

- Continue existing governmental arrangements with adjustments to address governmentally controlled factors affecting cooperation, such as IPR.
- Broadening and restructuring existing agreements to include new areas of cooperation and to establish operating procedures which will resolve factors affecting cooperation.
- A joint consultative mechanism, where appropriate, to address major policy issues, and to propose joint solutions to factors which limit cooperation, including aspects of multilateral cooperation which affect bilateral cooperation.
- A foundation to promote government, private sector, and university civilian joint research in scientific, engineering, and industrial R&D (the Brown proposal.)
- Public/private sector partnerships for drug discovery.
- Formation of new, non-governmental professional association/society relationships.

This list is intended only as a sample of possible steps which could be considered and is intended to define the range of possibilities. Inclusion of particular items on this list does not necessarily indicate U. S. government commitment to pursue it in the future.

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Customs--unusual delays are reported, as well as poor handling of sophisticated equipment required for scientific programs. Delays, of course, impede our interaction, something both governments are committed to facilitate. However, poor handling of equipment, such as unnecessary exposure to the elements of weather, could actually place that interaction in jeopardy.

Requirement for Russian government approval in some cases of cooperation/joint ventures--government approval is still required before some aspects of a particular projects, or the project itself, can be undertaken. The concern is that as changes occur in Russia, appropriate changes be made expeditiously to government procedures and regulations so that our S&T interaction is facilitated by the benefits accruing from the changes in Russia.

Taxes--in the past, the Russian government has taxed funds transferred to Russian collaborators. The rate was considerable and placed a considerable damper on the planned cooperation. Thanks to the efforts of your ministry, the situation apparently has been alleviate for cooperative activities, however, taxation is still a problem with S&T activities involving the U. S. private sector. The critical issue here is that a given project, whether governmental or private sector, costs more if taxed, and, therefore less interaction is available, and in fact some projects become uneconomical and are not undertaken.

COMMUNICATIONS. This is cited continuously by American participants as a hindrance to S&T activities with their Russian colleagues and covers the spectrum of reliable, accessible, and cost effective communications, including telephone, fax, postal, and e-mail service. The problem affects coordinating proposals and research, exchanging data and information, providing materials to Russian colleagues, and knowledge by Russian personnel of current events in S&T. An additional dimension of this problem is Russian-to-Russian communications. Many participants are no more knowledgeable of work being done in their own country than they are of international work.

- Telephone service between the U. S. and Russia is not adequate to support the breath of S&T interaction today, nor is internal Russian telephone service.
- Facsimile service is closely related to telephone service since facsimiles use telephone lines. Additionally, fax equipment used in both countries are not fully compatible.
- International postal service between the two countries is expensive, slow, and unreliable.
- E-mail is the coming medium of communications. This is especially true of scientific and academic activities, as well as large organizations, and increasingly of business activities as well. Only limited e-mail connectivity exists for Russian participants and the international colleagues. But the situation is even more limiting within Russia, both for foreigners attempting to communicate with Russian in cities outside of Moscow, and for Russians trying to communicate with their fellow countrymen. Given the inherent advantages of e-mail, namely store and forward capabilities, packet switching, and higher data rates, e-mail is an even more important, and potentially more beneficial, aspect of the communications situations.

The end result of these problems is that the flow of information is slowed and cooperative activities do not produce the results possible.

COORDINATION. American participants perceive a lack of coordination within Russia, including with, and within, the government. There are great changes occurring in Russia, and under such situations coordination is difficult, and in some cases unavoidable. In part this situation is highlighted simply to identify the situation. But in some respects, coordination could be improved. For example, American researchers find that colleagues in distant locations are unaware of cooperation initiated and under way in Moscow. Lack of coordination of this type limits the benefits of joint work.

COST BENEFIT ANALYSIS. Before undertaking a business venture or cooperative activity, each side should evaluate the cost of the program against the potential benefit. For cooperative government activities, we seem able to do this analysis. Likewise, some in the private sector can do this. However, there are members of the U.S. private sector who have expressed difficulty with such analyses when evaluating opportunities in Russia. Essentially, in some areas the problem is that there is insufficient information upon which to base an analysis. This may become a significant problem as the S&T

interaction between the U. S. and Russia matures and more is undertaken by the U. S. private sector, specifically, the business part of the private sector.

In a different sense, the lack of available information about capabilities has a broader effect. Some interaction is never even considered because the existence of some S&T institutions remains anonymous to foreigners, and because the capabilities of an even larger number of institutions are not known to foreigners interested in collaboration.

FINANCIAL. Financial matters are perhaps the most commonly cited areas affecting S&T interaction between the U. S. and Russia. Aside from the ever present situation of insufficient funds, both for the long and short terms, there are several other items worthy of mention. Both cooperating scientists and business persons mention the fact that the Russian banking is simply not set up to handle conveniently transfers of funds and conversion of currencies, both to and from rubles. Once funds are safely in a financial institution in Russia, it is very difficult to disburse the funds into the hands of the people intended to receive them. Part of this situation is the necessity to involve another bureaucracy, for example an institute, in the transaction in order for the funds to get to an individual.

The business sector finds the rate of inflation, interest rates for borrowing money in Russia, along with the difficulty of converting the ruble as particularly limiting.

INFRASTRUCTURE. American scientists, engineers, and businessmen have reported that in their dealings, infrastructure has a direct effect on joint undertakings. Their findings may be grouped into three areas: administrative, managerial, and logistical support; transportation; and, accommodations and habitability.

There is cooperation occurring today under present conditions. However, existing cooperation would be enhanced and facilitated and new cooperation could be expected if these areas of the infrastructure were improved. For example, the professional societies and associations experience difficulty sustaining their programs once those programs are set up because there is no administrative and management structure to sustain them. Health and safety issues, as well as the availability of supplies and equipment for research, also affect joint interactions. Transportation availability, specifically Aeroflot, is a major factor. Since Aeroflot is often the only option for travel within Russia it has a major effect, and in some cases cost and dependability frustrate American travellers and may actually prevent interaction. Finally, accommodations for visiting scientists and engineers, including availability of rooms and hot water, is a key consideration in cooperative undertakings.

OWNERSHIP. Of course, the issue of ownership is fundamental to the changes taking place in Russia. Just as Russians are wrestling with this issue, American scientists, engineers, and businessmen are trying to understand the ways in which ownership is developing. This is key to understanding with whom they should deal. From the U. S. perspective, there are several aspects of this issue which bear directly on our S&T interactions. Among them are:

- The types of ownership, that is Intellectual Property Rights (IPR), personal, and commercial.
- What do these types of ownership mean in practical terms to a Russian and to a foreigner?
- What do these types of ownership mean in philosophical terms to a Russian and to a foreigner? Are the meanings the same?
- Who has the legal and bureaucratic authority to commit to a business deal or cooperative program or project? This is not always apparent to the American participant.
- In situations where a technology already exists in Russia a question often confronts the American as to with whom one should proceed in commercializing the technology.
- Following joint development of a technology, who should the Russian partner be?

POSSIBLE AREAS FOR EXPANDED COOPERATION

There is considerable interest both in government and in the private sector to expand U.S.-Russian S&T interaction. In preparing for the December 1992 meeting, the U. S. government has reaffirmed its desire to continue S&T cooperation now underway.

Further, some preliminary interest has been shown in expanding cooperation in several areas. The areas identified below offer a basis for discussions on expanding cooperation. I should point out, to be absolutely clear, that these are areas of interest for possible cooperation in the future. Whether or not real cooperation will result in these areas will depend on three factors: first, the result of our bilateral discussions of these areas; second, further assessment to determine the feasibility and desirability of additional cooperation in a given area; and, third, whether there are sufficient funds available to undertake additional cooperation in these areas. These factors would seem to affect both sides. Additionally, some of the factors that affect cooperation may impact on the desirability of expanding cooperation into certain areas.

Finally, there is firm interest to expand cooperation to include all regions of Russia, particularly the Far East.

The areas identified for possible future cooperation are:

- Aviation, maritime and surface transportation.
- Health, biomedical, and behavior research on the effects of environmental pollution, including Chernobyl and Chelyabinsk; radiological health studies; drug development; and scientific and technical information systems.
- Biological, engineering, and social sciences.
- Geosciences; assessment and management of energy, mineral, and water resources.
- Energy, fusion research, environmental restoration and waste management, radiological health studies, fossil energy technologies, nuclear safety, and energy conservation.
- Materials science.

There is also interest in offering limited project-related training, seminars, and equipment in some of the areas cited above, subject to availability of funding.

The private sector has expressed interest in expanding cooperation in S&T to achieve a more normal US-Russia S&T relationship. Development of such a relationship will depend heavily on many of the factors identified as affecting cooperation, but, in the long term, would be the healthiest and most constructive type of S&T interaction between our two countries.

POSSIBLE NEW ARRANGEMENTS FOR EXPANDED COOPERATION

To permit, facilitate, and enhance current and expanded future S&T cooperation between the United States and Russia, a number of ideas can be suggested. Several ideas are provided below. They are not necessarily mutually exclusive, but rather represent a continuum. Some would overlap and be mutually supportive. It is believed that this list provides the grist for healthy and potentially fruitful discussions in December.

- Continue existing governmental arrangements with adjustments to address governmentally controlled factors affecting cooperation, such as IPR.
- Broadening and restructuring existing agreements to include new areas of cooperation and to establish operating procedures which will resolve factors affecting cooperation.
- A joint consultative mechanism, where appropriate, to address major policy issues, and to propose joint solutions to factors which limit cooperation, including aspects of multilateral cooperation which affect bilateral cooperation.
- A foundation to promote government, private sector, and university civilian joint research in scientific, engineering, and industrial R&D (the Brown proposal.)
- Public/private sector partnerships for drug discovery.
- Formation of new, non-governmental professional association/society relationships.

This list is intended only as a sample of possible steps which could be considered and is intended to define the range of possibilities. Inclusion of particular items on this list does not necessarily indicate U. S. government commitment to pursue it in the future.

CONGRESS
93rd Session

HOUSE OF REPRESENTATIVES

REPORT
102-968

NATIONAL DEFENSE AUTHORIZATION
ACT FOR FISCAL YEAR 1995

CONFERENCE REPORT

TO ACCOMPANY

H.R. 5006



Printed to be printed

THIS IS THE "NUNN-LUGAR"
258 PROVISION

TITLE XIV—DEMILITARIZATION OF THE FORMER SOVIET UNION

Subtitle A—Short Title

SEC. 1401. SHORT TITLE.

This title may be cited as the "Former Soviet Union Demilitarization Act of 1992".

Subtitle B—Findings and Program Authority

SEC. 1411. DEMILITARIZATION OF THE INDEPENDENT STATES OF THE FORMER SOVIET UNION.

