

U.S. Civilian Research & Development Foundation
Peace and prosperity through science collaboration

U.S.-Russia Collaborations
in Science & Technology

*Education Research Development
Nonproliferation
Commercial Opportunity*

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U.S. Civilian Research & Development Foundation

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The past 15 years have been remarkable.

- The world has gone from the cold war to economic globalization.
- Russia has gone from uncertainty and instability to stability and growth.

It has been a time of great change.

In my talk today, I'd like to tell you about how the United States and Russia are addressing that change through wide-ranging collaborations *and* partnerships between the United States and Russia in

- Education
- Scientific Research and
- Technology Development

These are partnerships that address issues of top priority to the United States:

- Nonproliferation of the knowledge to produce weapons of mass destruction and
- Economic opportunity and growth for both Russia *and* the United States

The U.S. Civilian Research & Development Foundation is a unique organization, created in the turmoil following the collapse of the Soviet Union. It is an organization that today is addressing issues of top priority to the United States not only in Russia, but across the countries of Eurasia and in the Middle East and North Africa, through a very unique paradigm of collaboration and partnership in science and business.



Over 10 Years of Excellence

- Since 1995
- Private, non-profit foundation
- Authorized by U.S. Freedom Support Act
- Established by National Science Foundation
 - Providing alternatives to emigration
 - Advancing defense conversion
 - Assisting to establish market economy
 - Providing access to
 - sophisticated new technologies
 - world-class scientists and engineers
 - new markets, new ventures, new opportunity

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The U.S. Civilian Research & Development Foundation or CRDF is a private, non-profit foundation authorized by Congress in 1992 and established by the U.S. National Science Foundation in 1995. In its original authorization, CRDF was to be an endowed foundation established to address issues related to scientists – of all kinds – following the collapse of the Soviet Union. The endowment from Congress never took place, but CRDF has survived through annual funding from a variety of sources and strong partnerships.

CRDF was established to

- Provide alternatives to emigration – that is to help create jobs and opportunity for scientists in Russia, so that they would not need to leave Russia in order to survive

CRDF was established to

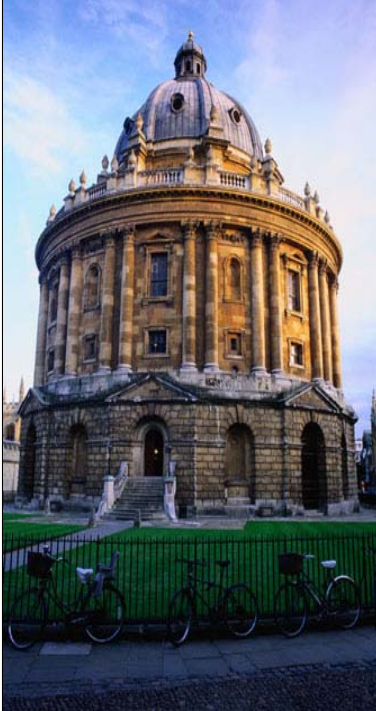
- Advance defense conversion – meaning to help create jobs and opportunity for scientists in civilian pursuits, rather than military

CRDF was to do this by

- Assisting Russia to establish a market economy – not just any market economy, but an economy that could engage scientists in civilian pursuits and would enable them to see opportunity at home

And, last, but not least, CRDF was to provide opportunity for the United States, too – by providing access to

- Sophisticated new technologies
- World-class scientists and engineers and
- New markets and emerging companies



Core Programs

- Science Education & Infrastructure
- Collaborative Research
- Industry Partnerships
- Nonproliferation of Weapons Expertise

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CRDF pursued these objectives by establishing programs in four broad program areas:

For over 10 years, through **education and infrastructure** programs,

- CRDF has worked closely with the government of Russia, the Academy of Sciences and the Ministries to establish a base of education, research and development potential in the civilian sector –
- A base that provides jobs for established scientists and outstanding opportunities for students and young scientists

In CRDF's **collaborative research** programs,

- CRDF provides opportunities for U.S. and Russian academically-oriented scientists to work together on joint research projects
- It has assisted Russian scientists to become part of the international community
- And, it has assisted U.S. scientists to look at their own research in new ways, leading to new ideas and new discoveries

