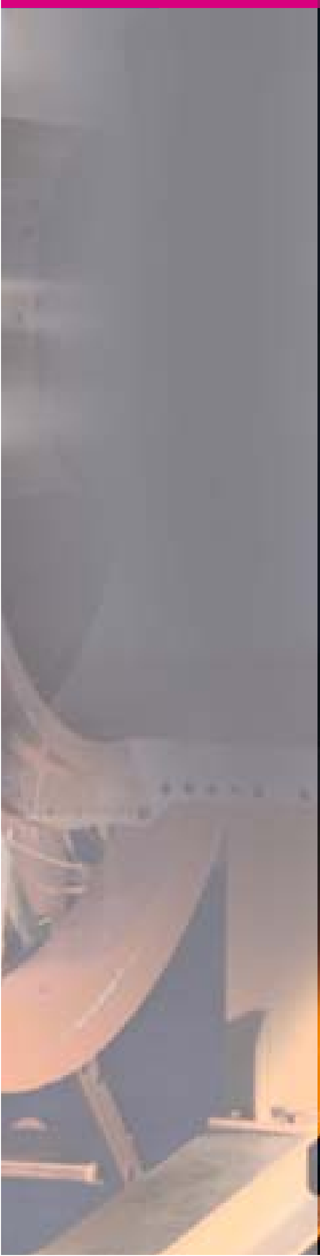
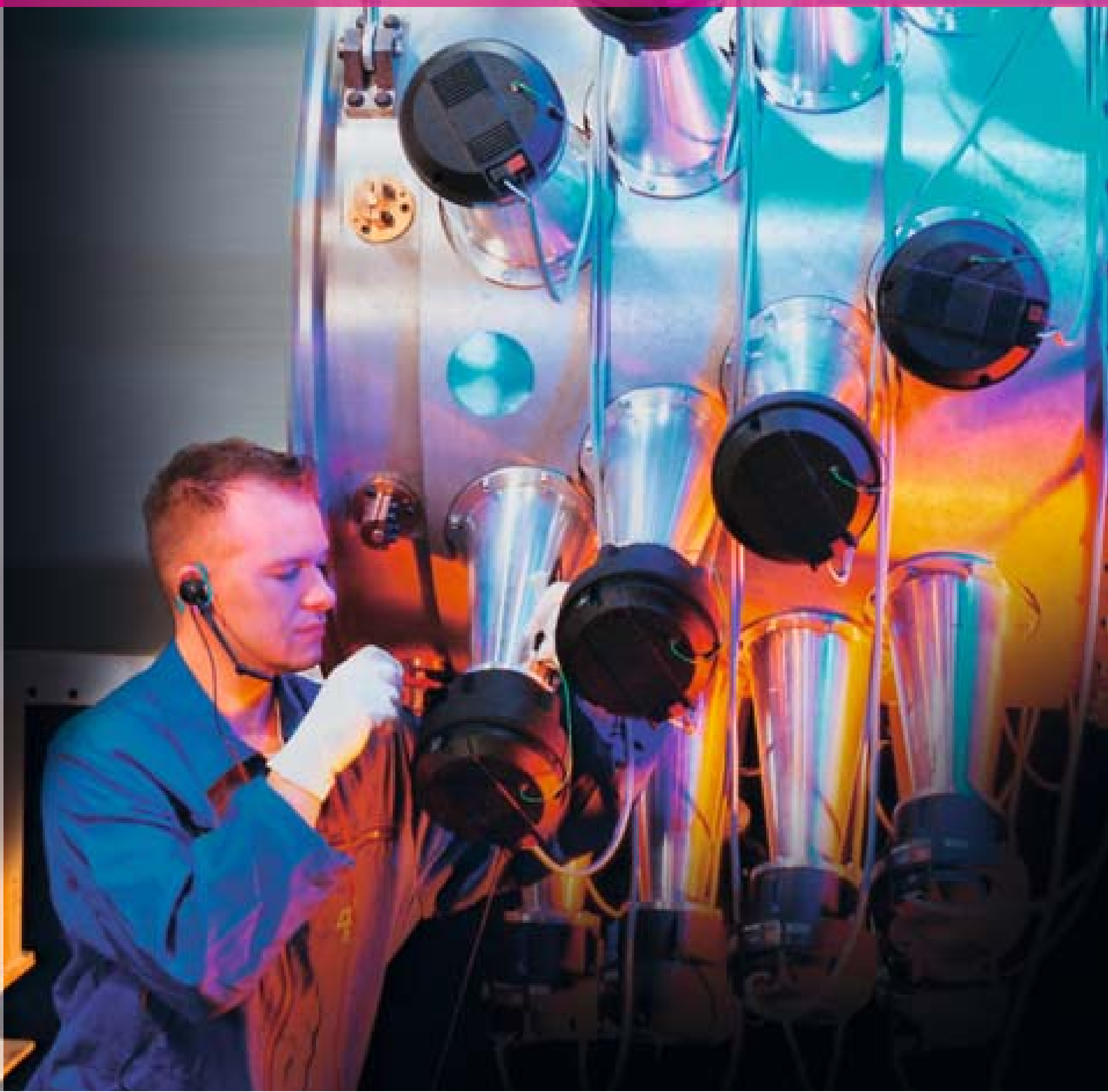
EUROPEAN COMMISSION
External Relations

The EU and Russia: Exploring beyond borders





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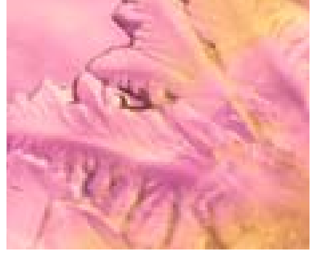


Four dimensions of cooperation

“Our goal is to create a common European peace in the interests and for the good of our countries. Of course, this is the heart of our relations. We all want for Russia to be a democratically flourishing country that is attractive for foreign investors, with transparent, stable rules, and to be a strong partner of the European Union.”