The Congress finds that it is in the national security interest of the United States—

(1) to facilitate, on a priority basis—

(A) the transportation, storage, safeguarding, and destruction of nuclear and other weapons of the independent states of the former Soviet Union, including the safe and secure storage of fissile materials, dismantlement of missiles and launchers, and the elimination of chemical and biological weapons capabilities;

(B) the prevention of proliferation of weapons of mass destruction and their components and destabilizing conventional weapons of the independent states of the former Soviet Union, and the establishment of verifiable safeguards against the proliferation of such weapons;

(C) the prevention of diversion of weapons-related scientific expertise of the former Soviet Union to terrorist groups or third countries; and

(D) other efforts designed to reduce the military threat from the former Soviet Union;

(2) to support the demilitarization of the massive defense-related industry and equipment of the independent states of the former Soviet Union and conversion of such industry and equipment to civilian purposes and uses; and

(3) to expand military-to-military contacts between the United States and the independent states of the former Soviet Union.

SEC. 1412. AUTHORITY FOR PROGRAMS TO FACILITATE DEMILITARIZATION.

(a) **IN GENERAL.**—Notwithstanding any other provision of law, the President is authorized, in accordance with this title, to establish and conduct programs described in subsection (b) to assist the demilitarization of the independent states of the former Soviet Union.

(b) **TYPES OF PROGRAMS.**—The programs referred to in subsection (a) are limited to—

(1) transporting, storing, safeguarding, and destroying nuclear, chemical, and other weapons of the independent states of the former Soviet Union, as described in section 212(b) of the Soviet Nuclear Threat Reduction Act of 1991 (title II of Public Law 102-228);

(2) establishing verifiable safeguards against the proliferation of such weapons and their components;

(3) preventing diversion of weapons-related scientific expertise of the former Soviet Union to terrorist groups or third countries;

(4) facilitating the demilitarization of the defense industries of the former Soviet Union and the conversion of military technologies and capabilities into civilian activities;

(5) establishing science and technology centers in the independent states of the former Soviet Union for the purpose of engaging weapons scientists, engineers, and other experts previously involved with nuclear, chemical, and other weapons in productive, nonmilitary undertakings; and

(6) expanding military-to-military contacts between the United States and the independent states of the former Soviet Union.

(c) **UNITED STATES PARTICIPATION.**—The programs described in subsection (b) should, to the extent feasible, draw upon United States technology and expertise, especially from the United States private sector.

(d) **RESTRICTIONS.**—United States assistance authorized by subsection (a) may not be provided unless the President certifies to the Congress, on an annual basis, that the proposed recipient country is committed to—

(1) making a substantial investment of its resources for dismantling or destroying such weapons of mass destruction, if such recipient has an obligation under a treaty or other agreement to destroy or dismantle any such weapons;

(2) forgoing any military modernization program that exceeds legitimate defense requirements and forgoing the replacement of destroyed weapons of mass destruction;

(3) forgoing any use in new nuclear weapons of fissionable or other components of destroyed nuclear weapons;

(4) facilitating United States verification of any weapons destruction carried out under this title or section 212 of the Soviet Nuclear Threat Reduction Act of 1991 (title II of Public Law 102-228);

(5) complying with all relevant arms control agreements; and

(6) observing internationally recognized human rights, including the protection of minorities.

Subtitle C—Administrative and Funding Authorities

SEC. 1421. ADMINISTRATION OF DEMILITARIZATION PROGRAMS

(a) **FUNDING.**—(1) In recognition of the direct contributions to the national security interests of the United States of the activities specified in section 1412, funds transferred under sections 108 and 109 of Public Law 102-229 (105 Stat. 1708) are authorized to be made available to carry out this title. Of the amount available to carry out this title—

(A) not more than \$40,000,000 may be made available for programs referred to in section 1412(b)(4) relating to demilitarization of defense industries;

(B) not more than \$15,000,000 may be made available for programs referred to in section 1412(b)(6) relating to military-to-military contacts;

(C) not more than \$25,000,000 may be made available for joint research development programs pursuant to section 1441;

(D) not more than \$10,000,000 may be made available for the study, assessment, and identification of nuclear waste disposal activities by the former Soviet Union in the Arctic region;

(E) not more than \$25,000,000 may be made available for Project PEACE; and

(F) not more than \$10,000,000 may be made available for the Volunteers Investing in Peace and Security (VIPS) program under chapter 89 of title 10, United States Code, as added by section 1322.

(2) Section 221(a) of the Soviet Nuclear Threat Reduction Act of 1991 (title II of Public Law 102-228; 105 Stat. 1695) is amended—

(A) by striking out "fiscal year 1992" and inserting "fiscal years 1992 and 1993"; and

(B) by striking out "\$400,000,000" and inserting in lieu thereof "\$800,000,000".

(3) Section 221(e) of such Act is amended—

(A) by inserting "for fiscal year 1992 or fiscal year 1993" after "under part B";

(B) by inserting "for that fiscal year" after "for that program"; and

(C) by striking out "for fiscal year 1992" and inserting in lieu thereof "for that fiscal year".

(b) TECHNICAL REVISIONS TO PUBLIC LAW 102-229.—Public Law 102-229 is amended—

(1) in section 108 (105 Stat. 1708), by striking out "contained in H.R. 3807, as passed the Senate on November 25, 1991" and inserting in lieu thereof "(title II of Public Law 102-228)"; and

(2) in section 109 (105 Stat. 1708)—

(A) by striking out "H.R. 3807, as passed the Senate on November 25, 1991" and inserting in lieu thereof "Public Law 102-228 (105 Stat. 1696)"; and

(B) by striking "of H.R. 3807".

Subtitle D—Reporting Requirements

SEC. 1431. PRIOR NOTICE TO CONGRESS OF OBLIGATION OF FUNDS.

(a) IN GENERAL.—Not less than 15 days before obligating any funds made available for a program under this title, the President shall transmit to the Congress a report on the proposed obligation. Each such report shall specify—

(1) the account, budget activity, and particular program or programs from which the funds proposed to be obligated are to be derived and the amount of the proposed obligation; and

(2) the activities and forms of assistance under this title for which the President plans to obligate such funds, including the projected involvement of United States Government departments and agencies and the United States private sector.

(b) INDUSTRY.—The President shall contain in the report required by this section a description of the activities of the industry, including the manner in which the industry is contributing to the development of the technology of the industry.

(1) the industry shall contain a description of the technology of the industry.

(2) the industry shall contain a description of the technology of the industry.

(3) the industry shall contain a description of the technology of the industry.

(4) the industry shall contain a description of the technology of the industry.

(5) the industry shall contain a description of the technology of the industry.

SEC. 1432. QUARTERLY REPORTS.—Not later than the first day of each fiscal year, the President shall transmit to the Congress a report on the progress of the activities of the industry under this title. Each report shall contain—

(1) a description of the progress of the activities of the industry under this title.

(2) a description of the progress of the activities of the industry under this title.

(3) a description of the progress of the activities of the industry under this title.

(4) a description of the progress of the activities of the industry under this title.

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(10) a description of the progress of the activities of the industry under this title.

SEC. 1441. PRIVATE SECTOR.—The President shall actively involve the private sector in the development of the technology of the industry.

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(b) **INDUSTRIAL DEMILITARIZATION.**—Any report under subsection (a) that covers proposed industrial demilitarization projects shall contain additional information to assist the Congress in determining the merits of the proposed projects. Such information shall include descriptions of—

- (1) the facilities to be demilitarized;
- (2) the types of activities conducted at those facilities and of the types of nonmilitary activities planned for those facilities;
- (3) the forms of assistance to be provided by the United States Government and by the United States private sector;
- (4) the extent to which military production capability will consequently be eliminated at those facilities; and
- (5) the mechanisms to be established for monitoring progress on those projects.

SEC. 1432. QUARTERLY REPORTS ON PROGRAMS.

Not later than 30 days after the end of the last fiscal year quarter of fiscal year 1992 and not later than 30 days after the end of each fiscal year quarter of fiscal year 1993, the President shall transmit to the Congress a report on the activities carried out under this title. Each such report shall set forth, for the preceding fiscal year quarter and cumulatively, the following:

- (1) The amounts expended for such activities and the purposes for which they were expended.
- (2) The source of the funds obligated for such activities, specified by program.
- (3) A description of the participation of all United States Government departments and agencies and the United States private sector in such activities.
- (4) A description of the activities carried out under this title and the forms of assistance provided under this title, including, with respect to proposed industrial demilitarization projects, additional information on the progress toward demilitarization of facilities and the conversion of the demilitarized facilities to civilian activities.
- (5) Such other information as the President considers appropriate to fully inform the Congress concerning the operation of the programs authorized under this title.

Subtitle E—Joint Research and Development Programs

SEC. 1441. PROGRAMS WITH STATES OF FORMER SOVIET UNION.

The Congress encourages the Secretary of Defense to participate actively in joint research and development programs with the independent states of the former Soviet Union through the nongovernmental foundation established for this purpose by section 511 of the FREEDOM Support Act of 1992. To that end, the Secretary of Defense may spend those funds authorized in section 1421(a)(1)(C) for support, technical cooperation, in-kind assistance, and other activities with the following purposes:

- (1) To advance defense conversion by funding civilian collaborative research and development projects between scientists and engineers in the United States and in the independent states of the former Soviet Union.

(2) To assist the establishment of a market economy in the independent states of the former Soviet Union by promoting identifying, and partially funding joint research, development, and demonstration ventures between United States businesses and scientists, engineers, and entrepreneurs in those independent states.

(3) To provide a mechanism for scientists, engineers, and entrepreneurs in the independent states of the former Soviet Union to develop an understanding of commercial business practices by establishing linkages to United States scientists, engineers, and businesses.

(4) To provide access for United States businesses to sophisticated new technologies, talented researchers, and potential new markets within the independent states of the former Soviet Union.

(5) To provide productive research and development opportunities within the independent states of the former Soviet Union that offer scientists and engineers alternatives to emigration and help prevent proliferation of weapons technologies and the dissolution of the technological infrastructure of those states.

TITLE XV—NONPROLIFERATION

SEC. 1501. SHORT TITLE.

This title may be cited as the "Weapons of Mass Destruction Control Act of 1992".

SEC. 1502. SENSE OF CONGRESS.

