Mobilizing American Industry for US-Russian Collaborations

Presentation by United States Industry Coalition
November 2010
Presentation Outline

• USIC Background
• Scientist-to-Entrepreneur Partnerships
• Success Stories
United States Industry Coalition (USIC)

• Association of American companies engaged in international scientific partnerships for peace and prosperity
  – Multinational corporations – Boeing, DuPont, GM, GE, Ford, etc.
  – Small innovative businesses >70%
  – >250 members since 1994
  – Membership open to foreign companies (3 Russian company members)

• Diverse industry categories


• US companies and partners from Russia, Ukraine, Kazakhstan, Armenia, and other countries developed hundreds of new technologies and products
Public-Private Partnerships

- USIC mobilizes US industry for participation in the Global Initiatives for Proliferation Prevention (GIPP) program of the US Department of Energy (DOE)
  - Russian/other scientists, DOE national laboratories, and American industry
  - Technology commercialization grants

- Over 150 USIC members leveraged 250 DOE projects
  - Private sector cost-share of taxpayer dollars
  - Ensure attainable and sustainable commercial goals
  - Cutting-edge products for worldwide markets

- USIC facilitates collective and efficient effort of partnering with US industry for USG
  - Company identification and matching with Russian/other scientific capabilities
  - Company due-diligence and project commercial viability reviews for >16 years
  - Monitoring project commercialization
  - Public promotion and Congressional outreach by USIC member companies

- US-foreign partner technologies for Small Business Innovation Research (SBIR), National Institutes of Health, ARPA-E and other government programs
GIPP/DOE Project

US-FSU Partner Project
- Prototype development
- Possibility of long-term commercial venture
Unique Scientist-to-Entrepreneur Model

• Scientists from Russian institutes & spin-off companies
  • New technology
  • R&D and engineering

• DOE laboratories
  • New technology
  • Foreign technology validation

• American entrepreneurs
  • New technology
  • Know-how in transferring technology into product
  • Private funds to commercialize technology
  • Access to US and worldwide markets

• US Government grants
  • Prototype development

• Private investors
  • Product development and commercialization
US Tech Commercialization Rates

- Tech commercialization rates at development stage (Stevens & Barley, 1997)
  - 0.06% of raw ideas of inventors commercialized
  - 21% commercial launch rate of significant development projects

- 30.2% of patents applied commercialized in industry vs. 21.6% in academia (Morgan, Kruytbosch, and Kannankutty, 2001)

- Small Business Innovation Research Program (SBIR)
  - 44% of Phase II US small business awards commercialized
  - 30-60% Phase I recipients go on to win Phase II; 56% - IT; 31% - Biotech; 46% Electronics; 40% Advance materials and Manufacturing (NSF Survey, 2006);
DOE National Laboratories

• USIC facilitates coordinated effort related to industrial partnering with DOE National Laboratories
  – Licensing of DOE-funded technology
  – Fairness of opportunity
  – Cooperative Research and Development Agreement (CRADA)
  – Foreign companies can license technology from DOE labs

• Collaboration with 11 DOE National Laboratories
  – Argonne National Laboratory (ANL)
  – Brookhaven National Laboratory (BNL)
  – Idaho National Laboratory (INL)
  – Kansas City Plant (KCP)
  – Los Alamos National Laboratory (LANL)
  – Lawrence Berkeley National Laboratory (LBNL)
  – Lawrence Livermore National Laboratory (LLNL)
  – National Renewable Energy Laboratory (NREL)
  – Oak Ridge National Laboratory
  – Pacific Northwest National Laboratory (PNNL)
  – Sandia National Laboratories (SNL)
Russian Institutes and Spin-off Companies

• USIC member companies partnered with over 16,000 scientists at more than 200 Russian/other institutes

• Russian institutes and spin-off companies
  - Kurchatov Institute & Kintech
  - Ufa Aviation Institute & Nanomet
  - Spektr-Conversion
  - All-Russian Institute of Light Alloys
  - Karpov Institute of Physical Chemistry
  - Institute of Nuclear Research
  - Prokhorov General Physics Institute
  - Lebedev Physical Institute
  - High Current Electronics Institute & Elion
  - All-Russian Scientific Research Institute of Atomic Reactors
  - Engelhardt Institute of Molecular Biology
  - Center for Ecological Research and BioResources Development (CERBD)
  - Biokhimmash
  - Makeyev Design Bureau of Russian State Rocket Center
  - Ural Process Engineering Company (UPEC)
  - Institute of Pulse Research and Engineering
  - Moscow Institute of Steel and Alloys
  - St. Petersburg Electrotechnical University
  - Medequipment
  - and dozens of other institutes
US-Russian Revenues and Investments