José Manuel Barroso,
President of the European Commission

The impetus for the EU and Russia’s four “Common Spaces” was provided by reality – more precisely, by the need to raise cooperation between these two major European players to a higher level.

When these spaces were first discussed three years ago, many sceptics claimed that the EU and Russia were so incompatible that it would take decades to achieve any significant convergence.

Although these sceptics saw how things were at that time, they failed to observe that both the EU and Russia were set to become ever more important to one another.

The road maps which govern the four Common Spaces were an important step forward, detailing plans to advance cooperation in all spheres of interaction.

The Common Economic Space was based on the complementary nature of the economies of Russia and the EU. The EU currently accounts for over 50% of Russia’s foreign trade and this trend is set to continue, with economic cooperation forecast to increase ever further.

The development of a Common Space in External Security reflects the fact that the stabilisation of the European continent and the observance of non-proliferation are in the interests of both the EU and Russia. The EU is currently formulating a common foreign and security policy. This policy will afford the EU and Russia the opportunity to coordinate their positions on pressing international issues.

The Common Space of Freedom, Security and Justice is a very promising area of cooperation for the EU and Russia, with both parties looking to overcome common challenges. These challenges include illegal migration, cross-border crime, human trafficking and the drugs trade. Efficient cooperation in lawmaking and law enforcement is an essential factor in combating these problems.

The Common Space of Research, Education and Culture is characterised by both parties’ genuine desire to enhance cooperation. The incentive is obvious – a common European space for higher education, mutual recognition of education certificates, a large-scale exchange of knowledge, and inter-cultural dialogue between young people.

Both the EU and Russia are open to a substantial increase in cooperation in the field of science. This brochure will examine the prospects for collaboration in this sphere.

Science knows no boundaries

Over the past 20 years, the European Union has been working to unite the efforts of scientists from different countries involved in research in the most promising areas of fundamental and applied knowledge.

Science and technology are now the beneficiaries of enormous resources and considerable attention in many EU Member States, and structures and mechanisms encouraging the “extraction” of new forms of knowledge are constantly being developed and perfected. However, funding is expensive, which often leads to science suffering when states formulate their research policies.

This can result in research in the most promising fields sometimes being duplicated by various states, and resources and manpower are thus used inefficiently. This is why the EU is doing all it can to encourage interstate cooperation in science, creating a European Research Area that will coordinate work in selected fields and make optimal use of all available potential to obtain significant results.

The main approach in providing for this activity is provided by the Framework Programmes for Research, Technological Development and Demonstration Activities. The first of these programmes was initiated in 1984, with each FP lasting for five years, including a year of overlap with the next programme.

The principal ideas and objectives of these programmes include:

- strengthening the scientific and technological base of industry in the EU and ensuring a high level of competitiveness;
- promoting all necessary research activity, with incentives for small- and medium-sized enterprises (SMEs), scientific centres and universities;
- supporting international scientific cooperation at all levels, under the auspices of the EU;
- improving the research and innovative potential of all EU Member States.

The latest Framework Programmes will be covered in greater detail below.

The role of the European Research Area, together with its ties with the Lisbon Agenda, is intended to make the economy of a united Europe the most competitive and dynamic in the world – a knowledge-based economy, an economy that is constantly accumulating and applying the latest achievements in science and technology.

“ In today’s world it is more important than ever to foster an environment in which truly excellent science is not only put to use through technology but is also recognised for its contribution to society and culture in general. ”

Janez Potočnik,
European Commissioner for
Science and Research

A contest we cannot afford to lose

Europe is one of the world's recognised research centres, generating about a third of the planet's scientific knowledge. The European Laboratory for Particle Physics in Geneva (CERN) and work in the aerospace sector, for example Airbus aircraft and Ariane rockets, show the success that can be achieved when European governments pool their efforts.

These successes have not led to complacency. Europeans are confident that they can and must achieve much more, particularly as Europe trails the United States and Japan, its two leading competitors, in many areas. The share of gross domestic product dedicated to research is 3.1 % in Japan and 2.7 % in the US, but less than 2 % in Europe. In absolute terms, this means that funding for research in Europe is tens of billions of euros behind that offered by its competitors, resulting in more and more young researchers leaving Europe to pursue their careers in the US.

This has led to some experts warning that Europe needs to increase cooperation and integration in research if it is to avoid becoming scientifically and economically marginalised.

The European Research Area seeks to address these concerns by improving the infrastructure of research in Europe and by focusing strengths and resources in specific areas.

One of the ways it does this is by employing the principle of complementarity. This means that if one country finds it has insufficient financial or human resources to conduct a specific research project, private research centres or Member States which have a comparative advantage in a certain field are brought in to help advance the project.

Scientific priorities are defined by determining which areas of international cooperation could have a significant economic effect.

Since 2001, the European Research Area has been developing a system of reference for assessing the exchange of experience between different methods of managing and financing science. This comparison of different approaches to science is intended to identify the most effective processes and to broaden their use across the EU.

In addition to this, an inventory of the entire European research structure has been compiled in order to provide scientists with access to the considerable opportunities it presents. Combined with existing pan-European research centres such as the European Laboratory for Particle Physics in Geneva, the European Synchrotron Radiation Facility in Grenoble (ESFR), the European Southern Observatory in Garching (ESO), and the European Molecular Biology Laboratory in Heidelberg (EMBL), this will lead to the realisation of Europe's truly impressive potential.