It is the sense of the Congress that—

(1) the proliferation (A) of nuclear, biological, and chemical weapons (hereinafter in this title referred to as "weapons of mass destruction") and related technology and knowledge and (B) of missile delivery systems remains one of the most serious threats to international peace and the national security of the United States in the post-cold war era;

(2) the proliferation of nuclear weapons, given the extraordinary lethality of those weapons, is of particularly serious concern;

(3) the nonproliferation policy of the United States should continue to seek to limit both the supply of and demand for weapons of mass destruction and to reduce the existing threat from proliferation of such weapons;

(4) substantial funding of nonproliferation activities by the United States is essential to controlling the proliferation of all weapons of mass destruction, especially nuclear weapons and missile delivery systems;

(5) the President's nonproliferation policy statement of June 1992, and his September 10, 1992, initiative to increase funding for nonproliferation activities in the Department of Energy are praiseworthy;

(6) the Congress is committed to cooperating with the President in carrying out an effective policy designed to control the proliferation of weapons of mass destruction;

(7) the President, high priority taken by the United States in funding for the year 1994;

(8) the Department of Energy have effectively of the

(9) under the fence and the assist in United States relating and emphasizing activities and monitor accidents assist with infrastructure and

(10) in a proliferation policy, of Energy show capabilities to i weapons of mass

SEC. 1503. REPORT OF THE DEPARTMENT OF ENERGY

(a) REPORT OF THE DEPARTMENT OF ENERGY shall be named in subsection of Defense and nonproliferation;

(b) MATTERS

(1) address the Department of Energy and capabilities of proliferation

(2) identify the Department of Energy and military and monitor (B) respond and to the interdiction and related

(3) describe which the Secretary of Defense mission commands support the in that mission

(4) conduct Research Agency (D)

PUBLIC LAW 102-396—OCT. 6, 1992

**DEPARTMENT OF DEFENSE
APPROPRIATIONS ACT, 1993**

2667(d)(1)(B), to be merged with and to be available for the same time period and the same purposes as the appropriation to which transferred.

SEC. 9108. None of the funds available to the Department of Defense in this Act may be used to award a contract for the procurement of four-ton dolly jacks if such equipment is or would be manufactured outside the United States of America and would be procured under any contract, agreement, arrangement, compact or other such instrument for which provisions including price differential provisions of the Buy American Act of 1933, as amended, or any other Federal buy national law was waived: *Provided*, That the Secretary of the military department responsible for such procurement may waive this restriction on a case-by-case basis by certifying in writing to the Committees on Appropriations of the House of Representatives and the Senate that adequate domestic supplies are not available to meet Department of Defense requirements on a timely basis and that such an acquisition must be made in order to acquire capability for national security purposes.

SEC. 9109. Notwithstanding any other provision of law, reimbursements received from the North Atlantic Treaty Organization for the E-3 Airborne Warning and Control System (AWACS) Radar System Improvement Program (RSIP) attributable to development work for fiscal years 1987 through 1992 shall be available to the Air Force until September 30, 1994, for meeting that service's financial commitments for the AWACS RSIP.

(TRANSFER OF FUNDS)

SEC. 9110. (a) The Secretary of Defense may transfer to appropriate appropriation accounts for the Department of Defense, out of funds appropriated to the Department of Defense for fiscal year 1993, up to \$400,000,000 to be available for the purposes authorized in the Former Soviet Union Demilitarization Act of 1992: *Provided*, That amounts so transferred shall be in addition to amounts transferred pursuant to the authority provided in section 108 of Public Law 102-229 (105 Stat. 1708).

(b) Of the funds transferred pursuant to subsection (a):

(1) not less than \$10,000,000 shall be available only for the study, assessment, and identification of nuclear waste disposal by the former Soviet Union in the Arctic region;

(2) not less than \$25,000,000 shall be available only for Project PEACE;

(3) not more than \$50,000,000 may be made available for the Multilateral Nuclear Safety Initiative announced in Lisbon, Portugal on May 23, 1992;

(4) not more than \$40,000,000 may be made available for demilitarization of defense industries;

(5) not more than \$15,000,000 may be made available for military-to-military contacts;

(6) not more than \$25,000,000 may be made available for joint research and development programs; and

(7) not more than \$10,000,000 may be made available for the Volunteers Investing in Peace and Security (VIPS) program.

(c) The Secretary of Defense may transfer from amounts appropriated to the Department of Defense for fiscal year 1993 or from balances in working capital funds not to exceed \$15,000,000 to

the appropriate purpose (d) The Law 102-229 for fiscal year 1993.

(e) The appropriation available to the \$40,000,000 ties authority of 1992: *Provided*, That the Secretary of Defense may carry out traditionally or Energy: authority of the On-Special Con

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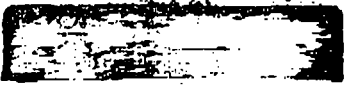
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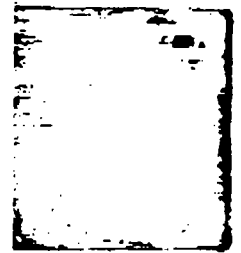
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PUBLIC LAW 102-511—OCT. 21, 1992

**FREEDOM FOR RUSSIA AND EMERGING
EURASIAN DEMOCRACIES AND OPEN
MARKETS SUPPORT ACT OF 1992
(FREEDOM SUPPORT ACT)**



PUBLIC LAW 102-511—OCT. 24, 1992

106 STAT. 2345

(1) a cost-benefit analysis comparing (A) the relative merits of the indefinite storage and safeguarding of such materials in the independent states of the former Soviet Union and (B) its acquisition by the United States by purchase, barter, or other means;

(2) a discussion of relevant issues such as the protection of United States uranium producers from dumping, the relative vulnerability of these stocks of special nuclear materials to illegal proliferation, and the potential electrical and other savings associated with their being made available in the fuel cycle in the United States; and

(3) a discussion of how highly enriched uranium stocks could be diluted for reactor fuel.

SEC. 511. RESEARCH AND DEVELOPMENT FOUNDATION.

22 USC 5861.

(a) **ESTABLISHMENT.**—The Director of the National Science Foundation (hereinafter in this section referred to as the "Director") is authorized to establish an endowed, nongovernmental, nonprofit foundation (hereinafter in this section referred to as the "Foundation") in consultation with the Director of the National Institute of Standards and Technology.

(b) **PURPOSES.**—The purposes of the Foundation shall be the following:

(1) To provide productive research and development opportunities within the independent states of the former Soviet Union that offer scientists and engineers alternatives to emigration and help prevent the dissolution of the technological infrastructure of the independent states.

(2) To advance defense conversion by funding civilian collaborative research and development projects between scientists and engineers in the United States and in the independent states of the former Soviet Union.

(3) To assist in the establishment of a market economy in the independent states of the former Soviet Union by promoting, identifying, and partially funding joint research, development, and demonstration ventures between United States businesses and scientists, engineers, and entrepreneurs in those independent states.

(4) To provide a mechanism for scientists, engineers, and entrepreneurs in the independent states of the former Soviet Union to develop an understanding of commercial business practices by establishing linkages to United States scientists, engineers, and businesses.

(5) To provide access for United States businesses to sophisticated new technologies, talented researchers, and potential new markets within the independent states of the former Soviet Union.

(c) **FUNCTIONS.**—In carrying out its purposes, the Foundation shall—

(1) promote and support joint research and development projects for peaceful purposes between scientists and engineers in the United States and independent states of the former Soviet Union on subjects of mutual interest; and

(2) seek to establish joint nondefense industrial research, development, and demonstration activities through private sector linkages which may involve participation by scientists and

106 STAT. 3346

PUBLIC LAW 102-511--OCT. 24, 1992

engineers in the university or academic sectors, and which shall include some contribution from industrial participants.

(d) FUNDING.—

(1) USE OF CERTAIN DEPARTMENT OF DEFENSE FUNDS.—

(A) To the extent funds appropriated to carry out subtitle F of title XIV of the National Defense Authorization Act for Fiscal Year 1993 (relating to joint research and development programs with the independent states of the former Soviet Union) are otherwise available for such purpose, such funds may be made available to the Director for use by the Director in establishing the endowment of the Foundation and otherwise carrying out this section.

(B) For each fiscal year after fiscal year 1993, not more than 50 percent of the funds made available to the Foundation by the United States Government may be funds appropriated in the national defense budget function (function 050).

(2) CONTRIBUTION TO ENDOWMENT BY PARTICIPATING INDEPENDENT STATES.—As a condition of participation in the Foundation, an independent state of the former Soviet Union must make a minimum contribution to the endowment of the Foundation, as determined by the Director, which shall reflect the ability of the independent state to make a financial contribution and its expected level of participation in the Foundation's programs.

(3) DEBT CONVERSIONS.—To the extent provided in advance by appropriations Acts, local currencies or other assets resulting from government-to-government debt conversions may be made available to the Foundation. For purposes of this paragraph, the term "debt conversion" means an agreement whereby a country's government-to-government or commercial external debt burden is exchanged by the holder for local currencies, policy commitments, other assets, or other economic activities, or for an equity interest in an enterprise theretofore owned by the debtor government.

(4) LOCAL CURRENCIES.—In addition to other uses provided by law, and subject to agreement with the foreign government, local currencies generated by United States assistance programs may be made available to the Foundation.

(5) INVESTMENT OF GOVERNMENT ASSISTANCE.—The Foundation may invest any revenue provided to it through United States Government assistance, and any interest earned on such investment may be used only for the purpose for which the assistance was provided.

(6) OTHER FUNDS FROM GOVERNMENT AND NON-GOVERNMENTAL SOURCES.—The Foundation may accept such other funds as may be provided to it by Government agencies or nongovernmental entities.

TITLE VI—SPACE TRADE AND COOPERATION

22 USC 5871.

SEC. 601. FACILITATING DISCUSSIONS REGARDING THE ACQUISITION OF SPACE HARDWARE, TECHNOLOGY, AND SERVICES FROM THE FORMER SOVIET UNION.

(a) EXPEDITED REVIEW.—Any request for a license or other approval described in subsection (c) that is submitted to any United

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Washington, D.C. 20520

Bureau of European and
Canadian Affairs

OFFICE OF INDEPENDENT STATES AND
COMMONWEALTH AFFAIRS (EUR/ISCA)

FAX COVER SHEET

RETURN FAX NO. (202) 647-3506

DATE: 3-25-93

TO: Dana Marshall

FAX NO. 395-6042

FROM: EUR/ISCA/^{CAST} Alison Barkley

SUBJECT: Civilian Research &
Development Foundation

REMARKS: per our telephone
conversation. My direct phone
is 647-6770.

Thanks a lot - we've been trying to
focus attention on this for a long time.

NUMBER OF PAGES FOLLOW: 1

March 25, 1993

UNCLASSIFIED

MEMORANDUM FOR: Dana Marshall, Office of the Vice President
FROM: EUR/ISCA/CAST - CABarkley
SUBJECT: Civilian Research & Development Foundation

We have dropped the ball in summit preparations on Russian science and technology. Nothing has been done. Yet, US national security would be increased if we could demilitarize the work of the more than 3 million Russian scientists and engineers. Putting Russian scientific talent into the development of civilian technology would help to revive economic growth in that country. U.S. competitiveness also may be spurred through our exposure to novel Russian approaches to solving technology problems.

In a non-paper to Secretary Christopher in Geneva, Foreign Minister Kozyrev made several suggestions on how the US and Russia should work together in science and technology. One proposal was for the U.S. to establish the Civil R and D Foundation that was authorized in the Freedom Support Act. Funding of up to \$25 million was appropriated in the Defense Budget for 1993. In a non-paper of March 19, Ambassador Lukin calls for the announcement at the summit of a joint R and D Foundation.

