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PROSPECTS FOR COOPERATION
IN SCIENCE AND TECHNOLOGY
WITH THE NEW INDEPENDENT STATES (NIS)

Prospects for Cooperation in Science and Technology
with the New Independent States (NIS)

CONTENTS:

SUMMARY	1 a
1. Introduction	1 b
2. Objectives of the Community's cooperation with NIS	1 b
3. Stimulating nuclei of a new science culture	2
3.1. Reduced number of projects with better support	2
3.2. Integrating INTAS	2
3.3. Cooperation with TACIS and coordination with Member States	3
3.4. Flexible project structure for infrastructure-building	3
3.5. Regional diversification	3
3.6. Thematic priorities	4
4. Improving project quality and application	5
4.1. Support for project generation	5
4.2. Application as one of the selection criteria	5
4.3. Conversion and international technological cooperation	6
5. Encouraging a more resourceful S&T environment	6
5.1. Improvement of information	6
5.2. Partner-finding initiatives	7
5.3. A Monitoring Network	7
5.4. Legal conditions	7
5.5. Payment transfer	8
6. Conditions for Foreign Direct Investment (FDI)	8
7. Operational conclusions: steps and instruments	8

ANNEX I	CURRENT COOPERATION AND THE PRESENT SITUATION OF S&T IN NIS
ANNEX II	INTEGRATING INTAS

PROSPECTS FOR COOPERATION IN SCIENCE AND TECHNOLOGY WITH THE NEW INDEPENDENT STATES (NIS)

SUMMARY

The EU intends to intensify its efforts on International Cooperation in S&T with the NIS for mutual benefit and with objectives generated by the spirit of the Agreements on Partnership and Cooperation.

After six years of economic decline, the RTD sector as a long-term pacemaker for social and economic development must be encouraged to re-emerge with a more efficient structure and faster than the general transformation process has allowed until now. S&T cooperation with the NIS will therefore aim

- to reorient scientists towards research on private and public needs
- to replace outdated structures and promote rationalization
- to cultivate the industrial prospects and assure sustainable development
- to identify partners for cooperation on the newly emerging markets and
- to support conversion of science towards civil purposes.

The immediate action in the first phase aimed at giving support to a wide range of researchers in relatively small projects. They remained, in general, academic. The funds available for this area under the 4th Framework Programme (FP) have been cut in half since 1994. The remaining resources will have to be more and better focused. Priority will be given to research projects which indicate that they will lead to results in industry or in the public domain in the near future. In order to enhance the application and quality of projects, more active support will be provided but for fewer and more relevant projects, with a view to creating nuclei of a renewed RTD culture. Following the completion of the pilot phase of INTAS, a new approach will be developed. Despite the reduced resources, the EU will spend a limited share on excellent fundamental research.

To improve project quality, a variety of support measures are envisaged, allocating to them a higher share of the funds in the future:

- * improvement of the general information and partner finding system,
- * strengthening of the preparatory phase of projects,
- * defining project selection criteria more precisely, and
- * measures contributing to the stabilization of the legal, economic and policy conditions for RTD

Further activities and priority-setting will be based on a dialogue with the NIS, and on a Technology Assessment and Monitoring Network.

Furthermore, coherence and the active cooperation of TACIS and of the Member States will be sought.

PROSPECTS FOR COOPERATION IN SCIENCE AND TECHNOLOGY
WITH THE NEW INDEPENDENT STATES (NIS)

1. Introduction

International cooperation in S&T with the NIS of the former Soviet Union (fSU) is taking place in a demanding environment as the transformation of the science sector is embedded in the overall process of political reform. The process of economic reform and democratization has proved quite difficult and the future development remains unforeseeable. Massive social problems have emerged and recently military conflict has occurred.

The exposure of the formerly protected economy to global market forces has led to the collapse of uncompetitive industries and consequently, to a continuous contraction of the GDP, for six years running. With doubts about the present legal situation as well as the political future, Western industries remain hesitant to pursue further investment (see 6.). At present, there are only a few sectoral signs of recovery while major parts of society suffer economic and social decline. Under these conditions, the RTD sector must find its function as a new pacemaker for economic and social development.

After the first experiences of R&D cooperation with the NIS, it seems appropriate to rethink the goals and initiatives and strive for better coordination of the available means. The objective of the Communication is to launch a debate on these aims, in particular with the Council and the EP.

2. Objectives of the Community's cooperation with NIS

It is the task of the individual NIS Governments to conduct the complex process of transformation. However, through international cooperation, the EU can make a significant contribution to this process. Following the Partnership and Cooperation Agreements (PCA), see Annex I, 1), cooperation activities undertaken in the region should contribute to stability and promote the process of peaceful integration into the global economy after the previous isolation. Any activity promoted will have to serve the mutual interest of the EU and the NIS. The financial support granted by the Community on S&T cooperation projects, may not have an incidence incompatible with the applicable rules of competition.

At present the RTD sector is still severely inhibited by the structures of the past and the major cuts in S&T resources (for an analysis of the present situation, see Annex I). The precarious economic conditions require much faster reform than the general transformation process has allowed until now. RTD must re-emerge with a flexible and more efficient structure, which can be sustained out of the NIS's own economic resources. EU international cooperation in S&T, should therefore aim:

- to reorient scientists towards research on subjects corresponding to private and public needs
- to replace outdated structures and promote rationalization
- to cultivate the industrial prospects and assure a sustainable development
- to identify partners for cooperation on the newly emerging markets and
- to support conversion of science towards civil purposes.

Main instrument of the EU to support and encourage the process of reform is the Technical Assistance Programme for the CIS (TACIS) with an annual budget of approximately 500 MECU. But also in S&T a wide array of different actions and programmes were set up to support the process. In particular the 4th RTD FP includes in its international cooperation (INCO) programme provisions dedicated to cooperation activities. The areas mentioned in the INCO workprogramme are: environmental protection and preservation of natural balances, health, advanced communications and telematics, information technologies, materials and production technologies, biotechnology, and transport. Furthermore, the possibility of a project by project participation in other specific programmes is provided (for more details on different EU actions see Annex I.1 and 2, and for a more detailed overview on achievements see COM (94)420 final).

The average annually available funds in the 4th RTD FP for "cooperation with the Countries of Central and Eastern Europe and the New Independent States of fSU" (a total of 248.5 MECU for the period 1995-1998), however, have been reduced and amount to half, compared to the 120.1 MECU allocated for one year in 1994.