Through CRDF's **industry** programs,

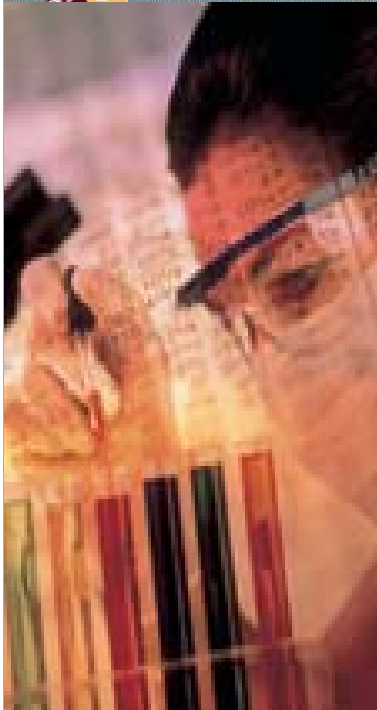
- CRDF provides opportunities for U.S. and Russian commercially-oriented scientists to work together
- It has assisted Russian scientists and entrepreneurs to explore the market potential of their ideas
- It has assisted U.S. scientists and entrepreneurs bring some of these ideas to market

And, through CRDF's **Grant Assistance Program**,

- CRDF has assisted U.S. companies and government and non-government organizations to carry out projects with Russian scientists and engineers

Finally, through CRDF's **nonproliferation** programs,

- CRDF provides services to the U.S. government in many efforts to deal directly with nonproliferation issues, by providing specific opportunities for weapons scientists to become engaged in civilian activities



Since 1995

- More than \$93m in grants
- Leveraged by
 - \$18.5m from Eurasian governments
 - \$15.9m from U.S. industry
- Engaging 13,000 Eurasia scientists and engineers
 - including 2,500 weapons scientists
- More than 2,500 projects
 - 1,300 U.S.-Eurasia teams
 - 9,000 publications and conference abstracts
- Assisted over 100 clients in industry, education and government to execute more than 1,000 projects valued at more than \$144m

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Since 1995, CRDF has distributed more than \$93m in grants for research and development, almost all in collaboration with U.S. partners

Funding is provided by the U.S. government, under the Freedom Support Act, and by private industry, other private foundations, the Russian government and other governments of countries in which we work.

A core attribute of all of CRDF's activities is "partnership"

Over the past 11 years, CRDF has engaged more than 13,000 scientists across Eurasia and supported the creation of 1,300 U.S.-Eurasia teams – a majority of these in the Russian Federation.

In addition, through its Grant Assistance Program, CRDF has assisted more than 100 separate U.S. clients to execute more than 1,000 research and development projects in Eurasia – the vast majority of these are in the Russian Federation.



CRDF Partnerships Benefit U.S. Science Technology Industry

- World-class scientists and engineers
- Emerging markets and new ventures
- Commercial opportunity

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These partnerships range from partnerships in

- Basic and applied academic research to
- Corporate research and development to
- The creation of new joint ventures and technology companies