- **US Company Revenues** from GIPP-supported technology
  - Over $157M cumulative since tracking started thru end of 2009
  - >70% product sales
  - Contracts, royalties, grants & cost-savings

- **Russian/other Institute/Company Revenues**
  - Over $77M cumulative since tracking started thru end of 2009
  - >70% product sales
  - R&D/engineering/manufacturing services, royalties, grants & cost-savings

- **About $300M** in cumulative outside investment attracted
  - US private investors demonstrate high interest in cutting-edge technologies supported by GIPP

- **Return on taxpayer dollar – new products, jobs and wealth**

*Sources: USIC member companies, Russian/other institutes & companies, public sources, and USIC analysis.*
Jobs and Businesses Creation

• Russian/other country civilian jobs
  – Over 2,300 jobs created or sustained by end of 2009

• US jobs
  – Over 160 jobs created or sustained by end of 2009
  – >70% of US industry partners are small businesses

• 38 independent and joint US-Russian/other businesses
  – Growing private business
  – Access to US and international markets & customers
  – Partnerships with US business community

*Sources: USIC member companies, Russian/other institutes & companies, public sources, and USIC analysis. Jobs depend on market conditions, overall economic situation, management expertise and other factors.
Project Commercialization Success Rate

• **25%** of GIPP projects generated sales revenues by end of 2009
  – Product sales
  – Service sales – contracts and R&D/engineering

• Additionally **24%** of projects produced other valuable business achievements
  – Investments
  – Royalties
  – Grants
  – Cost-savings
  – New business
  – Establishment of manufacturing
  – New patents
  – Prestigious awards & certifications

• About **100** US and Russian/other patents & patent applications generated

• **Project commercialization rate comparable to R&D commercialization rate in the US**
Success Stories
Former Russian Nuclear Weapons Experts Develop Cutting-Edge Dental Implant Technology

• Manhattan Scientifics with Russian partners and Los Alamos National Laboratory (LANL) created new nanotitanium implant material
  – First dental implant made with nanotitanium approved by FDA
  – More reliable, longer lasting, and faster post-surgery healing
  – Much quicker integration with human bone

• U.S. Sen. Tom Udall joined officials from LANL and US DOE for a ceremony in Albuquerque, NM, to officially start production of the dental implant

• Manhattan Scientifics owns exclusive US license to manufacture super strong, ultra light-weight “nanostructured” metals developed at LANL and in FSU

• Manhattan Scientifics and Russian Nanomet company plan to market new implants in Russia
Solar Modules and Power Plants of New Generation for Stavropol

• RUSNANO to invest $42M in project to create manufacturing of solar modules and new generation power plants in Stavropol region

• Co-founder Solnechnyy Potok (Solar Flux) company established by key developers from Ioffe Physical Technical Institute

• 85MW/year total capacity and $174M revenues projected by 2015

• Ioffe technology supported by GIPP under project with National Renewable Energy Laboratory (NREL) “Concentrator models based on III-IV multijunction solar cells and composite Fresnel lenses”
  – Further developed by Ioffe
  – Attracted RUSNANO & private co-investors
Medical Isotope Production

• Ongoing successful Russian-US business venture
  – Institute of Nuclear Research (INR), LANL, BNL, Nuclear Medicine Solutions, Clear Vascular, and TENEX/Izotope
  – INR is key supplier of Sr-82 isotope used in clinical positron emission tomography (PET)
  – Rb metal targets irradiated at INR in a co-production arrangement wherein LANL processes them into Sr-82

• Revenues generated by Russian institutes
  – Sr-82 and other isotope projects

• 398 jobs at INR and partner Russian institutes supported in 2009 (423 involved historically)

• Regular supply of important medical isotope for the US market
Low-Maintenance Wind Power System

- Multi-billion dollar wind power generation industry growing in popularity
  - Wind power comprise 42 percent of all new US generating capacity

- Need to reduce CO2 emissions

- Need to generate electricity cost-effectively in remote locations for ranchers, farmers, villages, deep-well survival

- Empire Magnetics, Makeyev State Rocket Center and Lawrence Berkeley National Laboratory developed small (3-70 kW) wind power system uses novel Vertical Axis Wind Turbine (VAWT) design