3. Stimulating nuclei of a new RTD culture

The general identification of priorities in the transformation of S&T in the NIS has remained controversial despite many individual and spontaneous efforts of different national and international bodies¹. In the first phase the European Community considered important that the international cooperation contributes to keep up enthusiasm for science and to mobilize researchers to get acquainted with competitive procedures. As a result available resources were split between many small projects. International support often bypassed existing structures. The beneficiaries were individual scientists in non-formalized cooperation frameworks. The strategy of the EU was not to interfere with research institutions and yet to give a wide chance for adaptation of scientists who were eager and competent. A first broad selection process of internationally funded projects was initiated. During this phase S&T cooperation remained essentially academic and showed little industrial involvement.

Based on the past experience and given the continuing urgency of the economic situation, the next phase should bolster up the process of transformation and contain more relevant structure building effects. NIS governments, in principle, are aiming for such transitions, even though social hardship often impedes implementation politically. International support should therefore use resources to encourage new tendencies and set examples of promising scientific performance. The EU as the most important trading partner has the a common responsibility to the NIS neighbours. In the following the Commission launches some ideas on how to implement a second phase of S&T international cooperation with NIS.

3.1. Reduced number of projects with better support

The new strategy should promote the creation of nuclei of a revitalised RTD culture. Resources should be concentrated on fewer and more relevant projects. Not only the selected projects themselves but also their environment should indicate a responsiveness

¹ OECD estimates that 'no less than 40 000 groups of experts' are supposed to contribute to setting S&T priorities and evaluating institutes. see: OECD, Science, Technology and Innovation Policies, Federation of Russia, Volume I, Paris 1994, p.36

to the general process of transformation. To improve project quality in terms of achieving better application, active support will be needed. A variety of support measures are envisaged:

- * improvement of the general information and partner finding system,
- * strengthening of the preparatory phase of projects,
- * defining project selection criteria more precisely, and
- * measures contributing to the stabilization of the legal, economic and policy conditions for RTD

3.2. Integrating: INTAS (summary of Annex II)

INTAS was set up for a pilot phase in order to provide urgently a flexible, efficient tool capable of attracting resources in addition to those provided by the Community and to ensure formal participation of the Member States in an action conducted outside the FP. It took the form of a private Association under Belgian law. The pilot phase has been extended until 31 December 1995. The current members are the Member States of the European Union, Norway, Switzerland and the Community itself.

INTAS in its current form has failed to attain the objectives set when it was set up. Independent audits have shown that it takes particularly long to conclude contracts, that the costs of this structure are high and that the procedure for evaluation of projects submitted to INTAS is not always transparent. Moreover, the unpredictability of the changes in Eastern Europe made it impossible to include this action in the 3rd FP, although this problem has been overcome in the 4th FP.

In the light of the foregoing, the Commission considers that the cooperation with the NIS in the field of science and technology must continue but must be targeted more closely on the real priorities. The preparatory action outside the FP has shown that conditions were not met for the creation of a separate structure (art.130n of the EC Treaty). To make this action more effective, it will therefore be continued but brought within the normal regulatory framework for implementation of the research programmes, while retaining the specific features of INTAS described in detail in Annex II.

3.3. Cooperation with TACIS and coordination with Member States

In order to make best use of the seriously reduced funds the R&D activities should seek coherence with and the active cooperation of TACIS. General support activities such as setting up information systems, giving assistance in the preparatory phase of projects, legal and managerial advice within a more systematic structure, should be closely linked to activities undertaken by TACIS. S&T cooperation in turn should respond to and support TACIS projects.

There is an information deficit concerning the various activities Member States are conducting individually in the area of S&T cooperation with NIS. To improve the mutual knowledge in order to increase synergy and coordination, the Commission has already started to launch studies on the actions initiated by the individual Member States². These types of studies will be continued and extended, making use of the rich material which also exists within other organizations such as the OECD, World Bank, UNCTAD and GATT/WTO.

² European Commission, Science, Research, Development: Cooperation in Science and Research with Central and Eastern Europe, Brussels 1994

3.4. Flexible project structure for infrastructure building

No direct institutional support will be provided from S&T cooperation funds. The task to overcome the lack of infrastructure and the necessity to build up or renew the long-term structures is the task of the NIS governments. The international cooperation in S&T will support their endeavour by project funding. TACIS, as the technical assistance programme could also be able to support these ventures by institutional support. In principle, the present political and legal situation gives preference to project funding. Work has to be devoted to find better and more sustainable legal solutions for the investment in scientific infrastructure.

3.5. Regional diversification

Decentralization and regionalization of RTD capacity must be strengthened. In general, regions with high S&T density have better chances to renovate their science structure through their own potential. Peripheral research centres without further connections are more at risk of collapse but they are also crucial for local development. Governed by the overall selection criterion of excellence, regional relevance must be given particular attention.

A major problem are the former isolated 'science cities', urban mono-structures supported by the central administration, mainly the Ministry of Defence. It must be borne in mind that military research will continue in many of these cities and their transformation into normal cities is not an explicit objective of the governments concerned. The ISTC is active in the field of conversion by supporting civil projects within former science cities. The general idea to transform those 'secret cities' which have been opened into 'Technopoles' is regarded with some scepticism. Possibly the market structures in the NIS are too weak to provide a self-sustained foundation. A more appropriate attempt for the transformation into "normal" towns might be through the general diversification of the occupational structure. The response to regional market needs may turn out to create better chances than a technology-led top-down transformation.

3.6. Thematic priorities

General priorities for RTD cooperation have been identified in the past. In particular, research projects in the field of the environment are of interest, e.g. for regions such as the Black Sea, the Lake Aral, the Baikal etc. Cooperation in Chernobyl and other areas on the effects of nuclear contamination and on nuclear safety will continue. The NIS may also contribute important results for global change research, because of access to the Arctic climate zone, of the availability of space technology and also because of the vast territorial extension.

The section dealing with NIS in the work programme of the Specific Programme on 'Cooperation with third Countries and international organizations' gives an overview of the most important areas for RTD cooperation. The interest in these areas is due to the particular attention paid by the EU to cooperation on those subjects where the NIS need to build infrastructure, to modernize their industries, to improve the low standard of living or to tackle other major problems of NIS societies. Subjects are based on mutual interest and they bear a promising potential for development. They partly refer to other policies, in particular to the development of the global information society, and to transport, industrial technologies and in the sector of energy generation, to processing and transportation.