Brussels is devoted to encouraging a large number of small and medium-sized enterprises, which make up a considerable part of the EU's economy, to play their part in the creation of the European Research Area. Significant experience has already been accumulated in so-called cooperative research, conducted in the interests of sector-based and regional industrial associations and unions, and the results of this are being applied and utilised by thousands of small and medium enterprises across Europe.

Small and medium enterprises frequently find it hard to access venture capital. The European Investment Bank solved this problem by offering greater financing to assist in the creation of companies oriented towards science and technology. European tax legislation was also amended to facilitate the establishment of such ventures.

Human capital is another important facet of the European Research Area, and considerable efforts are being devoted to providing for the mobility of European researchers. Freedom to move between institutions is one of the most important prerequisites for high-quality research and this also helps raise the overall level of scientific activity across Europe. However, a number of academic, administrative and social obstacles remain, imposing serious limits on scientists' freedom of movement.

Young scientists are particularly important to the European Research Area. It is no secret that science has declined in popularity somewhat, and Europe suffers from a lack of qualified scientists in certain sectors, for example in information technology.

The European Research Area was not created as a closed and self-sufficient entity. Scientists from EU candidate countries have often been invited to work in the European Research Area before their states' accession to the Union. Scientific cooperation with the Russian Federation and other former Soviet states has also been fostered.

The European Research Area is raising the role and appeal of European research on the world stage and is making Europe a centre that attracts scientists from around the world. This will enable European researchers to become evermore widely involved in international scientific cooperation, particularly in such vital fields as health, space research, energy and fighting poverty.

The tools of scientific integration

The Sixth Framework Programme will conclude in 2006. The programme differs from the five previous programmes in that it aims to effect long-term change across Europe, whereas earlier programmes were focused on making scientific cooperation easier.

The Sixth Framework Programme set out with a number of objectives:

- the concentration of all-European efforts on fewer priorities, primarily those where noticeable results could be expected;
- the consistent integration of the efforts of all participants by operating on a variety of levels;
- the promotion of research with long-term, structuring effects;
- the offering of support to activities directed at strengthening the base of European science and technology.

Over 17.5 billion euros, almost 4% of the total budget of the European Union, has been allocated to help achieve these goals.

The greatest share of these resources is designed to focus and integrate research according to the following seven themes:

- life sciences, genomics, and biotechnology for health (2.255 billion euros);
- information society technology (3.625 billion euros);
- nanotechnology, multifunctional materials and new production processes (1.3 billion euros);
- aeronautics and space (1.075 billion euros);
- food quality and safety (685 million euros)
- sustainable development, global change and ecosystems (2.120 billion euros);
- citizenship and governance in a knowledge-based society (225 million euros).

As part of the programme, a total of 2.605 billion euros was allocated to structure the European Research Area, in particular to improve research infrastructure, to ensure mobility, and other related objectives. Another 315 million euros were assigned to international scientific cooperation.

Money allocated as part of the Sixth Framework Programme was not available for use as simple subsidies for research organisations and companies. The funds were earmarked for a particular stated use and could not be spent in any other way.

In realising the Sixth Framework Programme, a network of National Contact Points, information centres that help search for partners to work on particular projects, was created in Russia under the auspices of leading scientific centres. One advantage of this system is that a researcher can submit an application drawn up in his or her mother tongue. Such networks have long been established in EU Member States and other Framework Programme-associated states, such as Iceland, Norway, Switzerland and Turkey. These earlier networks ensured a return on the investment states had made to the Framework Programme budget.

The issues that these National Contact Points deal with are wide-ranging. They include the distribution of basic and specific information on scientific research programmes and experimental design developments conducted in European Union Member States, the search for potential European partners to work together with Russian scientists, and training on submitting competitive proposals under the Framework Programme.

The results of the Sixth Framework Programme will only be fully available after the conclusion of the program at the end of 2006. However, the guidelines for the Seventh Framework Programme have already been drawn up.

The Seventh Framework Programme will run for a longer term than previous programmes, from 2007 to 2013, and will be divided into a number of sub-programmes, each covering the main directions of European research.

The first sub-programme is called 'Co-operation', and is designed to support work conducted on a trans-national basis. Part of this sub-programme will comprise various forms of international cooperation between EU Member States and third countries, countries that do not invest in the budget of the Framework Programme, such as Russia. Also falling under this section is the creation of Joint Technology Initiatives, mostly based on work undertaken by various European Technology Platforms. These Joint Technology Initiatives bring together applied research that has particular industrial significance. Over half of all resources in the Seventh Framework Programme budget are expected to be spent on these aims.

The second sub-programme is entitled 'Ideas', and will be overseen by the European Research Council. The thinking here is to enhance the dynamism and creativity of European research at the cutting edge of science, in all fields of knowledge, including engineering, socio-economic disciplines and the humanities.

The next element is 'People'. The Marie Curie Actions play a major role in work to increase the number of scientists and the effectiveness of their work. Their main objective is to use research activity in the European Union to significantly increase the mobility of European researchers, helping to establish ties with scientific and industrial centres and strengthening contacts between systems of governance.

The final section is 'Capacities', which aims to improve the entire research infrastructure and enhance the potential of European regions, creating "Regions of Knowledge." The European Strategic Forum on Research Infrastructure, in place since 2002, has been awarded a mandate under the Seventh Framework Programme to draw up road maps for the development of Europe's research potential for a 10–20 year period.