- VAWT offers advantages over conventional Horizontal Axis Wind Turbine
  - Lower maintenance costs
  - Increased durability and reliability
  - More economically viable in remote locations

- UN renewable energy project in Cape Verde Islands
  - Provide water to islands along West Coast of Africa
  - Windmills to power desalinization systems
Rarefaction Shock Wave (RSW) Cutter for Offshore Oil-Gas Platform Removal

- Offshore oil/gas installations and sub-sea equipment removed when production ceases

- New Russian technology from Sarov uses interaction of explosively-generated RSW to cut thick-walled cylindrical cross-section pipes
  - Requires only 9-15 lbs. of explosives
  - Able to sever pipes several inches thick
  - Minimizes effects of underwater blasts on marine life

- Technology development supported by Lawrence Livermore National Laboratory (LLNL)

- Sarov receives royalty from Halliburton for inside cutter technology and additional income for outside cutter startup tasks
Needle-free Injectors for Mass Immunizations

• MedEquipment team designed a unique disposable cap for needleless injector that prevents pathogen backflow
  – hundreds of injections per hour administered without spreading blood-borne pathogens
  – allows rapid mass immunizations with crucial applications in the fight against bio-terrorism
  – requires low level of operator skill

• Technology development supported by Kansas City Plant (KCP)

• Pulse NeedleFree Systems sells needlefree injectors in the animal health market
  – Pulse is now preparing to introduce the technology for human health applications
  – Combating major epidemic outbreaks in developing countries

• MedEquipment receives royalty for each piece of equipment sold and provides engineering support
Fighting Cancer – Non-narcotic Pain Relief

• In 2003 FDA approved Bio-Nucleonics’ lead product, strontium chloride Sr-89 Injection USP, which can target bone metastases

• Drug offers non-narcotic pain relief for patients with metastatic breast or prostate cancer

• Small seed grant in 1997 involving Pacific NorthWest National Laboratory fostered as string of unprecedented success for US company and FSU partner

• Joint business between Institute for Physics and Power Engineering (IPPE) and Bio-Nucleonics resulted in the creation of dozens of commercial jobs for both US and Russian partners

• First-ever FDA approved Active Pharmaceutical Ingredient (radiochemical) manufacturing facility in Russia established by Bio-Nucleonics
Heavy Metals Removal from Wastewater

• FenixTech and Ural Process Engineering Company (UPEC) wastewater treatment process:
  • Effective in removing chromium and other contaminants in tannery wastewater
  • Provides removal of various metals for recovery and utilization
  • Heats water in purification process reducing the need to warm incoming water
  • Includes wasteless disposal of sludge and other tannery solid waste

• Brokhaven National Laboratory supported development of the technology

• FenixTech – UPEC Partnership:
  – Czech-Russian company Fortex-UPEC is operating
  – Purification of waste containing precious metals at jewelry manufacturing plant in St. Petersburg
  – Negotiations with a South African company to integrate the technology in heavy metals removal at country’s mining companies
  – A pilot manufacturing - purification of industrial wastewater at the Nizhniy Tagil chemical plant
  – Russian Sanitary-Epidemiological Committee Certificate

• Looking for investments to fund further technology commercialization
Quotations by US and FSU Participants

- We established a relationship of kindred spirits with the Russian scientists and National laboratory scientists... We actually broke through state-of-art. The Synergism of all these individuals working together, allowed ... for a scientific advantage of nearly 5x what we would have nominally experienced (Larry Stolarczyk, Stolar Corp)

- Discovering a candidate for a potential agricultural product was a highly successful project outcome. We were able to screen 1,000s of compounds for their applications... USIC and this program enabled us to locate the 100 or so scientists... (Randolph Guschl, DuPont)

- GIPP program affected very significantly the life of more than 30 scientists of our University saving them from emigration process and focusing their efforts on application of science results for high-tech commercial microwave market. (Andrey Kozyrev, St. Petersburg Electrotechnical University)

- ...That program helped us to become an independent company (Boris Smolyarov, Medequipment)

- GIPP program is extremely beneficial for the Russian scientists. It is important that we can get experience of working with commercial partners... (Tatiana Krasheninnikova, JSC Biochimmash)

- ... The connections that have developed under this program have value that is difficult to measure on a commercial basis (Anthony Dean, General Electric)

- ...It ranks among my proudest and deeply personally satisfying activities. While improving life prospects for some great scientists and learning a great deal in return, we are making the economic pie bigger for us all (Kenneth Bower, Trace Photonics)
Thank you!