Nuclear technology and space technology were the most advanced and prestigious technology complexes in the past. Both were related to military purposes and both have

the potential for peaceful applications. Their position in the future society, however, and in particular their economic base and environmental sustainability have to be carefully considered. The investments in the past were immense but the installations are rapidly deteriorating. Without a long-term vision for future use and financial backing both complexes will face a problematic future. This may result in a loss for space technology and for the world's RTD community in general. For the nuclear sector this may lead to an unsafe development.

Economics, financial studies, social sciences, market-oriented legal research, business and administration are subjects which were lacking in former times or which were rather weak. Whereas economic and financial studies as well as training are offered by TACIS/ACE, the World Bank and many private universities, there is still a lack of social sciences. In particular capacity to monitor the development and to give realistic feedback on the direction of the development (Technology Assessment) are necessary. A Monitoring Network (5.3.) could help to establish these functions.

4. Improving project quality and application

Under the present conditions projects of relevance are those which lead either to an industrial application or to the creation of realistic problem-solving capacity in the near future.

From the point of view of EU industries, it appeared difficult to identify high tech products with a market potential and it was found even more difficult to apply Western production systems to them³. Better preparation of industrial RTD projects will contribute more for the future than extensive funding of non-targeted projects. It is necessary to better select and prepare projects for future industrial application.

Application of research results should also be considered when targeting research proposals in the public domain. The reduced resources will influence the selection of proposals for EU funding on the basis of their usefulness to improve the situation.

4.1. Support for project generation

Open calls for proposals as they are used in RTD specific programmes might not always be the most appropriate means for generating good proposals. A closer 'dialogue with the authorities of the NIS', with experts from NIS and the Member States should be developed as a useful tool, in the way that the 'Round Tables on industrial co-operation' function. The task of this 'dialogue with NIS authorities' should be to identify and negotiate relevant choices for industrial projects or for projects in the public domain.

The preparatory phase of projects, in general, must be improved. Joint workshops in selected areas should be used to create networks whenever the level of the envisaged projects still seems too academic. COST projects should be opened to NIS for better cooperation in networks. Out of these networks future projects may be generated. A share of the budget in the forthcoming initiatives will include funds for workshops and networks which serve in particular the preparation of applied projects.

4.2. Application as one of the selection criteria

In order to select industrial research projects with a realistic chance of application, more targeted selection criteria should be introduced besides the usual criteria of excellence.

³ IRDAC opinion on Scientific & Technological Cooperation with Central Eastern Europe

In the present situation those projects which are close to industrial production should be favoured. Project partners, therefore, should give evidence that the proposed project is relevant and has an industrial partner in the consortium.

Moreover, proposals for cooperative research projects in general will have to include a feasibility assessment. It should be carried out by the proposing partners as a precondition for submission of a proposal. It will describe the foreseen application and it must include a cooperation partner committed to using the results of the project. The partner committed to application of the results of projects in the public domain may be, e.g., an agency, such as an environmental organization, or a regional administration. For industrial projects this might be newly established SMEs in NIS, or an interested EU firm.

4.3. Conversion and international technology cooperation

Advanced technologies from the former industrial-military complex will have to be transferred for new civil production applications. However, the NIS markets seem not yet prepared for high standard products made in NIS. The condition that an industrial partner committed to application of the results must be found may prove difficult at present in the NIS. Conversion under these conditions becomes extremely difficult.

The ISTC is giving scientists the chance to work on such projects. ISTC projects are funded by the United States, the EU (via TACIS)⁴ and Japan. Scientists and engineers are supported to work on nuclear reactor safety, management of radioactive waste, aerospace, development of new materials, vaccines and other medical technologies, and tools addressing a variety of environmental problems. The projects launched in the first year of operation of the ISTC sponsor more than 8200 scientists and engineers who previously worked in weapons mass destruction and missile technologies. The question is how to make parts of these projects yield results with practical applications in industry and in the public domain, while continuing also the support of fundamental research

For the conversion of some of the military high-tech research capacities it may be more promising to cooperate with EU firms to develop technical equipment for Western production and for the EU markets than to start civil production for the Russian market. The general concept of setting up joint RTD ventures on the basis of using NIS research facilities to design products for EU markets, has to be carefully investigated. In the present situation this type of cooperation may create the most benefits for both sides. It can help qualified laboratories and institutes to adapt to R&D under market conditions. The cautious attitude of military research centres to enter into such cooperation with Western firms for non-military purposes (e.g. laser technology in medical equipments) would have to be overcome. Legal implications have to be examined and intellectual property rights need to be safeguarded.

The path to conversion with western firms and their actual industrial application may be long. Nevertheless, open cooperation with EU partners would make a major contribution to this process. 'The dialogue with the NIS authorities', preparatory workshops and networks to develop a common strategy and feasibility assessments should prepare the difficult task.

⁴ Finland and Sweden contributed individually

5. Encouraging a more resourceful S&T environment

Not only the projects themselves need better preparation. Constructive support is needed for the entire environment in which useful and stable projects could be created. Single elements can be contributed through TACIS or certain accompanying measures within INCO. The lack of general infrastructure must be tackled by the national authorities.

5.1 Improvement of information

A major difficulty is the lack of access to information on science and the state of the art in technological development. This involves the information on the overall system of monitoring developments as well as the practical partner-finding systems. Apart from economic statistics and indicators there is no appropriate system and the information available has not yet reached a useful level. The patchy information on the situation creates major problems. Information on the central cities such as Moscow and St. Petersburg has been built up in the past years of cooperation. Information is also available on regions such as Novosibirsk, Jekaterinenburg, Rostov and on model developments like Nizhni Novgorod. However, on other regions of Russia and on the other NIS, information is rather superficial.

Many attempts to evaluate and to assess the existing capacities have been undertaken by different organizations and consultants. A useful overview on the situation, however, a register or data bank of existing institutions and their current capacities and their potential is not available at present and should be developed. Also scientific communication networks should be encouraged to serve the improvement of information systems.