Bureaucrats and lawyers in the Department of Defense continue to oppose the idea even though Secretary Aspin was a co-sponsor of this idea as a Congressman. Vice President Gore was also a co-sponsor. DOD claims that Nunn-Lugar funds cannot be spent on non-weapons related scientists. State lawyers maintain that the FREEDOM Support Act legislative language can be, and indeed was meant to be, interpreted more broadly.

We have heard repeated complaints from the Russian side that the U.S. has not followed through for help in creating a civilian science sector in Russia. Without that sector, Russian military scientists have nowhere to go but abroad to practice their professions. The ISTC was a good idea, but has been a real disappointment. Russian parliamentary ratification is by no means assured, and meanwhile we have scientific proposals gathering dust.

The Civilian R&D Foundation could be up and running very quickly because it does not require an intergovernmental agreement or Russian parliamentary approval. The Foundation would be an important step toward developing a Russian civilian science sector that responds to societal needs and promotes economic development. It is intended as a flexible, non-governmental initiative that can be managed from Washington rather than Moscow.

UNCLASSIFIED

MARCH 23, 1993
AGENDA: RUSSIAN S&T ISSUES AND SUMMIT

APRIL 3-4 SUMMIT STATUS

- **JHG PARTICIPATION**
- **COMMUNIQUE:**

FOUNDATION
TASKING FOR FOLLOW-ON S&T MEETING

UPDATE - SALTYKOV TRIP TO U.S.

- **NEW INFO ON APRIL 17-28**
- **GEORGETOWN CONFERENCE - APRIL 20**
- **BASIC SCIENCES JOINT COMMISSION MEETING**
- **CHANCES FOR CANCELLATION: REFERENDUM ON APRIL 25**

SUMMIT FOLLOW-ON PLANS

- **DATE**
- **LOCATION**
- **CHARGE FROM APRIL 4 SUMMIT COMMUNIQUE**

LETTER TO SALTYKOV

- **GEORGETOWN CONFERENCE**
- **BASIC SCIENCES JOINT COMMISSION MEETING**
- **SUMMIT FOLLOW-ON S&T TALKS**

GENERAL SUMMIT S&T COORDINATION

- **HISTORICALLY A PROBLEM**
- **SAME THIS TIME**
- **ACTION NEEDED: JHG TO SPEAK TO LAKE OR TALBOTT ON OSTP ROLE**

SUMMIT S&T COORDINATION/GENERAL

APRIL 3-4 SUMMIT STATUS

- **GIBBONS PARTICIPATION**
- **COMMUNIQUE**

SALTYKOV TRIP TO U.S. APRIL 17-28

- **GEORGETOWN FOUNDATION TASKING FOR FOLLOW-ON S&T MEETING - APRIL 20**
- **MIT**
- **BASIC SCIENCES**

SUMMIT S&T FOLLOW-ON

- **CHARGE FROM APRIL 4 COMMUNIQUE**
- **LOCATION**
- **KEEP BUSH-YELTSIN IN BACKGROUND**
- **DATE**

March 18, 1993

BOOZ-ALLEN HAMILTON Inc.
Crystal Square 2, Suite 1100
1725 Jefferson Davis Hwy
Arlington VA 22202-4158
USA
fax: 703-685-6508

Dear Sirs,

I am pleased to invite you to participate in the Consulting Workshop "International Collaboration in the field of Military Conversion Technologies" (ICMCT) which will be held June 15-22 1993 in Russia on board the Special Cruise ship "Kronshtadt" as it sails

from St.Petersburg to Valaam and Kiji returning to St.Petersburg.

The information on registration is enclosed with this letter. The Second Announcement will be sent to you as soon as possible.

Please notice that the deadline for foreign participants is April 25 1993.

If you plan to submit contributions to the ICMCT Workshop and/or if you are interested in discussion of the Business Events details (advertising, consulting services etc.), please forward titles and short abstracts as well as your proposals to the Local Organizing Committee.

We are looking forward to a mutually beneficial collaboration in the field of advanced technologies between US-business and Russian institutions.

Sincerely yours,



Andrei Ushakov,
ICMCT Local Organizing
Committee Chairman

Encl.: First Announcement
Registration form
Financial Conditions

For additional details about the Workshop Program please

Dr. A.G. Ushakov ICMCT Chairman
Applied Physics Division Kurchatov Institute of Atomic
Energy 123182 Moscow Russia
095-196-91-85
0947-20-02 095-943-00-73 095-206-28-47
e-mail: trash@kiae.su

BUSINESS EVENTS

Representatives from Russian and German legal consulting
companies will provide information and consulting services
during the Workshop for those who would be interested in joint
ventures with Russian enterprises concerning advanced tech-
nologies. A simultaneous translation into English, meeting
rooms for negotiations, means of communication and other
facilities (fax, copying machine, computers) will be
provided. Advertising facilities on board the ship will be available
for sponsors of the Workshop. Different forms of advertising can
be discussed.

For details concerning advertising and business events please

Dr. Sergey L. Bogolyubsky, ICMCT Workshop Director,
Scientific-Technical Center "Intercontact",
Rogova st. 7/7, room N 5, 123479, Moscow, Russia
Phone/fax: 095-947-20-02

Elite meeting

THE ORGANIZERS WILL ALSO CARRY OUT THE THIRD INTERNATIONAL SCHOOL ON PLASMA PHYSICS AND CONTROLLED FUSION (PPCF-3)

This is a traditional scientific meeting that began in 1989. The
aim of the PPCF Schools is to foster opportunities for free
scientific exchange and continuous education of young scientists
in the fields of Plasma Physics and Controlled Fusion and their
application into the World Scientific Community. The Interna-
tional Program Committee is headed by academician
Kadomtsev. The scientific program of the Third school
includes a magnetic confinement (tokamaks, stellarators,
inertial systems, plasma heating, processes of transport),
laser confinement (lasers, particle beams, liners, Z-pinches),
and general problems of the physics of plasmas and nonlinear
effects.

LOCATION

ICMCT Workshop will be held during the wonderful period of
"midnight sun" on board the ship "Alexander Uliyanov". The
ship is fully equipped with comfortable rooms for one to three

persons with all conveniences, modern conference halls and
facilities for intensive work and leisure. The ship will visit ancient
settlements, monasteries at Valaam and Kiji, relics of
St. Petersburg and Petrozavodsk, protected woodlands on the
riverside of Svir and other landmarks of the Russian North. The
average air temperature in June is 15-22°C, and the water
temperature is 15-18°C.

DEADLINE

The deadline for applications is March 15, 1993

LOCAL ORGANIZING COMMITTEE

S.L. Bogolyubsky /STC "Intercontact"/ - Director
S.V. Buraka /Staff of the Representative of the President of
Russia/
A.A. Dunaev /"Technolog" Co. Ltd./
A.L. Feoctistov /Lebedev Inst./
A.V. Kopchikov /Kurchatov Inst./ - Scientific Secretary
V.G. Kuchinsky /Efremov Inst./
L.G. Reshetnikov /"CHETEK" Int'l. Corp./
V.Yu. Shuvaev /Kurchatov Inst./
S.Yu. Stefanovich /Karpov Inst./ G.G. Tsytseyenya /MIU/
A.G. Ushakov /Kurchatov Inst., WYSE/ - Chairman
O.N. Vasileva /"CHETEK" Int'l. Corp./

ADDRESS

Please, send your requests for additional information and
your applications to one of the following addresses:
Dr. Andrei Ushakov, ICMCT Chairman, Applied Physics
Division, I.V. Kurchatov Institute of Atomic Energy, 123182,
Moscow, Russia Phone: 095-196-91-85 fax: 095-947-20-02
095-943-00-73 095-206-28-47 OR:
Dr. Alexander Kopchikov, ICMCT Scientific Secretary
Scientific-Technical Center "Intercontact", Rogova st. 7/7,
room N 5, 123479, Moscow, Russia Phone: 095-947-20-02
095-196-77-46 Fax: (095)-947-20-02
e-mail: trash@kiae.su



The Second Announcement will be sent
in February 1993

Local Organizing Committee November 12, 1992

First announcement



CONSULTING WORKSHOP

INTERNATIONAL COLLABORATION IN THE FIELD OF MILITARY CONVERSION TECHNOLOGIES

June 15-22, 1993

On board the special cruise ship as it sails
from St. Petersburg to Valaam
and Kiji returning to St. Petersburg

Valaam



St. Petersburg

Kiji

TIONAL PROGRAM COMMITTEE

Velikhov	Chairman,	Kurchatov Inst., Russia
Fecotistov	Vice Chairman,	Lebedev Inst., Russia
Hakimov		Kurchatov Inst., Russia
Ryabov	Ministry of Atomic Energy of the Russian Federation	
Iudakov		Kurchatov Inst., Russia
Glukhikh		Eremov Inst., Russia
Grigoryants		CHETEK International Corp., Russia
		CHETEK International Corp., Russia
Idlovsky		Industry Promotion Service, Germany
Start		International Trade Technology, USA
Lebidin		Aviation Industry Department, Russia
Simonov		Karpov Physical-Chemical Inst., Russia
Bazylev		Scientific Research Center "Soliton NTT", Russia
Vege		University of P.-M. Cite, France
		University of Colorado at Boulder, USA

GANIZERS

ETEK" International Corporation, Russia; Industry Promotion, Germany; Scientific-Technical Center "Intercontact", Russia; International Society "World Young Scientists and Engineers" (WYSE), Russia

participation of:

Research Center "Kurchatov Institute", Russia; International Analytical Center under the Russian Government, Russia; Moscow Innovation University (MIU), Russia; Scientific Research Center "Soliton NTT", Russia

NSORED BY:

ETEK" INTERNATIONAL CORPORATION
"INTERCONTACT"

participation of other sponsors and organizers is appreciated.

CTIVE OF THE WORKSHOP

CMCT Workshop is organized to provide discussions on advanced military technologies to civilian uses to integrate those technologies into Russian and international civilian economies. It is designed to help the new Russian industrial structures find their way into the Russian World markets.

GENERAL INFORMATION

Military conversion technologies will be presented by representatives of both the former Soviet military industrial complex and the new economic structures of the Commonwealth of Independent States. Western enterprises, companies and laboratories are encouraged to take part in this activity. The Program of the Workshop includes both plenary and poster sessions, free discussions. It also includes commercial sessions, consulting services, seminars and other business events.

REGISTRATION AND FEES

Dates of registration and departure will be given in Second Announcement. Fees for participants and other financial conditions are given on the separate sheet enclosed with this announcement. At the registration desk participants will receive your name badge, Workshop program, list of participants, banquet ticket and other materials.

CONTRIBUTIONS AND PROCEEDINGS

The organizers plan to publish Workshop materials in a book of Proceedings. The instructions on preparation will be given in the Second Announcement.