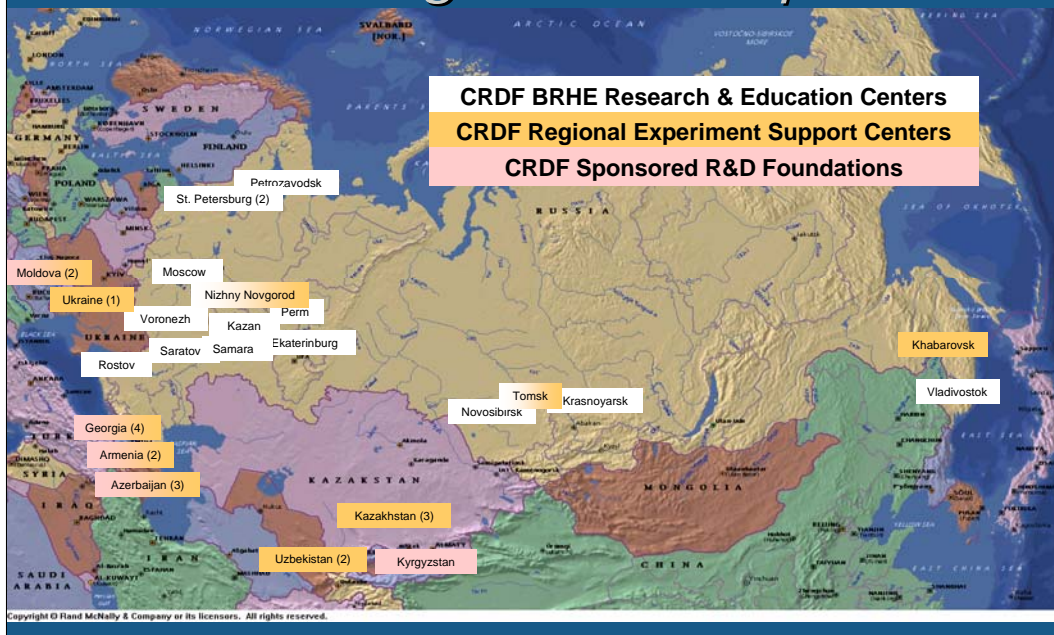
All of the partnerships have direct impact in the United States

- They provide us with access to outstanding, world-class scientists and engineers
- They provide us with access to new markets
- And, they provide us with opportunity for new business



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Building Partnerships



One of CRDF's most outstanding achievements is the creation of a network of partnerships with organizations across Eurasia,

- Research and Education Centers at Russian universities
- Regional Experiment Support Centers at more than 20 Eurasian institutions
- And, Scientific Research & Development foundations, similar to the U.S. National Science Foundation, in a number of countries

These partner organizations are truly the base of CRDF's operations – a vast network of scientists and engineers throughout Eurasia – developed and financed in close collaboration with the governments of the countries in which we work



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Basic Research and Higher Education

16 Research & Education Centers
at Russian Universities

- Since 1998
- Over \$55m from
 - Russian Ministry of Education and Science
 - John D. and Catherine T. MacArthur Foundation
 - Carnegie Corporation of New York

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A number of programs are being carried out in very close programmatic and financial collaboration with the Russian government

CRDF's Basic Research and Higher Education Program (BRHE) has been in operation since 1999

The program is funded *in its entirety* by private U.S. foundations and the Russian government.

Its objective is to create a system of education and co-mingled research, similar to that found in U.S. universities

The program brings the concept of competitive, market-driven, basic and applied research to the core of Russia's educational system



Building a Eurasian Association of Technology Transfer Managers



- 2003 AUTM Annual Meeting
 - 6 from Russian universities
- 2003 AUTM Basic Skills Seminar plus intensive TTO Training
 - 14 from Russian universities
- 2004 AUTM Annual Meeting
 - Russia, Armenia, Georgia, Kazakhstan, Moldova
- 2005 AUTM Annual Meeting
 - Russia, Armenia
- 2005 Eurasian Association of Technology Transfer Managers (EATTM)
 - 1st annual meeting, December 2005
 - Ekaterinburg, Russia

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Just over three years ago, CRDF and the Russian Ministry of Education and Science introduced Technology Transfer programs into the BRHE universities. And, we initiated the creation of a Russian-language association of technology managers, similar to the U.S. Association of University Technology Managers (AUTM).

These programs are growing stronger by the day with continued strong support and funding from the MacArthur Foundation, Carnegie Corporation and the Russian government.



Russia's Federal Agency for Science and Innovation

Cost-shared Cooperative Grants Competitions

Since 2005
Nine \$80,000 awards to
U.S.-Russia Teams

nanotechnology and materials, life sciences, environmental sciences
and conservation biology, and safety and anti-terrorism research

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At the beginning of our work in Russia in 1995, it was all about U.S. assistance and support

The economic, industrial, and scientific infrastructure was in complete disarray CRDF, building on the work of other philanthropic organizations, paved the way for a new and different future for many thousands of people – educators, researchers, engineers, and students

In 1999, with the BRHE program – a program that was funded 50% by the Russian government – the situation began to change