5.2. Partner-finding initiatives

Improved information services are vital for research centres whose former links suffer from the break-up of the FSU. Finding partners for the joint research proposals is already difficult under more transparent conditions. Partner search, however, within an underdeveloped information system diminishes even further the general chances of success for cooperation. Additional support must be given to help potential partners in the NIS, in the EU Member States, associated States and also in CEE countries to find suitable collaborators. Not the quantity of research network achieved but the quality should count. Model instruments for the improvement of RTD cooperation exist in the EU: the (former Value) Relay Centres. Similar instruments built up together with a technology assessment and Monitoring Network for the NIS will increase project quality and contribute to long-term infrastructure.

In addition, topic-oriented 'brokerage events' involving interested industries and other organizations could be organized in coordination with TACIS and Member States' activities.

5.3. A Monitoring Network

The further development of priorities for the type of action and orientation will be accompanied by a 'dialogue with the NIS authorities'. Locally existing information will be made more accessible, coordinated and exploited. Information must be linked to evaluation and monitoring studies. In the long run a Monitoring Network on a regional basis should be encouraged to communicate across the different NIS. The focal points of the network will continuously work on the improvement of information (data bases),

on the evaluation of the changes and monitoring of the RTD cooperation projects and their local effects. At the same time they will serve for better information dissemination and coordination between the regions and the NIS.

5.4. Legal conditions

Legal conditions are a major constraint. Industrial property rights, physical ownership as well as intellectual property rights (patents) are causing problems in cooperation. The RF established a new Patent Law modeled on the European Patent Organization (APE). However, without an active enforcement and appropriate control mechanisms, private-sector involvement in joint research projects will remain limited. Partners in international cooperation need general security about commitments, duties and risks. Initiatives require a stable legal background to refer to in cases of dispute. Legal treatment in the NIS, in many respects, is unpredictable. A joint task force or working party could support the advancement on legal conditions.

5.5. Payment transfer

Uncertainty relates also to taxation of payment transfers. The ISTC has achieved tax exemption. Attempts to achieve the same for INTAS are under way. The taxation appears to be higher if institutions are involved. This leads to attempts to bypass official institutions and to grant research funds to single scientists. The possibilities of the banking system must be included in the reflections. Joint talks and a working group together with the representatives of governmental or non-governmental organizations should address these financial problems.

6. Conditions for Foreign Direct Investment (FDI)

The general legal uncertainty is still the main hindrance to increased industrial investment from the West. Research and industrial development are closely linked. The structural change needed in the science sector is connected to the interest of private investors to cooperate with NIS industries and their research centres and design offices. Industry in the NIS must still get closer to the market needs. Cooperation programmes in science and technology can only prepare the ground. S&T can give stimulation, but without foreign investment to follow no constant innovation process will be initiated with long-term prospects and with a sustainable economic impact.

The real economic changes are expected when more foreign investment enters the countries. In principle EU-based enterprises are interested, and more investment could be possible. With an unclear legal situation and concerns about the general political future the level of investment at present still stays comparatively low, despite the attractive conditions of high technological know-how, a huge market and low wages.

7. Operational conclusion: steps and instruments

The new orientation of international RTD cooperation with NIS, should concentrate on the following elements:

1. Fewer and more relevant projects closer to application
2. Integrating INTAS

3. Preparation of actions, projects and finding possible partners through 'dialogue with NIS authorities' and project preparation by funding networks
4. New requirement for proposal submission: to deliver a feasibility assessment and submit together with a partner committed to application of the results
5. Cooperation and coherence with TACIS and other EU programmes; coordination with Member State actions, with EBRD and with Worldbank
6. In general: higher share of the funds for supporting measures to improve quality and application of projects:
 - * Databank on relevant research institutions, their scientific profile, evaluation results, ongoing projects etc.
 - * Encouraging the development of a decentralized NIS Monitoring Network
 - * Partner-finding events, information days etc. with interested industries
 - * measures contributing towards the improvement of legal and economic conditions for RDT

ANNEX I

CURRENT COOPERATION AND PRESENT SITUATION OF S&T IN NIS

CONTENTS

1. Framework of EU cooperation with NIS	10
2. Evolution of S&T cooperation with NIS	11
3. Present conditions in the aftermath of the SU in S&T	11
3.1. Heritage of the Past	12
3.2. Size and Volume of the Science Sector	13
3.3. Understanding Brain Drain	13
3.4. New territorial arrangement of the S&T Sector in the NIS	14
3.5. Emerging diversity of regional cooperation	14

1. Framework of EU cooperation with NIS

Considering the need for stability and the substantial economic opportunities in the future, it is in the EU's interest to develop trade and investment relations throughout the region within a legal framework. The Commission recently signed 'Agreements on Cooperation and Partnership' (ACP) with the RF, Ukraine, Kazakhstan and Kyrgystan. With all other countries except Tajikistan ACPs are being negotiated or exploratory discussions are under way.

The broadly formulated ACPs contains a specific article on RTD cooperation. Stating the aim of access to their respective RTD programmes, the three main areas of cooperation mentioned are: the exchange of scientific and technical information, joint RTD initiatives, training activities and mobility. In mutual interest, the objective is to give special attention to redeploing scientists and researchers involved with mass destruction weapons. Negotiations are foreseen to establish provisions for intellectual property rights.

The 4th RTD FP offers cooperation in S&T for NIS in Action 2: 'Cooperation with Third Countries and International Organisation', part A2: 'Cooperation with the Countries of Central and Eastern Europe and the New Independent States of fSU'. Moreover both the 4th RTD FP and the EURATOM FP provide for participation of NIS partners on a project by project basis in other Specific Programmes. In this respect, a distinction is to be drawn between partners from two groups of NIS:

- * from European NIS eligible to participate in all Specific Programmes of the FP by virtue of Article 130j of the EC Treaty and
- * from non-European NIS to participate in those Specific Programmes opened by virtue of an ad hoc provision of the Specific Programme decision.

TACIS, the technical assistance programme for NIS launched in 1991 with an annual budget of 500 MECU, provides know-how and technical equipment for a wide range of public and private organizations. TACIS allocated 20 MECU for the International Science and Technology Centre Moscow (ISTC) which was set up as an international organization together with Russia, the US and Japan. Its objective is to employ researchers from the military sector in civil projects. TACIS also funds ACE, the Action for Cooperation in the field of Economics, and supports action concerning the application of science and technology to the market economy, as well as the retraining of scientists, teaching, education and professional attachment.