WORKSHOP PROGRAM

A total of 200 applications from Russian and foreign institutions have been received for the Workshop. The following research centers of the CIS will make presentations at the Workshop:

Russian Scientific Center "Kurchatov Institute" (Moscow)
Institute of High Current Electronics (Tomsk)
Nuclear Physics Institute (Terni)
Eremov Institute (St. Petersburg)
Institute of Experimental Physics (Mazamas-16)
CHETEK International Corporation (Moscow)
Kharlov Physical-Technical Institute (Kharlov, Ukraine)
Kharlov Radiotechnic and Electronic Institute (Kharlov, Ukraine)
Physics-energy Institute (Otrinski)
Moscow Engineering-Physics Institute (Moscow)
Lebedev Institute (Moscow)
Research Institute (Chelyabinsk-70)
Moscow Radiotechnic Institute (Moscow)
Defense Ministry, Ministry of Atomic Energy and Industry Aviation Department
Karpov Physical-Chemical Institute (Moscow)
Scientific Research Center "Soliton NTT" (Moscow)
Research and design Institute of membranes (Tula)
Concern "Farad", Research Institute "GIRCONO" (St. Petersburg)
Research Institute of Molecular Electronics (Zelenograd)
Institute of Particularly Pure Substances (Miryev Monogor)
Joffe Physical-Technical Institute (St. Petersburg)
Institute of Precise Chemical Technology (Moscow)
Moscow State University (Moscow)
LOMO (St. Petersburg)
Sci. Industrial Association "Asophysics" (Moscow)
Sci. Industrial Association "Polyus" (Moscow)
Vavilov State Optic Institute (Moscow)

About 20 Western research centers and companies are invited to participate in the Workshop.

The following subject areas will be discussed:

1 - General problems of advanced technology applications in various fields representing a view of the Russian Government and Departments of Nuclear Power, Aviation and Defense Ministry - plenary session. (The detailed program will be announced later)

Chairman - Academician E.P. Velikhov

2 - Nuclear technique and technology including nonproliferation of nuclear weapons and materials, liquidation of nuclear weapons, nuclear materials transformation to civil uses - plenary poster sessions. (The detailed program will be announced later)

Chairman - Academician L.P. Fecotistov

3 - Technologies using lasers, particle beam accelerators and pulsed power systems for industrial applications (plenary poster sessions). (Includes concentrated electron beam output into the atmosphere, surface modifications using plasma-beam discharge facilities, electrofilters for power plants, coating metallic surface with composites, composite panels treatment, decontamination of industrial waste water and combustion of flue gases, treatment to prevent spoilage of liquid and dry foods, materials for tannery industries, sterilizing foodstuffs, bright x-ray sources for high resolution medical radiography, x-ray frequency generators, high-current macro-particle acceleration, compact x-ray microscopes etc.)

Chairman - Academician V.A. Glukhikh

4 - Space technologies and applications based on space technologies (the detailed program will be announced later)

Chairman - General A.A. Leonov

5 - New technologies for high purity oxides production, materials for electronics, energetics, high-temperature super conductivity (including systems of precursors, metal alcoxides, derived oxides, large scale technologies of their production, high quality powder for electronics, new generation of electronic capacitors, membranes, sensors, memory-devices, chemo-electric converters, non-linear dielectrics etc.)

Chairman - Professor A.P. Simonov

6 - Optics and optoelectronics (including optical and IR-materials, elements and systems, detectors, electron-image devices).

Name of the Chairman will be announced later.

The detailed program will be given in the Second Announcement. Additional sessions, both plenary and poster, could be established after all contributions are received.

**CONSULTI WORKSHOP
INTERNATIONAL COLLABORATION I TH FIELD
OF MILITARY CONVERSION TECHNOLOGIES
June 15-22 1993**

REGISTRATION FORM FOR PARTICIPANTS

PLEASE FILL COMPLETELY AND RETURN TO LOC BY FAX
FAX NUMBERS IN MOSCOW, RUSSIA: 095-947-20-02 095-206-28-47

1. Full Name: _____
2. Date of Birth: _____
3. Institution/Company name: _____
4. Full address: _____

5. Telephone: _____
6. Fax: _____
7. Telex: _____
8. E-mail: _____
- Contribution (if submitted) _____
9. Authors: _____
10. Title: _____

11. Session: _____
12. Presentation: oral poster (please underline)
13. Room required: Single Double Triple (please underline)
14. Accompanying persons
Full name _____
Full name _____
15. The Organizers need your passport number and those of accompanying persons to provide visa support for the travelling. Please indicate now if possible (if no please be ready to send the number upon the special request).
1 _____
2 _____
3 _____
16. Please indicate estimated dates of your arrival and departure.
Arrival _____
Departure _____

Note that the ship will be available from 14:00 June 15
to 13:00 June 22.

The ship will start from St. Petersburg
to Valaam and Kiji 20:00 June 17
and will return to St. Petersburg
from the cruise 7:00 June 21.
The detailed Schedule is in the Second Announcement.

THE LOCAL ORGANIZING COMMITTEE MARCH 15 1993

REGISTRATION AND ACCOMMODATION FEES.

REGISTRATION FEE

The Registration fee includes transportation from/to Pulkovo-2 international airport in St.Petersburg, local excursions in St.Petersburg, Valaam and Kiji, scientific tours to Efremov Institute and other institutes, technical services (computers, copying machines etc.), a reception, an evening party and other general expenses such as translation, consulting services, Local Organizing Committee services etc.

The registration fee is \$400 if paid before June 5, 1993.
After June 5 the Registration fee is \$460.

No registration fee is taken for children.

ACCOMMODATION FEE

The accommodation fee includes three meals a day: breakfast, lunch and dinner (not including wine) and apartments (rooms for 1,2,3 persons with toilet, shower and air conditioning) on board the ship June 15,16,17,18,19,20,21 and 22.

The accommodation fee for participants, guests and accompanying persons (spouses etc.) are for one person:

before March 30,1993	after March 30
\$440 - single room	\$505
\$320 - double room	\$370
\$280 - triple room	\$320
(to be offered for families with a child)	

DISCOUNTS:

For children up to 12 years - 50% discount

All prices are given per person in U.S. dollars.

BANK ACCOUNT:

Registration and Accommodation fees in full (free of all bank and postal charges) must be sent directly to the following Account:

For: Consulting Workshop ICMCT
Bank N: Raiffeisenbank Hardtberg Alfter eG, Bonn
BLZ 381 602 20
Account N: 6101539014
Company name: M.T.C. Technology-Transfe GmbH

Please return bank ticket confirming the payment by fax to the Local Organizing Committee

*Pls. Done 5/12
distribute
to NS staff*

THE WHITE HOUSE
WASHINGTON
May 19, 1993

Date MAY 21 1993

ACTION BY

REF ID

*JHG
Skip
Cliff
Dale B
Raymond
Holly
RM
Ratchford
Kitty*

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Charter for an Interagency Group on Bilateral Assistance for Russia, Ukraine and the other New Independent States of the Former Soviet Union

1. To assure maximum coordination within the Executive Branch on United States support and assistance for Russia, Ukraine and the other new independent states of the former Soviet Union (FSU), the President has designated Ambassador Thomas W. Simons, Jr. as Coordinator of U.S. Assistance to the New Independent States in accordance with Section 102 of the FREEDOM Support Act, and has determined that he will chair an interagency Assistance Coordination Group.

2. The Assistance Coordination Group will report to the Policy Steering Group established pursuant to the memorandum dated March 18, 1993, chaired by Ambassador-at-Large Strobe Talbott and co-chaired by Special Assistant to the President Toby T. Gati.

3. In his capacities as Coordinator and Chairman of the Assistance Coordination Group and under the direction of the Steering Group, Ambassador Simons will preside over allocation of U.S. assistance resources and the interagency process for design and implementation of all policies and programs dealing with bilateral assistance for the new independent states of the FSU.

4. The President has directed all Executive departments and agencies to treat the Assistance Coordination Group as the focal point for interagency deliberations on bilateral assistance for the new independent states of the FSU.

5. It is the responsibility of the Assistance Coordination Group to consider those Executive Branch actions that have significant implications for bilateral assistance for the new independent states of the FSU. Therefore, the department and agency heads shall ensure that all such actions under consideration by their departments and agencies come before the Assistance Coordination Group in a timely manner.

Anthony Lake

Anthony Lake
Assistant to the President
for National Security Affairs

Date Recd MAY 21 1993

THE WHITE HOUSE

WASHINGTON

May 19, 1993

ACTION 12

INFO 10

JHJ
Skip
Cliff
Dale B
Maynard
Holly
New
Ratchford
Kitty

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

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Anthony Lake
Assistant to the President
for National Security Affairs



United States Department of State

*Bureau of Oceans and International
Environmental and Scientific Affairs*

Washington, D.C. 20520

April 15, 1993

TO: Distribution
FROM: OES/SCT - Cathy Campbell *Cathy*
SUBJ: Visit by Russian Deputy Science Minister

Zurab Yakobashvili, Deputy Minister of Science and Technology Policy of the Russian Federation, will be in the U.S. April 17-28. He will accompany Minister Saltykov to meetings scheduled April 19-20 and then remain in the U.S. as part of an USIA visitor program. Betty Calambokidis, from Meridian, ^{who} is handling all the arrangements for his visit, has advised me that she is prepared to schedule any appointments US agencies would like to arrange with the Deputy Minister.

If you are interested, please contact Betty at (202) 939-5570.

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

May 17, 1993

Dear Mr. Minister:

I very much appreciate the chance we had to talk on your most recent trip to Washington, D.C., during the month of April. I enjoyed our meeting and found our open and frank discussions useful. It is a healthy start to what I hope will be a long and productive dialogue on science and technology issues of common interest.

At our meeting you mentioned the development of a high-flux nuclear reactor PIK which is being built in the Petersburg Nuclear Physics Institute at Gatchina. Following our meeting and a review of your letter, I have sent the information you provided to our technical agencies for study.

I was pleased to learn that you will join us for the Carnegie Group Meeting in Canada on May 21, 1993. I look forward to continuing our dialogue at that time.

Sincerely,


John H. Gibbons
Director

Dr. Boris G. Saltykov
Minister for Science, Higher Education,
and Technology Policy
11 Tverskaya Street
Moscow, Russian Federation

JFO'Neil:jward:via OA messenger to State 5/18/93

ACTION to KERb

INFO to Tom Rafter

g. O'Neil

JHG

1

MINISTRY OF SCIENCE AND TECHNOLOGY POLICY
OF THE RUSSIAN FEDERATION

11 TVERSKAYA STREET, MOSCOW, RUSSIAN FEDERATION.

FAX: (095) 230-2680

TRILEX: 411241 SU

TELEPHONE: (095) 229-4774

SIG of JHG

Stationery

Unofficial translation 4/21/93

DATE DUE

Dear Mr. GIBBONS,

Guided by interests of the international cooperation development in the field of basic research and the peaceful use of nuclear energy I would like to draw your attention to the large science and technological project of the high-flux research nuclear reactor PIK, which is being built in the Petersburg Nuclear Physics Institute (Gatchina city, Leningrad region).