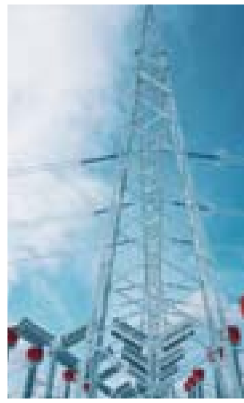
Two further sub-programmes will operate under the Seventh Framework Programme. One will be devoted to Euratom nuclear research and training activities, and the other to the creation of Joint Research Centres where work will be conducted in other fields of science.

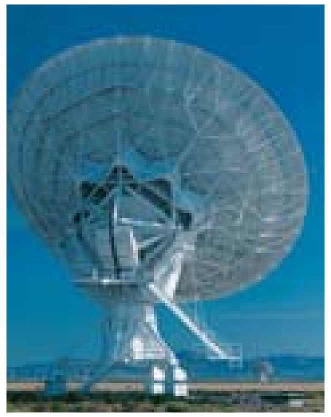
As a successor to the Sixth Framework Programme, the new programme's main task will be to provide for sustainable development in accordance with the Lisbon Agenda, the implementation of which continues to remain among the priorities of European integration. The chosen directions for action encompass the most important fields of knowledge, the areas of science and technology where development can contribute to the development of EU Member States, and respond to the social, economic, ecological and industrial challenges they face.

These fields are as follows:

- health;
- food, agriculture and biotechnology;
- information and communication technology;
- nanoscience, nanotechnology, and materials and production technology;
- energy;
- environment and climate change;
- transport and aeronautics;
- socio-economic sciences and the humanities;
- space and security research.

In addition to these, two priority themes have also been defined under the auspices of Euratom: thermonuclear power research and nuclear fission and radiation processes.





It is worth highlighting a number of new elements that constitute the main difference between the Seventh Framework Programme and its predecessors.

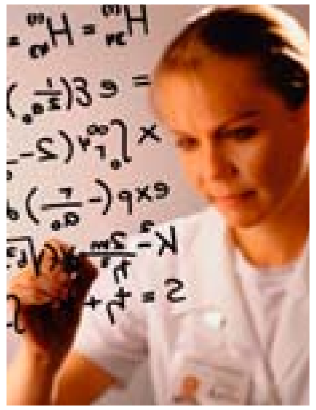
Firstly, the programme is expected to focus on the major themes cited above and will greatly simplify the actual operation of the programme, making existing mechanisms more flexible and increasing the ability to respond to all the integration requirements of Europe's scientific community. It will also take account of the needs of industries supported by European Technology Platforms and Joint Technology Initiatives.

Secondly, the European Research Council is being set up to provide pan-European funding for frontier research. The Council will become an important new element of the programme, aiding in the development of fundamental research, rather than focussing on applied research.

Thirdly, international cooperation will be integrated into all the main areas of the 7th Framework Programme and the creation of Regions of Knowledge will become a new theme in the integration of European scientific research, creating truly integrated regional science centres.

Finally, as part of the implementation of the Seventh Framework Programme, venture-capital financing will be greatly assisted, increasing the interest of private capital in allocating resources to promising research.

What does Europe expect to achieve through the Seventh Framework Programme? The results will not be evident immediately, but by 2030, the implementation of the objectives of the Seventh Framework Programme could increase European GDP by between 0.45 % and 1.66 % and the creation of potentially close to 1 million jobs. This would represent a significant contribution to solving the problem of persistent unemployment, one of the most complex tasks facing modern Europe. The improvement of scientific research could also have a favourable impact on Europe's export potential; total export volumes should grow by between 0.64 % and 1.57 %, with import volumes falling by between 0.27 % and 0.88 %.



Cooperation with scientists from the Newly Independent States

The International Association for the Promotion of Cooperation with Scientists from the Newly Independent States of the Former Soviet Union (INTAS) was created in 1993, with the stated mission of conducting research and fostering cooperation between the international scientific community and the Newly Independent States (NIS).

INTAS now includes all European Union Member States as members, along with Iceland, Israel, Norway, Turkey and Switzerland. The remaining twelve states that were formerly part of the Soviet Union work as INTAS' partners.

INTAS is funded by the EU and by contributions from organisations and individuals.

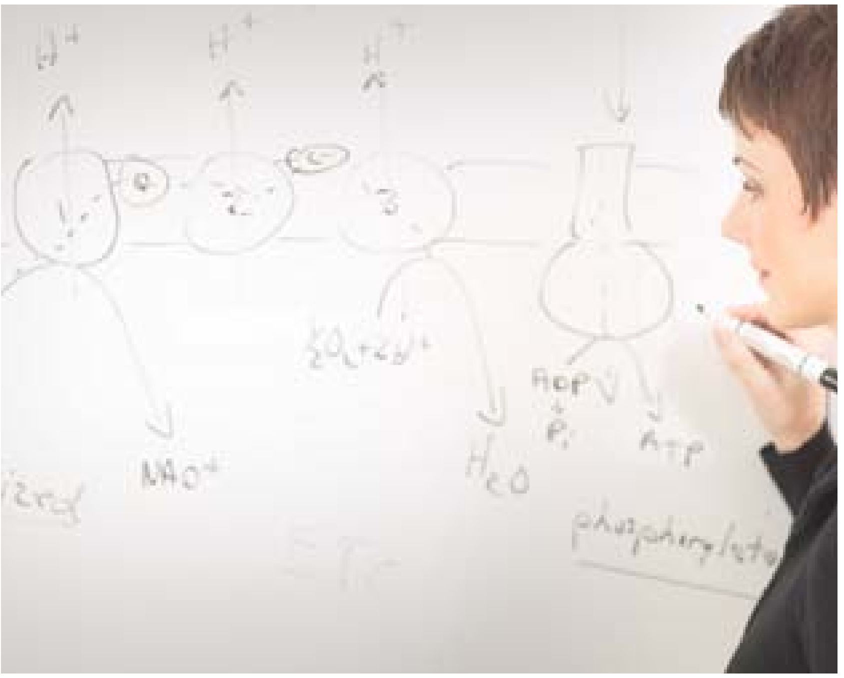
The executive body of INTAS is the General Assembly, where all member states are represented. It is engaged in decision-making and the formation of strategies. Other INTAS bodies are the Council of Scientists and the Secretariat. The Council of Scientists is a consultative body comprising leading scientists, including from the Newly Independent States.