2. Evolution of S&T cooperation with NIS

In the first phase, following the break-up of the fSU, the EU established a wide array of S&T cooperation actions to support the process of transformation⁵. Cooperation in nuclear fission safety (Chernobyl) and ITER, the controlled fusion project, had already been previously established. The COPERNICUS action was set up for Central Europe; researchers from the NIS were associated in 1994. Support was provided for participation in joint projects under five Specific Programmes of the 3rd FP. Founded as a private association, INTAS was specifically set up to support the general RTD potential in NIS via joint projects. THERMIE established cooperation in the energy sector, TEMPUS in higher education. NIS participation in some COST actions extended the joint European scientific networks. EUREKA accepted the RF as a member for industrial cooperation. European research organizations, such as CERN, ESO and the ESA, reinforced the already existing relations in their specific scientific fields. In addition, individual Member States, other nations, international organizations and non-governmental organizations have contributed in different fields to enhance the scientific cooperation without much coordination.

3. Present conditions in the aftermath of the SU in S&T

Science was prestigious in the fSU and the belief in the power of 'scientific-technological progress' belonged to the communist rhetoric. Despite the quantity and the undoubted quality of RTD activity, there were at the same time very clear deficiencies. The science organization pursued purposes other than scientific concepts which normally apply in market economies and democracies. Science in the fSU had been committed to advance

⁵ see in particular COM(94) 420 final: 'Cooperation in Science and Technology between the European Union and the countries of Central and Eastern Europe on the one hand and the new independent States of the former Soviet Union on the other', and the brochure European Commission: Scientific and technological cooperation with Eastern Europe, Brussels-Luxembourg 1994

selected technologies mostly geared towards achieving military superiority and to demonstrating the supremacy of communism. As such it had been operating in the beginning very successfully. It reached the climax with the launching of the sputnik.

In the eighties the fSU missed out on the dynamic development of the information and communication technologies and their wide application in society. In the West 'information' advanced to become one of the key factors for technological development (the 'information society'). Non-democratic societies, though, could not allow uncontrolled individual communication. Thus, the structure of society turned out to be the main barrier to exploitation of these new technological advances. Progress in contemporary societies does not simply depend on the scientific steps forward but it must assure the appropriate implementation and application in society. Neglecting this aspect undoubtedly contributed to the final collapse of the economic system.

3.1. Heritage of the Past

The conditions of scientific development within the fSU were able to produce some quite different and original scientific solutions which were not communicated to the international scientific community. However, deficiencies which stem from the past Soviet system prevail. They can be summarized as follows:

- * a predominant military orientation of S&T and of the relevant industrial production with a bias towards specific subjects such as nuclear physics, space and laser technologies, plus mathematics;
- * the isolation of most scientists from the world community, the secrecy of much of their work, often carried out in secret cities, has led to limited skills in languages used by the international scientific community and to restricted participation in international debates and networks;
- * no private ownership, no industrial property rights and no individual patents;
- * a centralistic structure with negative consequences for the regions: regional imbalance, no connection with local problems, long distance in the innovation processes between industrial production sites and related research centres;
- * absence of effective links between education (universities) and research (Academy of Sciences or research centres);
- * a heavy bureaucracy, with hierarchical top-down style of organization which contributed to the creeping degradation of the R&D system during the '80s, and no cost efficiency or consciousness in the sector;
- * no market and little consumer orientation and no problem-solving capacity, extreme supply-side alignment of a centrally planned economy;
- * a lack of information and communication technology development for application in industry and consumer goods;
- * no recognition of environmental problems and a lack of energy-saving technologies;
- * no independent and critical discipline of economics, financial affairs, business studies, management, etc.;

* no empirical social sciences research to follow and monitor the ongoing processes in society, but 'scientific Marxism-Leninism' as the ideological affirmation.

The science sector, though strong, well developed and dominant in society, is facing important changes. Cooperation with the EU can help to bring about important structural changes that are called for to adapt to the new situation.

3.2. Size and Volume of the Science Sector

The science sector in terms of personnel compared to other industrialized countries was highly oversized: after a steep drop the RSE* per thousand labour force (12.9 in 1989, 11.4 in 1990) was still 10.1 in 1991, compared e.g. with the 1991 EU average of 4.2.

Governments cut down the expenditure for science sharply, as the inherited science sector could not contribute to improve the economic and social situation in the short term. From around 3.5% of GDP spent on R&D by the end of the '80s, the share⁶ still corresponded to 2.1% of GDP in 1990. Today, in the NIS it possibly counts for less than 0.5%, taken into account that the GDP itself has shrunk by approximately 50%. In comparison the average EU spending on S&T is 2% of GDP.

The dramatic reduction of financial resources was introduced without proper planning. Meanwhile the Russian Ministry of Science and Technology Policy suggested a priority scheme. In view of the severe social consequences, it remains to be seen whether the plan will generate reduced and more effective RTD structures. Institutes and organizations with 5000 and more staff are less creative in terms of working conditions and, like bigger structures in general, tend to resist reform.

Under present conditions the output from the science sector is insufficient. The operating budget is spent largely on basic functions such as heating and electricity. In addition, staff salaries are very low which affects motivation and often institutes are closed for days and weeks to save on energy or premises are rented out to earn additional money.

3.3. Understanding Brain Drain

The reduction of personnel in the oversized structures will have to continue. The question is how to keep the best scientists on the one hand and how to stimulate chances for leaving researchers to make use of their science background for the benefit of modernization of industries. In this sense, the brain drain is necessary. The fear of the brain drain appeared as the main argument in favour of fellowship programmes. However, fellowships also may function as stepping stones to prepare emigration.

No fellowships were awarded under the EU RDT cooperation scheme with the NIS. Instead, the EU considers that cooperative research projects - e.g. for SMEs to start with the development of technological products - can better redirect the internal brain drain flow to inferior jobs into fields of technical competence and industrial innovation. Nevertheless the disapproval of the so-called 'internal brain drain' is only slowly decreasing. The argument is driven by the former prestige of scientists: a 'minor

* Research Scientists and Engineers

⁶ corrected according to the OECD calculation see: OECD, Science, Technology and Innovation Policies, Federation of Russia, Volume I, Paris 1994

commercial job' for a 'better salary' seemed unacceptable. With the pressure to reduce the overall number of researchers, movements into private business can be considered as a self-regulating process to redistribute talented people to new and needed occupations.