This reactor is analogous in parameters and experimental possibilities to the best research reactor of the world, which is functioning in the International Institute L. Lanjevin (Grenoble, France) and widely used by international scientific community.

At this moment approximately 70 per cent of the construction works of the reactor complex have been already carried out. The cost of the remaining works estimated by our experts of \$ 30 million.

In reply to the address of the Russian Federation Government (letter of July 15, 1992 No 1371n-II41) and on initiative of the Germany and France an international feasibility study on this project was carried out on the spot in January 1993. The experts (a list of the participants is included) evaluated the project highly from the point of view of engineering and technological parameters which were laid down at the development stage and they have confirmed that the project meets in overall the requirements adopted in the West on nuclear safety.

We would welcome, Mr. Minister, participation of your country in completing construction of the PIC reactor taking into account the possibility of its joint exploitation in the future, for example, in the framework of the International Center on Neutron Research.

This question, to my opinion, could be discussed in details at the meeting in Montreal this year in May.

Please, Mr. Minister, accept my sincere assurances in the greatest respect.

Boris G. Saltykov
Minister for Science and Technology policy
of
the Russian Federation

Mr. John GIBBONS
Science Adviser to the President of the U.S.A.
Fax: (202) 395-3261

JFO

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

May 17, 1993

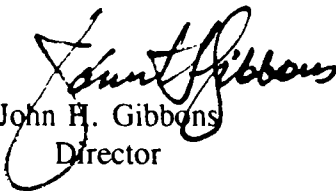
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Sincerely,


John H. Gibbons
Director

Dr. Boris G. Saltykov
Minister for Science, Higher Education,
and Technology Policy
11 Tverskaya Street
Moscow, Russian Federation

JFO'Neil:jward:via OA messenger to State 5/18/93

ACTION to K Erb

INFO to Tom Patchford

J. O'Neil

JHC

1

MINISTRY OF SCIENCE AND TECHNOLOGY POLICY
OF THE RUSSIAN FEDERATION

11 TVERSKAYA STREET, MOSCOW, RUSSIAN FEDERATION.

FAX: (095) 230-2680

TRILEX: 411241 SU

TELEPHONE: (095) 228-4774

SIG of JHC

Stationery

Unofficial translation DATE DUE 4/21/93

Dear Mr. GIBBONS,

Guided by interests of the international cooperation development in the field of basic research and the peaceful use of nuclear energy I would like to draw your attention to the large science and technological project of the high-flux research nuclear reactor PIK, which is being built in the Petersburg Nuclear Physics Institute (Gatchina city, Leningrad region).

This reactor is analogous in parameters and experimental possibilities to the best research reactor of the world, which is functioning in the International Institute L. Lanjevin (Grenoble, France) and widely used by international scientific community.

At this moment approximately 70 per cent of the construction works of the reactor complex have been already carried out. The cost of the remaining works estimated by our experts of \$ 30 million.

In reply to the address of the Russian Federation Government (letter of July 15, 1992 No 1371n-II41) and on initiative of the Germany and France an international feasibility study on this project was carried out on the spot in January 1993. The experts (a list of the participants is included) evaluated the project highly from the point of view of engineering and technological parameters which were laid down at the development stage and they have confirmed that the project meets in overall the requirements adopted in the West on nuclear safety.

We would welcome, Mr. Minister, participation of your country in completing construction of the PIC reactor taking into account the possibility of its joint exploitation in the future, for example, in the framework of the International Center on Neutron Research.

This question, to my opinion, could be discussed in details at the meeting in Montreal this year in May.

Please, Mr. Minister, accept my sincere assurances in the greatest respect.

Boris G. Saltykov
Minister for Science and Technology policy
of
the Russian Federation

Mr. John GIBBONS
Science Adviser to the President of the U.S.A.
Fax: (202) 395-3261

THE WHITE HOUSE

WASHINGTON

April 9, 1993

Dear Minister Saltykov:

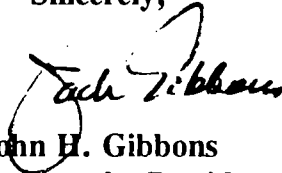
Thank you very much for your kind letter of congratulations. I am still adjusting to my new position and it is comforting to hear from a colleague such as yourself who understands the issues and problems we face in science and technology policy. I look forward very much to meeting you in person when you travel to Washington to participate in the Georgetown conference on "Science in Russia in the Transition Period" on April 20, 1993. I hope to participate in the conference with you, although my schedule may not permit it.

I appreciate your assurance on continuing and expanding the fruitful cooperation our two countries have enjoyed under the agreement for Cooperation in the Fields of Basic Scientific Research. I would like to reassure you of the interest in the United States in continuing the fruitful cooperation begun under this agreement four years ago. In fact, I would like very much to discuss basic science cooperation with you, along with other matters, while you are in Washington. Perhaps we could meet on April 19, 1993, the day before the Georgetown conference, in the afternoon.

As the Summit clearly emphasized, the United States remains committed to expanding the science and technology interaction between our two countries. In this regard, I look forward to building on the progress that you and my predecessor, Allan Bromley, achieved in advancing our science and technology relationship. Capitalizing on the momentum from the Summit, I believe we will have ample opportunities for just this in the near future.

Until we meet in Washington, I wish you every success.

Sincerely,



John H. Gibbons
Assistant to the President
for
Science and Technology

Dr. Boris G. Saltykov
Minister for Science, Higher Education,
and Technology Policy
11 Tverskaya Street
Moscow, Russian Federation

ACTION to KerbINFO to Tom PatchfordJ.B. NeneJHG

1

MINISTRY OF SCIENCE AND TECHNOLOGY POLICY
OF THE RUSSIAN FEDERATION

11 TVERSKAYA STREET, MOSCOW, RUSSIAN FEDERATION.

FAX: (095) 230-2680

TELEX: 411241 SU

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SIG of JHC

Stationery

Unofficial translation

DATE DUE

4/27/93

Dear Mr. GIBBONS,

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Boris G. Saltykov
Minister for Science and Technology policy
of
the Russian Federation

Mr. John GIBBONS

Science Adviser to the President of the U.S.A.

Fax: (202) 395-3261

From Russia

1. Prof. A.A.Anselm, Director of Petersburg Nuclear Physics Institute
2. Prof. V.L.Aksenov, Director of Neutron Physics Laboratory of JNR (Dubna)
3. Prof. V.A.Nazarenko, Director of Neutron Research Department (NRD) of PNPI
4. Dr.K.A.Konoplev, Deputy Director of NRD, Head of Reactor Physics and Technology Division
5. Dr. I.A.Kondurov, Deputy Director of NRD
6. Prof. A.P.Serebrov, Head of Neutron Physics Division of NRD
7. Prof. A.A.Okorokov, Head of Condensed State Research Division of NRD
8. Prof. Yu.V.Petrov, Head of Reactor Physics Laboratory, Theoretical Physics Department of PNPI
9. Prof. O.I.Sumbaev, Head of X- and gamma-Ray Spectroscopy Laboratory of NRD
10. Prof. G.A.Petrov, Head of Heavy Nucleus Fission Physics Laboratory of NRD
11. Dr. A.N.Erykalov, Deputy Director of Theoretical Physics Department of PNPI
12. Dr. V.A.Trunov, Head of Material Research Laboratory of NRD
13. Dr. V.D.Trenin, Head of Hydrogen Isotope Separation Laboratory of NRD
14. Dr. O.A.Kolesnichenko, Head of Reactor PIK Shop of NRD
15. Mr. V.Kh.Sclesnev, Head of Capital Construction Department of PNPI
16. Mr.G.Rostovzev, Chief of St.Petersburg local safety Committee

Clinton Presidential Records

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Foreign Language Marker

Collection: Clinton Presidential Records

Subgroup: Office of Science and Technology Policy

Series: Gibbons, John

Subseries:

Document Title Letter from the Russian Minister for Science,
Education, and Technology Policy

Language: Russian

Folder Title Bilateral Cooperative Agreement with the former USSR
[Union of Soviet Socialist Republics]

OA/ID: CF 100

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

March 17, 1993



OFFICE OF THE
DIRECTOR

Date Rec'd 3/22/93
ACTION to Ratchford
INFO to Ratchford
John S'Neil

SIG of JAG
Stationery OSFP
DATE DUE _____

Honorable Les Aspin
Secretary of Defense
Washington, D.C. 20301-1000

Dear Mr. Secretary:

The 1993 FREEDOM Support Act calls for the creation of a nongovernmental foundation to support civilian R&D cooperation between the United States and the former Soviet Union (FSU). The legislation stipulates that this new foundation would be established by the Director of the National Science Foundation (NSF) in consultation with the Director of the National Institute for Standards and Technology (NIST), and that it would focus on basic and industrial civilian R&D cooperation. Funding for the foundation is to come from the Department of Defense's allocation for demilitarization of the FSU.

I believe that this legislation gives the United States a historic opportunity to make a major difference in the future course of science and technology in the FSU. By strengthening the civilian research base in both basic and applied research, we can offer attractive alternatives to highly talented people hitherto engaged exclusively in military R&D, while at the same time helping to preserve centers of scientific excellence in the FSU and seeding new linkages that will contribute to a stronger economy and the development of democratic institutions. These objectives respond strongly to overall U.S. government foreign policy goals as well as to the defense and science interests of our respective agencies. They are in our common interest and they cost relatively little to achieve.

- 2 -

My staff is prepared to work closely with yours in exploring how to fund and implement this important opportunity.

Sincerely,


Walter E. Massey
Director

cc: Honorable Albert Gore, Jr.
The Vice President of the United States

Honorable Warren M. Christopher
Secretary of State

Honorable George E. Brown, Jr.
Chairman, Committee on Science, Space,
and Technology
U.S. House of Representatives

✓ Honorable John H. Gibbons, Director
Office of Science and Technology Policy

Honorable Raymond Kammer, Acting Director
National Institute of Standards and Technology

"Document Control"

TYPE: INFORMATION DOCUMENT NUMBER: 9300484
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: MASSEY, WALTER E.: NATIONAL SCIENCE FOUNDATION

TO: SECRETARY ASPIN OF DOD (CC: JHG)

DATE OF
CORRESPONDENCE: 03/17/93

SUBJECT: NSF LOOKS FORWARD TO WORKING CLOSELY W/DOD TO
IMPLEMENT CREATION OF A NONGOVERNMENTAL FOUNDATION
TO SUPPORT CIVILIAN R&D COOPERATION BETW. U.S. AND
FSU (FORMER SOVIET UNION)

DIRECTORATE STAFF
ASSIGNED: INTERNATIONAL/POLICY ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: Tom Ratchford John O'Neil

John O'Neil

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 03/24/93 DEPT RECEIVED:
FILE: INT/FSU

CENTRAL FILES:

THE WHITE HOUSE

WASHINGTON

March 11, 1993

MEMORANDUM FOR ANTHONY LAKE

ASSISTANT TO THE PRESIDENT FOR NATIONAL
SECURITY AFFAIRS

FROM:

JOHN H. GIBBONS 
ASSISTANT TO THE PRESIDENT FOR SCIENCE AND
TECHNOLOGY

SUBJECT:

S&T AND THE VANCOUVER SUMMIT

Pursuant to our conversation, several members of my staff and I met with Rose Gottemoeller and Dan Poneman to discuss the S&T content of the Vancouver Summit. I offered to develop a proposal for consideration in summit preparations. I am pleased to provide that proposal at this time.