The Secretariat is the chief administrative body, guiding everyday activity and carrying out the decisions of the General Assembly and the Council of Scientists.

Scientists interested in cooperating with colleagues abroad will undoubtedly find a number of advantages in dealing with INTAS.

The association offers a highly efficient electronic system which handles submissions

and processes applications. Cooperation with INTAS ensures tax-free grants and tax-free imports of equipment for scientific research carried out under its auspices. A smooth payment scheme via NIS banks ensures that scientists engaged in INTAS special projects receive timely financing. The huge number of eminent scientists taking part in the activities of the Council of Scientists is also an advantage. Finally, the INTAS information network ININ helps the association distribute information and search for contacts.



INTAS works to promote joint scientific research projects that are of considerable importance to both association members and the Newly Independent States. The association also extends grants to young NIS scientists and supports seminars, summer schools and other educational networks.

INTAS comprises both applied research and fundamental studies in all spheres of science –both in “pure science,” and in socially important fields such as environmental protection, energy supply, information technology, telecommunications, and aerospace research.

Since 1993, the association has received 20 600 applications, 2 800 of which have been realised as projects thanks to the efforts of 15 844 research groups from a variety of countries. INTAS has supplied individual grants to 33 000 scientists in the Newly Independent States. The 1993–2005 budget totals 253.1 million euros, of which 91 % went directly to scientific research. Management and administrative spending have, clearly, been quite modest.

Over the same 12-year period, 1 228 young NIS scientists, including 891 Russians, have received grants totalling 11.8 million euros. The association also allocated 831 000 euros for 66 summer schools and 2.5 million euros for 281 scientific conferences.

The expenses may be considerable, but INTAS has consistently provided impressive results.

The association’s work has directly resulted in 550 new patents, and the publication of 8 240 articles in domestic scientific journals and 20 150 articles in international scientific publications. Since 1999, INTAS has been the most widely mentioned international sponsor in Russia.

Independent experts believe that INTAS boasts an impressive organisational capacity as well as significant financial and scientific input. Its role as a bridge between the EU and NIS scientific communities can not be overestimated – both in establishing new scientific teams working on particular tasks and in connecting enthusiastic scientists to recognised research bodies, such as Airbus Industries and the European Space Agency, the European Laboratory for Particle Physics in Geneva, and many more.

INTAS operates in the field of fundamental research, with applied research the focus of another network.

INTAS

Eureka!

Eureka! – the European network for market-oriented, industrial research and development was actually inspired by the United State's Strategic Defence Initiative, commonly known as "Star Wars". French crystallographer and pioneer of the Ariane network Hubert Curien saw that military research could boost research in all spheres of technology. Curien convinced then President of France François Mitterrand of the need to accelerate the development of innovative technologies in the EU, but with one important caveat – military application was to be ruled out.

"I think that Eureka has played a significant role in connecting scientific research to industry," Curien said in an interview. "It was a chance to obtain additional financing for researchers, and we could not let this pass us by. Years on, technologies look very different, mainly thanks to the life sciences," he said.

The Eureka network focuses on providing the conditions necessary for ensuring successful international cooperation in the field of innovative research, and on commercialising the achievements of research and development studies. Eureka's main areas of work centre on power engineering, the environment, information technologies, telecommunications, innovative materials, medicine and biotechnology, robotics, laser technologies, and transport.

Today, 35 states, including Russia, participate in the network's activities. The governing body is the Ministerial Conference, which works out strategies, defines vectors of activity, authorises new projects and presents new initiatives.

Two executive bodies, a group of high-level representatives and a group of national Eureka coordinators, manage the network and everyday activities between conferences.

The coordinators form an international network that offers support to national scientific institutions and enterprises in applying for projects and making contact with colleagues throughout Europe.

Since 1990, many inter-parliamentary conferences have been held within the framework of the Eureka network, each bringing together lawmakers from the network's Member States. These conferences outline recommendations for strategic development.

The network envisions three types of project; independent, umbrella and cluster projects.

Independent projects are self explanatory in nature.

Umbrella projects operate in specific technological fields and seek to facilitate the launch of new projects, in doing so selecting partners to comprise working groups.

Cluster projects embrace strategic lines of cooperation within the Eureka network.

Eight cluster projects are currently underway under the auspices of the Eureka network. The most notable of these are:

ITEA: focusing on software research for heavy-duty systems; bringing together 364 partners from 21 countries.

MEDEA+: concerned with microelectronics and semi-conductor technologies; 288 partners from 19 countries.

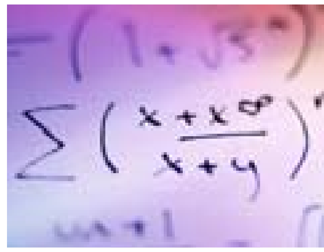
EURIMUS II: concentrating on micro and nanosystems; 240 partners from 19 countries.