'External brain drain', despite the original fears, remained moderate. After a first wave of massive academic departures in 1990/91 (Jewish and German migration), the drain of scientists has become modest. More temporary contracts are being established between scientists and foreign institutes or industries. They offer a transitional solution for persons who wish to extend their knowledge and mobilize their acquired qualifications in new environments. After a first panic reaction today the positive elements of brain drain are also appreciated. Departures out of an open political system with new exchange channels - different than in the past - leave the scientists the possibility to continue communication with their former institutions, mostly to the benefit of both sides. An informal twinning of institutes could emerge from these relations.

There is no publicly available information on brain drain from the military-industrial complex into particular countries interested in the secrets of weapon technologies. Frequent movements of Russian scientists occur, especially out of the Baltic States, but also from Kazakhstan or other non-Russian republics. Having worked in military research centres outside Russia, now unemployed and with no relation to Russia or Russian research institutions nor to their present State of residence, it is this group which might feel the temptation to accept offers from third countries. The ISTC, in particular, aims to apply knowledge acquired in military research for civil projects. The results of this action should help to limit the scientific military brain drain.

3.4. New territorial arrangement of the S&T sector in the NIS

As a consequence of the break-up of the FSU, the S&T sector has become dissociated. Important institutes and production sites which previously formed a chain are today located in different States. Disrupted, incomplete cycles and chains of innovation and application are a frequent problem.

Approximately 70% of the research capacity stayed on the territory of the Russian Federation, again with a very uneven regional distribution. Ukraine is the second important site for military and civilian S&T after Russia. Some NIS still have a high concentration of (military) research centres on their territory with the difficulty of relating these centres to their national needs while other countries received no high-level research institution for their future development. Both situations cause severe problems for the new national support structures.

The attempt to reunite the former links in these chains will not necessarily provide the best solutions as production conditions and market prospects have changed. Cooperation proposals from former partners will be welcome if they prove the feasibility of industrial innovation in the new cooperation.

3.5. Emerging diversity of regional cooperation

Strategies for regional RTD cooperation in the NIS are conditional as the political relations developing between the individual States are not yet stable. Relations in negotiations between NATO, OSCE and individual NIS influence the attachment in the region. The RF represents, with its huge economic, social and military potential, the greatest challenge for the EU. Concerning other NIS, the westernmost (Ukraine, Belarus, Moldova) are in need of cheap energy supplies. The Central Asian Republics hold

important economic potential, especially in the energy sector, but they demand massive investments for adequate exploitation. The Trans-Caucasian republics need even greater support, taking into account, in particular, the instability which affects the region. Access to European trade, investment and technology, therefore, is a priority for all partners. The RF will remain the main shaping factor, its course will have the main impact on developing options for all other NIS.

The original differentiation between the CEEC and NIS could become blurred with further development. Regional cooperation treaties between neighbouring countries contribute to creating new regional cooperation patterns. Thus CEEC/NIS zones with different needs for S&T cooperation are taking shape: the westbound zone, associated to the EU, the westerly NIS zone between Russia and the EU, a Trans-Caucasian zone, the Central Asian Republics and the Russian Federation itself. Studies and a permanent dialogue will have to investigate their changing options and requirements.

ABBREVIATIONS

ACE	Action for Cooperation in the Field of Economics
ACP	Agreement on Partnership and Cooperation
APE	European Patent Organization
CEE	Central and Eastern Europe
CIS	Commonwealth of Independent States
COPERNICUS	Action in support of the countries of Central and Eastern Europe and since 1994 for the NIS in the field of research, outside the five specific programmes open to third countries
COST	European Cooperation in the Field of Science and Technology
CERN	European Centre for Nuclear Research
CRAFT	Cooperative Research Action for Technology
ESA	European Space Agency
ESO	European Southern Observatory
EU	European Union
EUREKA	European Network for Industrial Research Cooperation,
FDI	Foreign Direct Investment
FP	Framework Programme
fSU	former Soviet Union
IMF	International Monetary Fund
INCO	International Cooperation in S&T (Programme of DG XII)
INTAS	International Association for the Promotion of Cooperation with Scientists from the Independent States of the Former Soviet Union
ISTC	International Science and Technology Centre
IRDAC	Industrial R&D Advisory Committee of the European Commission
NATO	North Atlantic Treaty Organization
NIS	New Independent States
OECD	Organization for Economic Cooperation and Development
OSCE	Organization for Security and Cooperation in Europe (former CSCE)
R&D	Research & Development
RF	Russian Federation
RTD	Research and Technological Development
TACIS	Technical Assistance for the Commonwealth of Independent States
TEMPUS	Trans-European Mobility Programme for University Students
THERMIE	European Technology for the Mastering of Energy
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

ANNEX II

INTAS : THE INTEGRATION OF INTAS

1. Background

After the break-up of the Soviet Union events gained pace and the resultant disorganization of the economy seriously called into question the position of science and technology in the new independent States which had emerged.

In response to various resolutions from the European Parliament and to the critical situation of science in Eastern Europe, which was still unpredictable at the time of adoption of the third Framework Programme, funds were set aside outside the Framework Programme for cooperation in science and technology with the countries of Eastern Europe.

At its April 1992 meeting on research the Council decided to back the Commission's initiative to support science and technology in the NIS and asked the Commission to examine the possibility of setting up an international foundation.

The Association for the Promotion of Cooperation with Scientists from the New Independent States of the former Soviet Union (INTAS) was set up for limited period of time as a private association under the Belgian law. The Statutes of this Association were approved by the Commission on 17 December 1992 for a pilot period ending on 31 December 1994.

The objectives of INTAS were as follows :

- to provide rapid, efficient support by means of flexible, effective action to maintain the scientific potential of the NIS;
- to attract resources and partners in addition to those provided by the European Union;
- to ensure formal participation by the Member States in an action outside the Framework Programme.

A separate structure outside the general organization for Community RTD programmes could have been foreseen following Article 130 O and 130 Q of the Acte Unique Treaty. However, this disposition requires the unanimity of the Council. It was necessary therefore that the completion of the INTAS objective was satisfactorily achieved within the pilot phase.