I propose a concurrent meeting on S&T policy issues at the Vancouver Summit. The results of this meeting would form the basis for a more comprehensive session, chaired by myself and Russian Vice Premier and Minister of Science, Higher Education and Technology Policy Boris Saltykov, approximately a month later. The site of the comprehensive session could be either Washington or Moscow.

The Vancouver S&T meeting would last approximately three hours. President Clinton and President Yeltsin would spend approximately 10 minutes at the beginning of the meeting to kick it off and then 10 minutes at the end to charge the two chairmen to conduct the follow-on meeting. Saltykov and I would chair the meeting.

If this proves impossible because of time considerations, the summit statement could briefly address S&T policy issues and commission the more comprehensive session chaired by me and Saltykov.

Clearly technology is crucial to the long-term stability and growth of the Russian economy. There are, in fact, some very rough parallels between what the Russians need to do and the Technology Initiative announced on February 22. The discussions at the meeting would focus on how Russia harnesses its technological capabilities to support economic growth and what the U.S. can do to support Russian efforts. I am attaching some material to flesh out this concept.

It seems to me that there needs to be effective coordination of S&T summit issues since they tend to be included in the range of summit initiatives from both sides and the President should be advised on the overall S&T content. I would be pleased to take responsibility for that coordination, working closely with you and your staff.

Attachment

OBJECTIVE OF THE MEETING:

To address the question of what is needed for Russia to effectively capitalize on its science and technological strengths for economic stability and growth.

The desired outcome would be a set of agreed upon broad principles that would be considered in detail at a more comprehensive meeting a month or so later.

DISCUSSION. Clearly technology is crucial to the long-term stability and growth of the Russian economy. There are, in fact, some very rough parallels between what the Russians need to do and the Technology Initiative announced on February 22. The discussions at the meeting would focus on how Russia harnesses its technological capabilities to support economic growth and what the U.S. can do to support Russian efforts.

A selective list of issues that need resolution in order for US-Russian S&T relations to flourish in both government and the private sector would be agreed upon in advance of the meeting. Representative candidates for this list include:

- Dealing with immediate crisis in Russian S&T
- Defense Conversion
- Energy Efficiency Assistance
- Non-proliferation and related issues
- Reform of Russian S&T system: merit review, individual investigators
- Problems facing commercial S&T interactions: IPR, banking, customs, taxation, ownership, legal system, communications, etc.
- U.S. export controls
- U.S. policies with respect to defense contractors
- U.S. Governmental assistance: financial and technical

Initiatives have been proffered to the Russians by U.S. Government over time, and these may surface unexpectedly during the Summit. The Russians also may raise other S&T issues at the Summit. We must be prepared to address such issues should they surface during the Summit.

PARTICIPANTS. Participants in the meeting would be drawn from government and the private sector (industry, non-profits, and academia). Approximately eight to ten participants would be optimal. Candidate representation, based on a series of meetings held last year on related issues, could include:

GOVERNMENT*

Dr. Gibbons
Secretary O'Leary
Ambassador Strobe Talbott
Dr. William Perry

INDUSTRY OFFICIALS

Texaco or other energy company
Honeywell or other energy efficiency company
Sun Microsystems or other electronics/computer company
Fancy Electronics or other small business
Pittman-Moore or other agricultural company

NON-PROFIT ORGANIZATIONS

David Hamburg, Carnegie Corporation
Ernest Henley, American Physical Society
MacArthur Foundation

ACADEMIA

Frank Press, NAS
Don Langenberg, U. Maryland System
Princeton University

In addition, observers would be invited to hear the discussions firsthand. A representative of each principal participant could be invited plus additional government representatives from technical agencies such as Agriculture, DOC/NIST, HHS/NIH, and NSF. Selected representatives from other companies, non-profit organizations (including the Soros Foundation) and academia would also be invited.

* Government representation is dependent upon availability of newly nominated principals.

DRAFT AGENDA

I Welcome

A. President Clinton

B. President Yeltsin

II Remarks

A. Dr. Gibbons

1. Introduction

2. S&T and Economic Growth under the Clinton Administration

3. US-Russia S&T Activities

a. Government

b. Private Sector (Non-profit/For-profit)

c. Academia

4. What's needed in the future

B. Minister Saltykov

III Discussion

A. U.S. Technology Initiative

B. What's needed to harness technology for Russia's economic growth

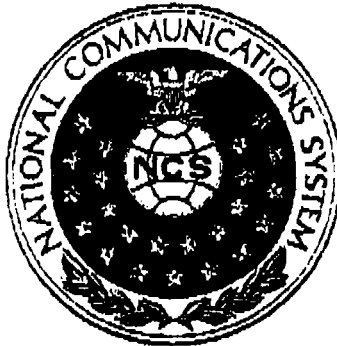
C. What the U. S. can do to facilitate

IV Clinton-Yeltsin charge to Dr. Gibbons and Minister Saltykov for further work

The meeting would last approximately three hours; Presidents Clinton and Yeltsin would participate for the first 10 minutes and the last 10 minutes.

**NATIONAL COMMUNICATIONS SYSTEM
PLANS AND PROGRAMS
(NCS/NPM)**

**(703) 692-8506 DSN 222-8506
FAX (703) 692-7682**



DATE 9/14/93

NUMBER OF PAGES INCLUDING COVER 3

TO Jo Ann Ward

LOCATION DSTP

PHONE 202-395-7296 **FAX** 202-395-1571

SPECIAL INSTRUCTIONS _____



NATIONAL COMMUNICATIONS SYSTEM

OFFICE OF THE MANAGER
701 SOUTH COURT HOUSE ROAD
ARLINGTON, VIRGINIA 22204-2198

IN REPLY
REFER TO: NP

14 September 1993

Honorable John H. Gibbons
Director
Office of Science and Technology Policy
Old Executive Office Building
Washington, DC 20506

Dear Dr. Gibbons:

I'm looking forward to your visit to the National Communications System (NCS)/Defense Information Systems Agency (DISA) on September 20. I plan to accompany you during your visit and I've enclosed an agenda for the day. We'll spend the morning discussing NCS programs and the support that NCS provides to the Office of Science and Technology Policy. During lunch in my office, we'll be provided a DISA overview briefing, then we'll attend an asynchronous transfer mode demonstration.

Please let me know if you have any questions regarding the agenda or the topics we'll be covering. See you on the 20th!

Sincerely,

ALONZO E. SHORT, JR.
Lieutenant General, USA
Manager

1 Enclosure:
Agenda

AGENDA FOR DIRECTOR, OSTP VISIT TO NCS/DISA

SEPTEMBER 20, 1993

1015 - 1215 NATIONAL COMMUNICATIONS SYSTEM PROGRAMS

- Escort Dr. Gibbons to National Coordinating Center (NCC)/
tour of NCC
- NCS Introduction
- National Telecommunications Management Structure (NTMS)
Implementation - classified
 - NTMS Concept and Program Status
 - Support to OSTP during wartime emergencies
 - Response to OSTP tasking to expand NTMS for all
hazards
- National Coordinating Center for Telecommunications
Briefing
 - NCC Role in Federal Disaster Response
 - NCS Support to Joint Telecommunications Resources
Board
- NCS Role in NII
- NCS Wrap-Up/Discussion
- Tour/demo Secure Video Teleconferencing Center

1215 - 1400 DEFENSE INFORMATION SYSTEMS AGENCY BRIEFINGS

- Lunch with LTG Short
 - DISA Overview
- Asynchronous Transfer Mode Over Satellite
Demonstration

1400 - Depart DISA Headquarters

Enclosure 1

Compare
w/ BSA
1 May 1st
proposed

Draft 5/24/43

MEMORANDUM OF UNDERSTANDING
ON
COOPERATION IN FUNDAMENTAL AERONAUTICAL SCIENCES
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
OF THE UNITED STATES OF AMERICA
AND
THE DEPARTMENT OF AVIATION INDUSTRY, MINISTRY OF INDUSTRY
OF THE RUSSIAN FEDERATION

THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) OF THE UNITED STATES OF AMERICA AND THE DEPARTMENT OF AVIATION INDUSTRY, MINISTRY OF INDUSTRY OF THE RUSSIAN FEDERATION, HEREINAFTER REFERRED TO AS "THE PARTIES":

HAVE AGREED AS FOLLOWS:

ARTICLE I. PRINCIPLES

1. THIS MEMORANDUM OF UNDERSTANDING (MOU) SHALL ESTABLISH COOPERATIVE RESEARCH IN FUNDAMENTAL AERONAUTICAL SCIENCES BETWEEN THE PARTIES, UTILIZING THE COMPLEMENTARY CAPABILITIES, FACILITIES AND TALENTS OF THE PARTIES.
2. THE PARTIES SHALL CARRY OUT COOPERATIVE EFFORTS IN FUNDAMENTAL AERONAUTICAL SCIENCES UNDER THIS MOU ON THE BASIS OF EQUALITY, RECIPROCITY AND MUTUAL BENEFIT.
3. THE PARTIES HAVE IDENTIFIED FUNDAMENTAL AERONAUTICAL SCIENCE COOPERATIVE RESEARCH ACTIVITIES IN AREAS SUCH AS:
 - TRANSITION AND TURBULENCE
 - THERMAL PROTECTION SYSTEM MATERIALS
 - CHEMICALLY REACTING FLOWS
 - COMPOSITE STRUCTURES AND MATERIALS

Draft

4. COOPERATION UNDER THIS MOU MAY BE IMPLEMENTED IN THE FOLLOWING FORMS:
 - COOPERATIVE SCIENTIFIC RESEARCH PROJECTS
 - COOPERATIVE UTILIZATION OF TEST FACILITIES AND TEST ARTICLES
 - JOINTLY-SPONSORED SCIENTIFIC CONFERENCES, SYMPOSIA AND WORKSHOPS
 - EXCHANGES OF DATA, INFORMATION AND DOCUMENTATION
5. COOPERATIVE ACTIVITIES UNDER THIS MOU, INCLUDING EXCHANGES OF TECHNICAL DATA, INFORMATION AND EQUIPMENT, SHALL BE CONDUCTED IN ACCORDANCE WITH NATIONAL LAWS AND REGULATIONS OF EACH PARTY, AND SHALL BE SUBJECT TO THE AVAILABILITY OF APPROPRIATED FUNDS.