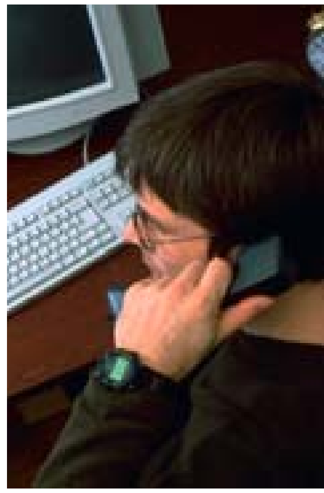
PIDEA+: centred on data transmission technologies; 168 partners from 13 countries.

Two award schemes operate under the Eureka network. The Lillehammer Award dates from 1994, when Norway was the chair of the network. Bearing the name of the Norwegian city which hosted the Winter Olympics the same year, it is awarded for outstanding environmental protection projects. The second award scheme, Spain's Lynx Award, celebrates impressive advances in management and profitability.

Russia has been a full Eureka member since 1993. It participates in various projects including in information technology, robotics, laser technology, medicine, environmental protection, and innovative materials.

State support is a key condition for carrying out joint projects. However, state support does not necessarily entail financial backing,

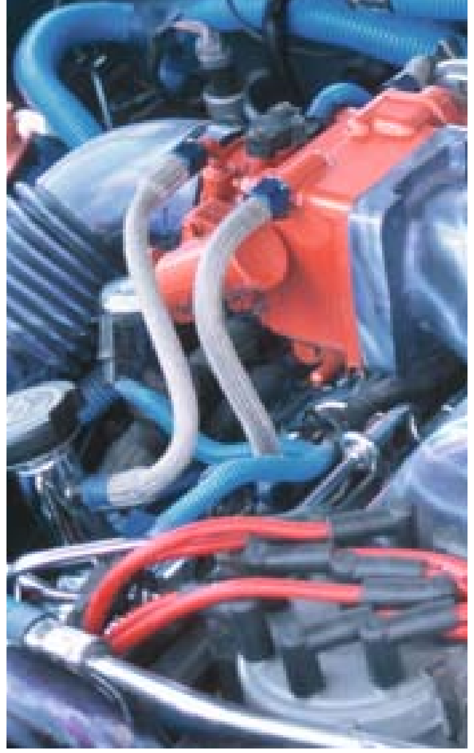


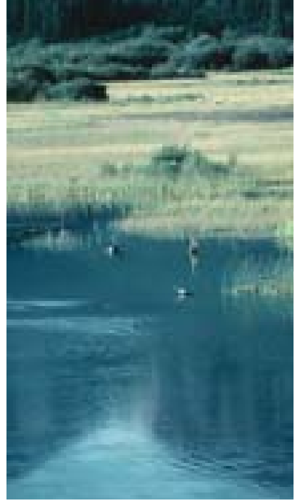


as most projects with Russian participation are financed by private donors or by extra-budgetary funds. Russia has taken part in over 70 projects since joining the network.

"The joint project carried out by the Russian Kamov helicopter manufacturer together with our French partners is quite remarkable," says Alexander Tkachev, Russia's Eureka coordinator. "The KA-226 is characterised by its distinct removable unit. It may be used in gas industries. Our European partners offered to supply it with their engine. The project, dubbed 'Twin', is being carried out successfully," he said.

The E/3274 ELBOR project is another example of fruitful cooperation. The unique, highly efficient technology of casting engineering component parts was developed jointly by Russian and Czech scientists. Based on a highly porous boron nitride dressing tool, the technology boosts processing quality and precision, indispensable qualities in a number of machines and devices.





Another project, carried out with the participation of Russian, German and Czech medical researchers, led to the creation of a device that makes it possible to diagnose the slightest changes in the human cardiovascular system, for example, those provoked by stress. The device has enormous potential in facilitating timely treatment of serious heart diseases. The project successfully drew on the achievements of Russian medical advances made in space.

In a third instance of international cooperation, Russian, Cypriot, Turkish, Swiss, Austrian and Polish scientists all contributed to a joint information project to monitor environmental pollution.

Eureka has a long record of flexible operation, and is famed for its lack of red-tape and bureaucracy. The program's projects have had a cumulative effect thanks to the combined efforts of international groups of scientists. Patented devices and techniques developed as part of Eureka reach markets they would otherwise be unlikely to.

Seeking partners through Eureka comes with the important advantage that a company's sincerity and reliability is guaranteed by the state. The state shows its commitment by approving each project individually. Alexander Tkachev believes that the special logo that every Eureka project now bears may become sort of a brand, a pan-European seal of quality that certifies the excellence of a product, technology or invention.

A substantial part of the scientific research capacity in Russia and other CIS countries is employed in defence-related industries. This delicate sphere of cooperation requires a special approach.

Non-proliferation through cooperation in scientific research

The International Science and Technology Centre (ISTC) is responsible for matters of non-proliferation. During the past 10 years, this organisation has been an important tool of cooperation in science and technology for the 37 states that have signed up to its objectives.

The Centre's stated objectives are: to give NIS scientists formerly engaged in defence projects an opportunity to reshape their work in non-military industries; to support fundamental and applied scientific research and technological development; and to encourage the integration of NIS researchers and experts into the worldwide scientific community.

The ISTC offers financial support to a wide variety of scientific fields and technologies. Priorities in its work are environmental protection, control of radioactive waste, nuclear safety, immunology and vaccinology, renewable energy supplies, nanotechnologies and high-energy physics.

The management structure comprises three main bodies – the Governing Board, the Coordinating Committee and the Scientific Advisory Committee. The Executive Committee operates the Centre on day-to-day basis.

The functions of the Centre's executive body are carried out by a Secretariat. The Secretariat's 200 employees oversee the 2 000 projects that are currently being carried out with ISTC support.