On 23 November 1994 the Council adopted a specific programme of research and technological development, including demonstration, in the field of cooperation with third countries and international organizations (1994 to 1998). This confirmed the Community's participation in the pilot phase of INTAS which was extended until 31 December 1995. In Annex 1 of the Specific Programme, the Council approved the Community participation in INTAS as a preparatory activity which will end on 31.12.95. Any prolongation of that period is subject to a Council decision.

On 27 December 1994 the member of the Commission responsible for research sent a letter to the Union Member States stating that the Commission would be sending the Council a communication on the future of INTAS.

At the Council meeting on 10 March 1995, the Commission informed the Council that it had decided to grant INTAS funding totalling ECU 5 million in 1995. The Council asked the Commission whether it was possible to revise this amount upwards. The Commission also announced that a document on the Community's future participation in INTAS would be submitted to the Council on 9 June 1995.

2. Practical experience with INTAS

A restricted call for proposals was published before the official inauguration of INTAS. After this preliminary round, INTAS decided to proceed with calls for proposals open to all fields of natural and human science in an attempt to involve as many scientists as possible from the NIS.

On this basis, a call for proposals closed in October 1993 resulted in the selection of 509 projects granted ECU 21 million and a second call closed in April 1994 saw the selection of 459 projects to receive ECU 20 million (8000 proposals were received in response to these two calls).

Coopers & Lybrand conducted an evaluation of INTAS and the Commission asked Ernst & Young to carry out a financial audit.

According to the audit by Ernst & Young, as yet the Association lacks an accounting system allowing systematic monitoring of all entitlements and commitments.

3. Relations between the results of INTAS and the objectives set

3.1. Speed and efficiency of the action

Cooperation with the NIS is certainly no easy matter. Nevertheless, the International Science and Technology Centre (ISTC), set up by an intergovernmental agreement (between Japan, the USA, the Russian Federation and the European Union) in Moscow to help convert military scientific activities to peaceful purposes, started operations in April 1994. Over 3000 scientists have received funds from this Centre already in the ten months since then.

Similarly, in 1994 a call for proposals was published under the COPERNICUS programme (for the countries of Central and Eastern Europe and the NIS) run by DGs III, XII and XIII. 220 projects were selected (including 45 participants from NIS) and all the contracts were signed within eight months. One year after the 1994 call, none of the INTAS contracts were signed. In addition, many of the contracts from the 1993 call have yet to be signed.

It is therefore clear that establishment of a body outside the Commission has by no means speeded up procedures, on the contrary.

What is more, INTAS's costs per million ECU committed are some five times higher than those of the Commission for a comparable scheme such as COPERNICUS : this is attributable mainly to the number of staff employed on each scheme. The audit by Ernst & Young estimated the administrative costs at around 13.5 % of the 1994 budget of approximately ECU 22.7 million. This percentage will rise even higher if INTAS were to continue but with lower funding than at the moment.

All INTAS's activities have been based on providing support for as many scientists as possible from the NIS in every field of natural and human science. INTAS justified this policy by pointing to the urgent situation created by the break-up of the Soviet Union. It has indeed been taken as the basis for a series of activities of this type by the International Science Foundation set up by Mr Soros. Today the urgent situation has given way to a structural phenomenon calling for a different approach. The scale of this phenomenon far surpasses the support available under the FP. As demonstrated by an OECD evaluation of the science system in Russia, there are too many researchers in this country. Under the guidelines for activity 2 of the FP, the action taken by the Community must concentrate solely on the mutual interests of the Member States of the Union and of the beneficiaries and on selective support for the most competitive teams. The policy pursued by INTAS is out of line with the objectives of the 4th FP on international cooperation and with the interests of the NIS, since it endeavours, despite the limited resources, to maintain research potential in every field of science and technology without any foundation in economic reality.

Examination of the list of projects selected shows that they are scattered widely, often in fields far removed from the problems currently facing these countries and from the criteria set out in INTAS's statutes of "promotion of scientific research as a key component in economic and social progress and in consolidating democracy".

3.2. Funding in addition to the support from the European Union

The European Union members of INTAS contributed ECU 0.33 million (0.6 %) to the budget in addition to the 95% contribution from the Community. Austria, Finland, Norway, Sweden and Switzerland have contributed ECU 2.41 million. INTAS members have also seconded eight national experts and the Commission has seconded two officials to INTAS. In the 4th Framework Programme, the share from the Community budget will rise to almost 100 % with the accession of new Member States to the European Union and the participation of Norway and Switzerland in the 4th Framework Programme on the basis of the EEA Agreement and a bilateral agreement respectively.

Under these circumstances, there is no longer any reason for a separate structure. In fact, the preparatory activity has shown that there is no need for such a separate structure (Article 130N). Furthermore, if such a structure were to persist, it would attract criticism from the European Parliament and the Court of Auditors.

Also, the annual funding provided for in the 4th Framework Programme is half the amount available in 1994. This signifies that in order to attain the objectives of activity 2 in the Framework Programme and to avoid excessive cuts in the support for the countries of Central and Eastern Europe, the Commission will be unable to earmark any more than ECU 10 million to INTAS's tasks in future. As is the case for the rest of international cooperation, the financial contributions from beneficiary countries will be added to this amount. Clearly, this will not be enough to fund a structure with operating costs as high as INTAS (over ECU

2.5 million per year, including the seconded national experts).

3.3. Discussion and coordination forum

INTAS provided a means for the Member States to participate in the implementation of this support for the NIS while there was still no committee for this programme. The establishment of the committee for the international cooperation side of the 4th Framework Programme removed the *raison d'être* for INTAS. In practice, parallel operation of two similar committees, the type III A committee for the international cooperation programme on the one hand and the INTAS General Assembly on the other, creates confusion about the division of responsibility.

4. Conclusions

Cooperation with the NIS comes under the 4th Framework Programme and the committee for the international cooperation programme assists the Commission in implementing this action. Since the urgent situation in the countries receiving the support has turned into a structural problem, the preparatory scheme should be replaced by a regular activity within the 4th Framework Programme. The fact that the annual funding available for scientific cooperation with Eastern Europe is now half the amount available in 1994 is another factor in favour of concentrating activities within the Framework Programme.