ARTICLE II. ORGANIZATION AND ADMINISTRATION

1. THE PARTIES SHALL SERVE AS THE PRINCIPAL IMPLEMENTING AGENCIES FOR DEVELOPING AND CARRYING OUT THE COOPERATION ENVISAGED UNDER ARTICLE I OF THIS MOU.
2. EACH OF THE COOPERATIVE PROJECTS MAY BE THE SUBJECT OF A SPECIFIC WRITTEN AGREEMENT BETWEEN THE DESIGNATED IMPLEMENTING AGENCIES THAT DEFINES THE NATURE AND SCOPE OF THE PROJECT, THE INDIVIDUAL AND JOINT RESPONSIBILITIES OF THE DESIGNATED IMPLEMENTING AGENCIES, FINANCIAL ARRANGEMENTS, IF ANY, AND THE PROTECTION OF INTELLECTUAL PROPERTY CONSISTENT WITH THE PROVISIONS OF THIS MOU.
3. THE PARTIES SHALL FORM A JOINT WORKING GROUP FOR THE IMPLEMENTATION OF AGREED COOPERATION IN AERONAUTICAL SCIENCES WITHIN THE SCOPE OF THIS MOU.
4. THE JOINT WORKING GROUP IN AERONAUTICAL SCIENCES SHALL MEET PERIODICALLY IN THE UNITED STATES AND RUSSIA, USUALLY ON AN ANNUAL BASIS, FOR THE PURPOSE OF PROVIDING A MANAGEMENT STRUCTURE AND OVERSIGHT OF JOINT EFFORTS CARRIED OUT PURSUANT TO THIS MOU. THE JOINT WORKING GROUP SHALL:
 - APPROVE THE WORK PROGRAM FOR AGREED JOINT EFFORTS; REVIEW THE STATUS OF ONGOING EFFORTS; EVALUATE THE RESULTS OF COMPLETED EFFORTS; CONSIDER NEW PROPOSALS FOR COOPERATION; CONCLUDE SPECIFIC PROJECT AGREEMENTS; EXCHANGE INFORMATION ON AERONAUTICAL SCIENCES RESEARCH BEING CONDUCTED IN EACH COUNTRY; AND EXCHANGE INFORMATION ON ADMINISTRATIVE MATTERS RELATING TO THE IMPLEMENTATION OF ALL COOPERATION CONDUCTED UNDER THIS MOU.

Draft

ARTICLE III. ALLOCATION OF CERTAIN RISK

1. WITH RESPECT TO ACTIVITIES UNDERTAKEN PURSUANT TO THIS MOU, NEITHER PARTY SHALL MAKE ANY CLAIM AGAINST THE OTHER WITH RESPECT TO INJURY OF DEATH OF ITS OWN OR ITS CONTRACTORS' OR SUBCONTRACTORS' EMPLOYEES, OR WITH RESPECT TO DAMAGE OF ANY KIND TO OR LOSS OF ITS OWN OR ITS CONTRACTORS' OR SUBCONTRACTORS' PROPERTY WHETHER SUCH INJURY, DEATH, DAMAGE OF LOSS ARISES THROUGH NEGLIGENCE OR OTHERWISE, EXCEPT IN THE CASE OF WILLFUL MISCONDUCT.
2. AT ELECTION OF EITHER PARTY, ADDITIONAL OR ALTERNATIVE PROVISIONS RELATING TO THE ALLOCATION OF RISK FOR SPECIFIC COOPERATIVE ACTIVITIES MAY BE NEGOTIATED PRIOR TO THE COMMENCEMENT OF THOSE SPECIFIC ACTIVITIES.

ARTICLE IV. EXCHANGE OF TECHNICAL DATA AND GOODS

EACH PARTY IS OBLIGATED TO TRANSFER TO THE OTHER PARTY ONLY THOSE TECHNICAL DATA AND GOODS NECESSARY TO FULFILL THE RESPONSIBILITIES OF THE TRANSFERRING PARTY UNDER THIS MOU AND ANY RELEVANT IMPLEMENTING ARRANGEMENTS, SUBJECT TO THE FOLLOWING:

1. IN THE EVENT A PARTY FINDS IT NECESSARY TO TRANSFER TECHNICAL DATA IN CARRYING OUT ITS RESPONSIBILITIES UNDER THIS MOU OR IMPLEMENTING ARRANGEMENT THAT ARE PROPRIETARY, AND FOR WHICH PROTECTION IS TO BE MAINTAINED, SUCH TECHNICAL DATA WILL BE MARKED WITH A NOTICE INDICATING THAT IT SHALL BE USED AND DISCLOSED BY THE RECEIVING PARTY AND ITS CONTRACTORS AND SUBCONTRACTORS ONLY FOR THE PURPOSES OF FULFILLING THE RECEIVING PARTY'S RESPONSIBILITIES UNDER THIS MOU OR IMPLEMENTING ARRANGEMENT, AND THAT THE TECHNICAL DATA SHALL NOT BE DISCLOSED OR RETRANSFERRED TO ANY OTHER ENTITY WITHOUT PRIOR WRITTEN PERMISSION OF THE FURNISHING PARTY. THE RECEIVING PARTY AGREES TO ABIDE BY THE TERMS OF THE NOTICE, AND TO PROTECT ANY SUCH MARKED TECHNICAL DATA FROM UNAUTHORIZED USE AND DISCLOSURE.
2. IN THE EVENT A PARTY FINDS IT NECESSARY TO TRANSFER TECHNICAL DATA AND GOODS IN CARRYING OUT ITS RESPONSIBILITIES UNDER THIS MOU OR IMPLEMENTING ARRANGEMENT THAT ARE EXPORT-CONTROLLED, THE FURNISHING PARTY SHALL MARK SUCH TECHNICAL DATA WITH A NOTICE AND IDENTIFY SUCH GOODS. THE NOTICE OR IDENTIFICATION SHALL INDICATE THAT SUCH TECHNICAL DATA AND GOODS SHALL BE USED, AND SUCH TECHNICAL DATA SHALL BE DISCLOSED, BY THE RECEIVING PARTY AND ITS CONTRACTORS AND SUBCONTRACTORS ONLY FOR THE PURPOSES OF FULFILLING THE RECEIVING PARTY'S RESPONSIBILITIES UNDER THIS MOU OR IMPLEMENTING ARRANGEMENT. THE NOTICE OR

Draft

IDENTIFICATION SHALL ALSO PROVIDE THAT SUCH TECHNICAL DATA AND GOODS SHALL NOT BE RETRANSFERRED, TO ANY OTHER ENTITY WITHOUT PRIOR WRITTEN PERMISSION OF THE FURNISHING PARTY. THE PARTIES AGREE TO ABIDE BY THE TERMS OF THE NOTICE OR IDENTIFICATION AND TO PROTECT ANY SUCH MARKED TECHNICAL DATA AND IDENTIFIED GOODS.

3. THE PARTIES ARE UNDER NO OBLIGATION TO PROTECT ANY UNMARKED TECHNICAL DATA OR UNIDENTIFIED GOODS.

ARTICLE V. PATENT AND INVENTION RIGHTS

NOTHING IN THIS MOU OR IMPLEMENTING ARRANGEMENT SHALL BE CONSTRUED AS GRANTING OR IMPLYING ANY RIGHTS TO, OR INTEREST IN, PATENTS OR INVENTIONS OF THE PARTIES OR THEIR CONTRACTORS OR SUBCONTRACTORS.

ARTICLE VI. SCIENTIFIC AND TECHNICAL DATA RESULTING FROM THE COOPERATION

IT IS THE INTENT OF THE PARTIES THAT THE SCIENTIFIC AND TECHNICAL DATA RESULTING FROM THE COOPERATIVE ACTIVITIES UNDER THIS MOU BE EXCHANGED BETWEEN THE PARTIES AND THAT THE RESULTS OF THEIR COOPERATIVE ACTIVITIES BE MADE AVAILABLE TO THE SCIENTIFIC COMMUNITY IN GENERAL THROUGH PUBLICATION IN APPROPRIATE JOURNALS OR OTHER ESTABLISHED CHANNELS. IN THE EVENT SUCH REPORTS OR PUBLICATIONS ARE COPYRIGHTED, EACH PARTY SHALL HAVE A ROYALTY-FREE RIGHT UNDER THE COPYRIGHT TO TRANSLATE, REPRODUCE, DISTRIBUTE, AND USE SUCH COPYRIGHTED WORK FOR THEIR OWN PURPOSES.

ARTICLE VII. RELEASE OF PUBLIC INFORMATION

RELEASE OF PUBLIC INFORMATION REGARDING THIS COOPERATION MAY BE MADE BY THE APPROPRIATE PARTY FOR ITS OWN PORTION OF THE COOPERATION AS DESIRED AND, INsofar AS PARTICIPATION OF THE OTHER IS INVOLVED, AFTER SUITABLE CONSULTATION.

ARTICLE VIII. ENTRY INTO FORCE, AMENDMENT, TERMINATION

1. THIS MOU SHALL ENTER INTO FORCE IMMEDIATELY UPON SIGNATURE OF BOTH PARTIES, AND SHALL REMAIN IN FORCE FOR FIVE YEARS. IT MAY BE EXTENDED FOR FURTHER FIVE-YEAR PERIODS BY WRITTEN AGREEMENT BETWEEN THE PARTIES.

Draft

2. THIS MOU MAYBE AMENDED BY WRITTEN AGREEMENT BETWEEN THE PARTIES.
3. THIS MOU MAY BE TERMINATED BY EITHER PARTY ON SIX MONTHS ADVANCE WRITTEN NOTICE.
4. EXPIRATION OF THIS MOU SHALL NOT AFFECT THE IMPLEMENTATION OF ANY COOPERATIVE ACTIVITY UNDERTAKEN PURSUANT TO THIS MOU AND NOT FULLY EXECUTED BEFORE THE EXPIRATION OCCURS.

IN WITNESS WHEREOF, THE UNDERSIGNED, BEING DULY AUTHORIZED BY THEIR RESPECTIVE GOVERNMENTS, HAVE SIGNED THIS MEMORANDUM OF UNDERSTANDING.

DONE AT _____, IN DUPLICATE, THIS _____ TH DAY OF _____, 1993, IN THE ENGLISH AND RUSSIAN LANGUAGES, BOTH TEXTS BEING EQUALLY AUTHENTIC.

ON BEHALF OF THE
NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION

ON BEHALF OF THE
DEPARTMENT OF AVIATION
INDUSTRY
MINISTRY OF INDUSTRY