The International Science and Technology Centre's activity is focused on research projects. As teams seeking ISTC funding are often engaged in work in sensitive areas, each state must approve its members' participation in international cooperation in science. Participants in ISTC-sponsored projects must guarantee that the findings of the research will not be used for military purposes.

Primarily, funding for these projects is provided by the ISTC. However, the Centre also has a programme for partner projects, which is sponsored by private industrial enterprises and governmental and non-governmental entities. In such cases, the Centre utilises its vast experience to connect potential partners and to manage and monitor project deadlines and performance.

The International Science and Technology Centre is going commercial in order to create stable jobs for researchers previously employed in the defence industry. It intends to use the results of their work in profit-making non-military activities. To do this, the Centre is constantly on the look out for promising potential partners and investors interested in funding innovative research with market potential. The Centre supports the drafting of business plans and carries out market surveys. It analyses intellectual property and its potential and sponsors participation forums, exhibitions and meetings with foreign partners. Commercialisation also helps to minimise risks, as the programme also helps in the purchasing of equipment, materials and parts. These projects do not create new intellectual property, but commercialise the results of earlier research.

The International Science and Technology Centre is also involved in the management and administration of research. As part of its educational programme, the Centre seeks to give participants the expertise and skills needed to enable them to profit from their research. A lack of such experience has often undermined the successful marketing of a stunning triumph in scientific research. The programme's curriculum includes the marketing of innovative products, the protection and commercialisation of intellectual property, the financial study of projects seeking investors, sources of funding for research and development, managing commercialisation, courses on how to present projects successfully to business circles, quality specifications and product certification, export control, and other issues that are vital in reaping the rewards of a cross-fertilisation of science and business.

In 2001, the International Science and Technology Centre introduced the Technology Database Programme. This programme aims to create an infrastructure to allow for exchanges of information in science and technology, ensuring the implementation of research undertaken by Russian and NIS scientists.

Another good example of the International Science and Technology Centre's functions is the Patent Support Programme. This programme offers specific financial support to scientific organisations taking part in the Centre's projects in order to cover their expenses at the initial stages of patenting. It also provides assistance during the complicated procedure of submitting patent applications in ISTC member states.

The International Science and Technology Centre also ensures that scientific bodies that do not have the opportunity to participate in ISTC projects have the financial means to purchase software and hardware, thus making it possible for them to join the common telecommunications infrastructure.

Russian scientific bodies that cooperate with the International Science and Technology Centre have the possibility of obtaining additional resources for scientific research. They are assisted in the commercialisation of their intellectual property and in finding reliable partners abroad. Foreign scientists

establish contacts with Russian colleagues whose research was formerly closed to them. Businessmen have a guarantee that their investment will be put to good use.

“Our good track record over many years testifies to this. We make a thorough audit of all the projects carried out under ISTC auspices. Needless to say, we are absolutely transparent in financial, scientific and organizational aspects. This is important as our annual budget amounts to millions and millions of dollars,” head of the Centre’s partnership development group Steve Born said.

A spectacular example of international cooperation in a crucial and problematic scientific area is ITER, a project to build an experimental thermonuclear reactor.

Power engineering as a common goal

Few issues are more important for humankind than the creation of a secure and efficient energy supply. Natural energy sources and hydro resources have clear and well-known advantages and disadvantages. Nuclear power could be considered to be a step forward, but it too has its drawbacks, principally in issues related to cost-effectiveness and environmental acceptability.

There is another option, one which paves the way for virtually inexhaustible energy supplies on a large-scale basis. The necessary raw materials are inexpensive and processing is free from the risks associated with nuclear reactors. This extraordinary source of energy is known as controlled thermonuclear fusion – the fusion of the nuclei of two isotopes of hydrogen, deuterium (double-weight hydrogen) and tritium (triple-weight hydrogen). Deuterium is found in abundance in the Earth’s oceans, while tritium can be extracted from lithium, which is found in the Earth’s crust in quantities 200 times greater than uranium. There would be no shortage of fuel for such a reactor. The process is environmentally sound, producing helium as a by product as opposed to radioactive waste. It is impossible, even theoretically, to accelerate fission reaction to a critical stage, as this can only take place in an absolute vacuum and stops immediately under any other conditions.

However, one factor must still be taken into consideration. For the process to be cost effective the reactor would have to heat plasma to 100 million degrees Celsius, five times hotter than the subsurface of the sun! This may happen in the future, for now, controlled thermonuclear fusion exists as a scientific experiment only.

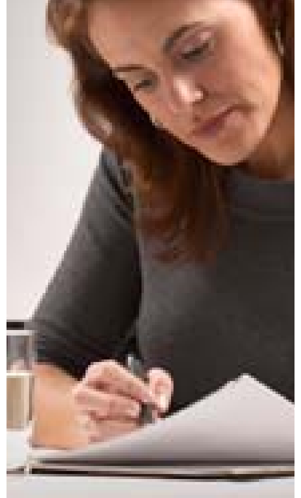
The next step in the realisation of this dream is the development of an experimental reactor with a capacity of 10 megawatts. Since this is far too large a project for a single country to undertake, the EU, Russia, the United States, and Japan have joined forces to create an economically viable thermonuclear reactor. China, South Korea and India later joined the ITER consortium.

Negotiations for the project started in 2001. The international agreement on ITER is to be signed in late 2006, with construction

of the world's most powerful Tokamak (a machine that produces a doughnut-shaped electric field to confine plasma) slated to begin at the famed Cadarach nuclear centre in southern France as early as 2007. Construction will take 10 years with costs of up to 5 billion euros. The next 20 years will be spent accumulating scientific data, with expenses shared by the EU (50%), and the other participants, including Russia (approximately 10% each).