It is continuing to change

In point, just last year we began a collaborative program – more than 50% funded by the Russian government – for basic and applied research grants to teams of U.S. and Russian scientists


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 ФОНД СОДЕЙСТВИЯ РАЗВИТИЮ
 малых форм предприятий в научно-технической сфере

Russia's Foundation for Assistance to Small Innovative Enterprises (FASIE)

- Since 1994
- START since 2004
 - Like U.S. SBIR program
 - Phase-1 Grants (1 year)
 - Phase-2 Grants (2 years)
 - 25 Regional Innovation Technology Centers

**Submission of Business Plans to FASIE
Prior to 2003**



Year	Number of Submissions
1994	20
1995	40
1996	60
1997	180
1998	160
1999	200
2000	220
2001	380
2002	450

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We are also collaborating closely with Russia in areas of commercial research and development



The Russian Foundation for Assistance to Small Innovative Enterprises (FASIE) is a Russian program quite similar to the U.S. Small Business Innovative Research (SBIR) program at the U.S. National Science Foundation

Significant amounts of new funding are being made available through this foundation for the creation of new, science- and technology-based businesses in Russia



CRDF – FASIE Seminars 2005

CRDF-FASIE Seminars Russia 2005

-  Phase I Seminars, January-June 2005
-  Phase II Seminars, June-December 2005



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Last year we assisted FASIE with training, by providing guidance with curricula and U.S. ‘volunteer executives’ to participate in a number of events
Next year, we hope to initiate a collaborative industry grants program



CRDF Industry Grants

*Meet U.S. Strategic
Partners and Investors*

Partner Development Events

- Distinctive access to the U.S. business and technology community

Innovation and Investment Forums

- Showcase business and investment opportunities
- Eurasia's best seed-stage and mid-growth science and technology companies

Explore New Opportunities

First Steps to Market Programs

- Create new U.S.-Eurasia R&D partnerships
- Grants fund 1-year exploratory projects with U.S. for-profit companies

Develop New Business

Next Steps to Market Programs

- Develop commercially viable business opportunities
- Grants fund 2-year R&D projects with U.S. for-profit companies

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CRDF has been active in its industry programs, funding commercially-oriented research & development in Russia and Eurasia, since 1998

Projects involve U.S. for-profit companies and Russian research & development teams

CRDF shares the cost of the projects with the U.S. companies

Next year, as I mentioned, we hope to establish a program where U.S. companies share the cost with a Russian organization, the Russian Foundation for Assistance to Small Innovative Enterprises (FASIE), with CRDF's guidance and management assistance

Through

- Partner development events and
- Innovation and Investment Forums

We are also beginning to work closely with other organizations and U.S. states to introduce Russian technology companies to potential U.S. strategic partners and investors

The forums, in particular, are an entirely new approach to develop sustainable business opportunities for both the U.S. and Russia

They are collaborative, co-funded partnerships between CRDF, state economic development funds, private industry, and our Eurasian partners

The first of these Forums will be in Cleveland, Ohio in June



CRDF Industry Partnerships Benefit U.S. Business

First Steps to Market

- \$1,383,636 of CRDF funds invested
- 57 FSTM grants to date
 - 23 with U.S. micro companies (< 10 employees)
 - 22 with U.S. small companies (< 100 employees)
 - 4 with U.S. mid-sized companies (< 500 employees)
 - 8 with U.S. large companies (> 500 employees)

Next Steps to Market

- \$5,011,277 of CRDF funds invested
- 80 NSTM grants to date
 - 39 with U.S. micro companies (< 10 employees)
 - 19 with U.S. small companies (< 100 employees)
 - 3 with U.S. mid-sized companies (< 500 employees)
 - 19 with U.S. large companies (> 500 employees)

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Our programs have engaged all manner of companies on the U.S. side – both large and small



Lasers Reshape Cartilage

FSTM Grant (2003-2005)
Project Value: \$59,800

- Institute of Laser & Information Technologies, Moscow, Russia
- Torquin Therapeutics, Austin, Texas



Objectives and Results:

- Develop new laser technology for reshaping cartilage, specifically intended for non-invasive surgery on deviated septa
- FSTM project established commercial potential of technology, resulting in a patent application and creation of a new company, Arcuo Medical Inc., with over \$450,000 in new funding
- R&D continues under the Next Steps to Market (NSTM) Program

Project examples



Improved Combustion Control



FSTM Grant (2005-2006)
Project Value: \$37,500

- The Boeing Company, Phantom Works Division in St. Louis, MO
- Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

Objectives and Background:

- Effective plasma production and control by pulsed nanosecond high-voltage gas discharge and e-beam for on-board magneto-hydrodynamic (MHD) electric power generation
- Decrease cost and weight of control systems and increase efficiency.
- Explore potential for further joint research development between The Boeing and MIPT

Project examples



Water Purification & Desalinization



The "Dial-5" desalinating device with productivity of 0.3 to 1.0 m³/h.

NSTM Grant (1998-2000)
Project Value: \$58,900

- ULTRAMET, Inc., Pacoima, California
- Institute of Inorganic Chemistry of the Russian Academy of Sciences, Novosibirsk, Russia

Objectives and Results:

- Safe drinking water through ecologically safe purification and desalinization technologies for production of safe drinking water.
- Working prototype "Dial 5" ED instrument in operation throughout Northern Russia
- Negotiations carried out with Siberian Health Corporation to establish industrial production of bottled drinking water

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Project examples



Pharmaceuticals from Sea Cucumbers



A Sea Cucumber

NSTM Grant (2003 - 2005)
Project Value: \$172,300

- Coastside Bio Resources, Stonington ME
- Pacific Institute of Bioorganic Chemistry, Vladivostok, Russia
- With researchers from the BRHE Research and Education Center at Far East State University, Vladivostok

Objectives and Background:

- Develop separation methods for compounds derived from marine invertebrates for use in pharmaceuticals and improved vaccines for domestic animals
- The Pacific Institute has focused on the structures and bioactivities of marine glycosides for over 25 years
- A team from Murmansk Marine Biological Institute will collect the sea cucumbers from commercial food processing waste and separate tissues of the specimens for chemical analysis and bioassays
- The Russian team expertise has isolated over 80 compounds from 40 different sea cucumber species for various uses

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Project examples



Improving High-Temperature Lubricants



At the Topchiev Institute in Moscow

NSTM Grant (2002-2004)
Project Value: \$480,540

- Crompton Corp., Middlebury, Connecticut
- Topchiev Institute of Petrochemical Synthesis, Moscow, Russia

Objectives and Background:

- Create models of lubricants and additives to study their thermal properties
- Find optimal detergent effect at specified temperatures
- Projected market share of resulting product is 40% of a \$15m/yr market
- Product expected to be market-ready in 12-18 months

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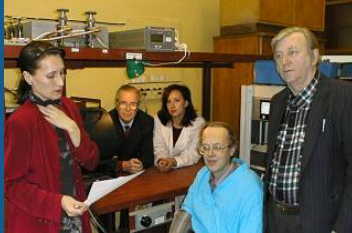
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Project examples



Refractive Nanocomposites



Members of the Russian nanocomposite research team

NSTM Grant (2001 - 2003)
Project Value: \$113,400

- 3M, St. Paul, Minnesota
- Just Optics, Ltd., St. Petersburg, Russia

Objectives and Background:

- Improve performance of 3M optical products
- Increase refractive index of polymers using nanoparticle composites
- Manufacture nanocomposites to be optically uniform and have low color, high clarity, and environmental durability
- Just Optics is preparing the nanocrystals, analyzing their refractive index, and measuring their clarity

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Project examples



Why do U.S. Companies Form R&D Alliances in Russia and Eurasia?