INTAS has received no significant funding apart from the resources from the European Union. Practical experience with INTAS has failed to show that it is faster and more efficient than the Commission - on the contrary. Nevertheless, the need and interest for Europe to provide support for the scientific and technical potential in the NIS remain. The achievements of INTAS should be safeguarded and valued and the continuity of the action as such will be ensured. Under these circumstances, the Commission has reached the following conclusions

1. The Commission therefore does not propose a draft decision for the continuation of Community participation in INTAS after 31.12.95. Furthermore, the Commission as a representative of the Community in the INTAS Assembly will not agree to a continuation of the Association after that date (in accordance with Article 1, paragraph 4 of the INTAS statutes).
2. The cooperation to support science and technology in the NIS must continue. However, the activities must be targeted more to concentrate resources on the real priorities. The scale of the needs in relation to the resources available makes it impossible to cover every scientific discipline without spreading the resources too thinly. In particular, the support should focus on fields in which:
 - the former Soviet Union was particularly skilled (space, mathematics, informatics, theoretical physics, etc.);
 - vital hardware or data can be harnessed;
 - research is essential in order to resolve certain major problems specific to these countries.

3. The corresponding section of the international scientific cooperation programme will be carried out within the normal regulatory framework provided for implementation of the research programmes. National experts from Member States could be involved in the Community activities as required.
4. The Commission will be assisted by the committee for the international cooperation programme in accordance with the rules of comitology. The committee will take over the role of the INTAS General Assembly.
5. The tasks of the INTAS Scientific Council will be carried out by a committee created for this purpose.
6. To build on what has been achieved and uphold the political signal given by cooperation with the NIS, the designation INTAS could be maintained and the contacts established in the NIS could be kept up.
7. In the frame of the financial means foreseen for cooperation with the NIS by the Specific Programme, an amount of about 10 MECU per year, during the period 1996-1998 will be reserved for this activity. As is the case for the rest of international cooperation, the financial contributions from beneficiary countries will be added to this amount.

FINANCIAL STATEMENT

1. TITLE OF OPERATION

Reincorporation within the Commission of the activities of the International Association for the Promotion of Cooperation with Scientists from the New Independent States of the former Soviet Union (INTAS) and cooperation with scientists from these States.

2. BUDGET HEADING INVOLVED

B6-7211

International scientific cooperation

3. LEGAL BASIS

Council Decision 94/807/EC of 23 November 1994

4. DESCRIPTION OF OPERATION

4.1 General objective

To reincorporate the activities of INTAS within the Commission in order to promote scientific and technological cooperation with the new independent States of the former Soviet Union, with a view, in particular, to stabilizing the RTD potential and providing support for scientists in these countries.

4.2 Fields covered

Measures necessary on staff and premises in order to conduct scientific and technological research activities, with a view, in particular, to stabilizing the RTD potential as provided for in the work programme on international cooperation.

4.3 Period covered

1996 and thereafter.

5. CLASSIFICATION OF EXPENDITURE OR REVENUE

Non-compulsory expenditure.

6. TYPE OF EXPENDITURE OR REVENUE

This expenditure by the Commission replaces a grant for funding INTAS. The objective is to transfer the resources in order to implement scientific and technological cooperation schemes between the Member States and the new independent States.

7. FINANCIAL IMPACT

7.1 Amount deemed necessary (1995-1998)

Allocation for the programme	578.000 MECU*
Appropriations available in 1995	56.450 MECU
Preliminary draft research budget	3.467 MECU
EFTA/EEA contribution	0.940 MECU
Total appropriations for 1995:	60.857 MECU

Appropriations available for aid expenditure in 1995	42.621 MECU
Preliminary draft research budget	3.467 MECU
EFTA/EEA contribution	0.723 MECU
Total appropriations for aid expenditure 1995:	46.811 MECU

Cost of the operation to be covered under Art. 53	5.000 MECU
BALANCE:	41.811 MECU

PROGRAMME SCHEDULE

MECU	1995	1996	1997	1998	1999+	TOTAL*
Commitments	59.917	145.000	176.000	197.083	----	578.000
Payments	38.636	106.000	86.000	146.000	201.364	578.000

* The Commission will submit a proposal for a 7% increase for the fourth (1994-98) framework programme, to allow for enlargement, to the Council and Parliament.

7.2 Method of calculating total cost of operation

1992 :	4 MECU	
1993 :	22 MECU	
1994 :	20 MECU	Grant for INTAS
1995 :	5 MECU	
1996 :	10.6 MECU	(amount requested)

7.3 Itemized breakdown of cost

The operation covers the operating expenditure for the new calls for proposals.

Reincorporation of 8 seconded national experts	=	ECU	300 000
Internal staff (5 persons)	=	ECU	250 000
Rent and leases	=	ECU	50 000
New call for proposals	=	ECU	10 000 000

7.4 Indicative schedule of appropriations (in ECU million)

Appropriations	1996	1997	1998
Commitments	10.6	10.6	10.6
Payments	0.6	10.6	10.6

8. ELEMENTS OF COST-EFFECTIVENESS ANALYSIS

8.1 Specific objectives: target population

The objective of the activities reincorporated by the Commission is to contribute to promoting cooperation with the new independent States of the former Soviet Union in the field of research and technological development, with a view, in particular, to stabilizing the RTD potential in these countries.

8.2 Grounds for the operation

The pilot phase, limited to 1995, fits into the framework for international cooperation in the field of research (Article 130i of the Treaty) with the objective of safeguarding the RTD potential, as provided for in the work programme.

8.3 Monitoring and evaluation of the operation

The projects will be monitored and evaluated within the general framework of the fourth framework programme.

9. ANTI-FRAUD DISPOSITION

A number of existing administrative and financial controls are carried out in all areas of signing and the execution of research contracts. Among these controls, one can summon :

In the previous stage of the conclusion :

- The initial selection of proposals on the base of the scientific value of the project and the costs of the research according to the area, the duration and the potential impacts.

- The Analysis of the financial data transmitted by the proposers in a negotiation form.

After the signature of the contract :

- Examining the expense report before payment, at all levels (the financial administrators and the scientific administrators).
- In house control permits, by the examination of justificatory documents, to detect the errors or other irregularities. In order to reinforce the effectiveness of these controls, the departments of the Commission created an audit committee which centralises and carries out the overall controls. These controls are effective through the members of the audit committee, or audit firms with whom the Commission have concluded framework contracts and are under the supervision of the audit committee.

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