"As a full member of the ITER project, we receive a great deal of scientific and technological data which we could not obtain by ourselves due to the constraints of cost", deputy head of the Federal Nuclear Energy Agency's (Rosatom) Nuclear Science and Technology Department Vitali Kortsyavin. "The value of this data cannot be overestimated, it is unique," he said.

Experts believe that ITER will make a decisive contribution to encouraging a positive view on the prospects of thermonuclear power engineering. Even now, the amount of energy used for plasma processing is matched by the yield. The aim is to increase ITER's output to 10 times greater than the energy input. Cost-effective nuclear power will probably be a matter for the second half of this century. However, Tokamak could be profitable much earlier than we think.



Science as a profitable enterprise

The EU-funded Science and Technology Commercialisation project funded by the EU has operated in Russia since 2005. The project forms part of cooperation with the Russian Academy of Sciences. It seeks to bring innovative thinking to the Academy, to support the Academy's research and to implement initiatives aimed at commercialising scientific research.

"The goal of this project corresponds to Russia's aspiration to integrate itself into the world market economy. An efficient national innovative system will help to make Russia's enormous scientific-technological potential profitable," head of the Scientific-Organisational Department of the Presidium of the Russian Academy of Sciences Vladimir Ivanov said.

The project boasts several European partners, among them:

INNO, Germany (www.inno-group.com), which formulates innovative strategies, infrastructure support and direct management of the commercialisation of scientific findings.

AEA, United Kingdom (www.aeat.co.uk), which specializes in innovation, power engineering and environmental protection.

TNO, the Netherlands, one of Europe's leaders in applied research.

There are already commercialisation centres in nine Russian cities – all of them recognised scientific research hubs and each catering to its own region. These centres form a network that extends across the whole country. They provide technical, technological, ecological, patenting/licensing and business appraisal for innovation projects. They assist in preparing business plans and conducting marketing surveys. The "Science and Technology Commercialisation" project centres also help scientists seeking partners for the commercialisation of their projects in Russia or Europe.

A closer look at contact centres

National Contact Points (or Centres, as they are known in Russia), have already been mentioned as part of the Sixth Framework Programme. Two of these Centres are presented in more detail below.

The first, the National Contact Centre for the Free Migration of Scientists, is based at the Institute for Research in Statistics and Scientific Economics (IRSSE) at the State University's Higher School of Economics.

The Centre's priority is to set up an international centre to support the free movement of scientists, postgraduates and undergraduate students. Apart from IRSSE, three leading education and scientific centres participate in this activity – the universities of St. Petersburg, Tomsk and Rostov-on-Don. The Centre will also coordinate the activities of information and advisory centres set to be established at 30 universities and at science and research bodies nationwide.

The experience of the National Contact Centre for the Free Migration of Scientists will help create efficient tools for offering institutional, informational and consultative support in assisting Russian scientists wishing to participate in EU educational and research networks.

The Centre will also assist undergraduate and postgraduate students to integrate into the European and world scientific community. "Free Migration networks do not only open new horizons for scientists, they also counter the brain drain that is destroying scientific communities in many countries," Anna Pikalova, a senior researcher at IRSSE, said.

The second National Contact Centre is entitled "The Community of Knowledge", a regional network of contact points which enjoys the support of numerous scientific and technological bodies with vast experience in social and humanitarian studies.

"The Saint Petersburg region is recognised in Russia for its research in management philosophy, sociology, anthropology, ethnography, and philology. Saratov can boast of success in socio-economic and gender research, while Voronezh has vast experience in cultural studies, semiotics, conflict management and history. We wanted to create a national interdisciplinary information network covering the community of knowledge and related topics – mobility in the social sciences, the socio-economic aspects of industry, innovation statistics, environmental protection, social responsibility of business and many other important things," Centre head Vladimir Zavarukhin said.

There is still a lot to be accomplished. We need to pull separate details together in order to make them part of a greater whole, and, most importantly, we need to coordinate the nascent Russian network with the European National Contact Points, which do a great deal to enhance scientific research.

Glossary and links

CERN – former Conceil Europeen pour la Recherche Nucléaire, now Organisation Européenne pour la Recherche Nucléaire, European Organization for Nuclear Research, www.cern.ch

EMBL – European Molecular Biology Laboratory, www.embl-heidelberg.de

ERA – European Research Area, www.ec.europa.eu/research/era

ESFR – European Syncritron Radiation Facility, www.esfr.fr

ESO – European Southern Observatory, www.eso.org

EUREKA – Pan-European network for market-oriented, industrial Research and Development, www.eureka.be

EURIMUS – EURECA Industrial Initiative for Microsystems Users, www.eurimus.com

FP – Framework Programme (FP-6, FP-7), www.ec.europa.eu/research/fp6, www.ec.europa.eu/research/fp7

ININ – INTAS Information Network

INTAS – International Association for the Promotion of Cooperation with Scientists from the New Independent States of the Former Soviet Union, www.intas.be

ISTC – International Science and Technology Center, www.istc.ru

ITEA – Information technology for European Advancement, www.itea-office.org

ITER – International Thermonuclear Experimental Reactor, www.iter.org

Marie Curie – Marie Curie Actions – Human Resources and Mobility, http://cordis.europa.eu/fp6/mobility.htm

MEDEA – Microelectronics Development for European Applications, www.medeaplus.org

NCP – National Contact Point; NCP on Mobility of Scientists, http://fp6.hse.ru/centr_nats.html; NCP Knowledge Based Society, http://fp6.csrs.ru/ncp

PIDEA – Packaging and Interconnection Development for European Applicatons, www.pidea.com.fr

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