- highly educated
- highly motivated
- new paradigms
- new markets
- low cost

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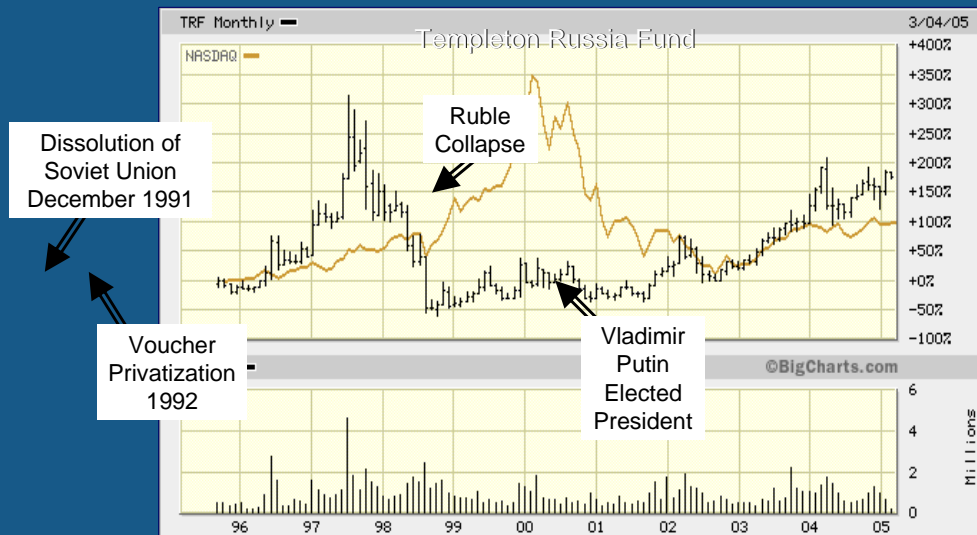
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We've had tremendous success over the past 10 years developing new partnerships with Russian scientists

U.S. companies are drawn to the mix for a variety of reasons

The least of which is cost ...

Russia's Business Climate



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Let me end my presentation with a brief look at the present and future of scientific partnerships

Russia has been through tumultuous times over the past 15 years

- From the collapse of the Soviet Union
- Through voucher privatization
- And the ruble collapse in 1998
- Then a slow stabilization and finally growth

Increasing Venture Investment



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Investment in Russia has kept pace

To date, true, most of the investment is in infrastructure plays and not science- and technology-based business

But, times are changing ...



Technopark Initiatives

City	Core institute	Companies	Total invest.	Start
St.Pet-rg	Bonch-Bruevich Ins-te of Telecom	Siemens, Nokia, Intel*, Google*	\$1 bil	2010 - 12
Chernogolovka	Chemical Physics Ins-te	Cognitive Technologies	\$735m	2010
Dubna	Institute for Nuclear Research	IBS	\$700m	2008
Troitsk	11 industry and academic institutes	R-Style, HKK, Krok, RBC, Borlas, Seagate	\$500m	2010
Dmitrov	Green field	Lanit	\$400m	2012
Sarov	4 large research ins-tes	AFK "Sistema"	No data	2008

(*) unconfirmed information
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Source: Troika Dialog Group 2006

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Russia is beginning to invest seriously in

- Basic and applied research and
- In the creation of a strong technology-driven economy

Russia is building technology parks ..



Russian Venture Fund Development

Leveraged by	Venture Funds	Year
Ministry of Economic Development and Trade	6 -7 regional venture funds ~ \$30m each 25% fed budget; 25% regional; 50% private equity (closed end mutual funds to start); under private management;	May 2006
Ministry of Science and Education	Innovation venture fund (fund to fund investments limited to 10% in each). The Fund expect to get significantly more and raise stakes up to 49% (not verified info)	Since 2000 2006
Ministry of Information and Telecom	Russian Investment Fund of Technology and Innovation -\$100m; 75% fed; 25% private. (Approval stage)	2006

Source MEDT, 04/2006
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And, it is investing in innovation ...



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Building Strong Partnerships
for Our Future

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Today, we have many complicated international issues to concern us, involving countries around the world

We faced comparable issues 15 years ago, and we saw a way forward by looking at commonalities and opportunity

Scientists – researchers, engineers, educators – share a common understanding

International partnerships – such as those initiated and nurtured by the U.S. Civilian Research & Development Foundation –

- Have addressed *and continue to address* problems of national concern

And, international partnerships

- Have provided *and continue to provide* new opportunity of social and economic benefit to us all

Thank you for your attention.