ISTC 2012: Toward Sustainable Global Security - Appendices

By: **David V. Gibson and James E. Jarrett**

Date: June 23, 2003

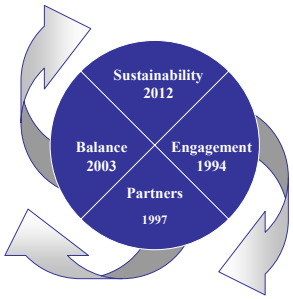
Abstract:

Review of the programs and activities of the International Science and Technology Center (ISTC) in Moscow, Russia, with recommendations. ISTC is an organization that facilitates commercial occupations for Russian scientists formerly working on weapons of mass destruction.

Keywords: economic development; nuclear non-proliferation; Russia; Russian Federation; technology commercialization

I S T C 2 0 1 2:
Toward Sustainable Global Security
APPENDICES

Prepared For
International Science &
Technology Center (ISTC)
Moscow, Russia
www.istc.ru



Prepared By
IC2 Institute
The University of Texas at Austin
& International Collaborators
from EU, Japan, Korea
www.ic2.org

APPENDIX A:
Power Point Presentations

ISTC 2012:

Toward Sustainable Global Security

Part I: Project Overview, Objectives, and Methods

Part II: Key Observations, Challenges, and Recommendations

Part III: Fast Track Action Plan for Evolution To Partnership and Self-Sustainability

ISTC 2012:

Toward Sustainable Global Security

Part 1:
Project Overview, Objectives, & Methods

IC² Institute [www.IC2.org]
University of Texas at Austin
Researchers from
EU, Japan, RF, and RoK
Expert Advisors

June 16, 2003

ISTC 2012:

Toward Sustainable Global Security

Part I: Project Overview, Objectives, and Methods

Part II: Key Observations, Challenges, and Recommendations

Part III: Fast Track Action Plan for Evolution To Partnership and Self-Sustainability

Part I:
Project Overview, Objectives, & Methods

ISTC'S Central Mission

Redirect RF/CIS Weapons of Mass Destruction (WMD) Research to Peaceful Purposes thereby Minimizing if not Preventing the Threat of Nonproliferation

- Stabilize Former Weapons Scientists
- Prevent "brain drain" to rogue nations
- Preservation of S&T potential of RF/CIS
- Integrate FWS into international S&T community
- Support RF/CIS transition to market economies

ISTC 2012:

Toward Sustainable Global Security

Is NOT an assessment or policy review of ISTC's activities and objectives

Is NOT about the sustainability of ISTC as an organization

Is ABOUT the sustainability of RF/CIS
- Nonproliferation programs and activities
- Science &Technology research excellence
- S&T based regional economic development

International Research Team

- U.S.A. -

The University of Texas at Austin

Dr. David V. Gibson, Associate Director, IC² Institute

Dr. James Jarrett, Senior Research Scientist, IC² Institute

Dr. Eliza Evans, Research Manager, IC² Institute

Dr. J. Bruce Kellison, Associate Director, Bureau of Business Research

International Research Team

- EU -

Instituto Superior Tecnico, Lisboa, Portugal
- Prof. Manuel Heitor, Director, Center for Innovation, Technology Policy and Research

Delft University of Technology, Netherlands
- Prof. Peter J. Idenburg, Dean, Delft Top Tech School of Executive Education

Segal Quince and Wicksteed Ltd, Cambridge, England
- Robert Hodgson, Non Executive Director

Institute for Socio-Economic Studies on Innovation & Research Policies, Rome, Italy
- Prof. Giorgio Sirilli, Research Director

International Research Team

Japan

The University of Tokyo

Prof. Kiyoshi Niwa, Department of General Systems Studies

Korea

Kyonggi University, Seoul

Prof. Tae Kyung Sung, Department of Management Information Systems

Russia

Dr. Leonid Gokhberg, Vice-Rector, Higher School of Economics, Moscow

Dr. Nikolay Rogalev, General Director, Science Park, Moscow Power Engineering Institute, Moscow

Dr. Alexander Sokolov, Deputy Director, Center for Science Research and Statistics, Moscow

International Research Team

- Expert Advisors -

Dr. Jean-Pierre Contzen, EU Member
Scientific Advisory Committee Member, Past Chair Governing Board, ISTC Moscow

Dr. George Kozmetsky, Chairman of the Board, IC^2 Institute, University of Texas at Austin

International Team's Research Objectives

- Review ISTC programs and activities in meeting established and evolving objectives focused on nonproliferation and sustainability
- Analyze challenges and reflect on metrics for success
- Recommend programmatic initiatives to the Parties and suggest opportunities to increase effectiveness

Research Activities

February 2002 – April 2003

- ISTC Documents and Publications
- Interviews (50)
  - Funding and Recipient Parties
  - ISTC Staff: ED, DEDs, STIMs, SPMs, Administration
  - Case profiles of Science Projects at 12 RF/CIS Institutes
- Surveys (Telephone, Mail, E-mail)
  - Funding and Non-Funding Corporate Partners – US, EU, RoK, Japan
- Focus Groups at ISTC
- Workshop on Sustainability at ISTC

Worldwide S&T is sustainable over the long-term through

- Educational & Research excellence
- Attracting young talent
- International cooperation & partnerships
- Multi-sourced funding
- Public sector applications
- Commercial applications
- Responding to national purpose and societal value
- Political stability and the rule of law

ISTC Supported Sustainability Criteria That Also Support RF/CIS Nonproliferation

- Internationally Open & Networked
- Research Excellence
- Economic Value
- Multi-Sourced Funding
- Attracting Young Talent
- National Purpose
- Societal Value

Internationally Open and Networked

Rationale

RF/CIS and world science benefits from being open and networked

- knowledge sharing increases knowledge base

Observations

ISTC has been critically important for former weapons scientists within the RF/CIS in initiating and sustaining international contacts, building relationships, and fostering understanding and trust

Indicators

- International projects initiated
- RF/CIS and international scientist exchange
- Publications co-authored with foreign researchers
- Participation in national and international conferences and workshops

Research Excellence

Rationale

R&D selectivity for excellence is key to the development of a world-class S&T System

Observations

ISTC promotes research excellence and reinforces the importance of excellence as a key criteria in the selection of RF/CIS research proposals

Indicators

- Collaboration with prestigious research centers within the RF/CIS and abroad
- Funding from national and international public/private partners
- Publications in refereed scientific journals
- Research awards and other recognition from scientific peers

Economic Value of R&D

Rationale

Corporate funding partners increase the economic orientation of S&T and improve contributions to national and global markets and economies

Observations

ISTC has been critical to linking international business partners with RF/CIS institutes and to championing economically-oriented research

Indicators

- Partnerships with private companies: Large, mid-sized, and start-up -- international and within RF/CIS
- Commercial products and processes developed
- Number and value of patents with market applications
- Spin-offs and start-ups
- Increased market access and total sales
- Economic development within Funding and Recipient Parties

Multi-Sourced Funding

Rationale

Multiple funding sources are vital to sustaining viable regional and national S&T systems

Observations

ISTC actively promotes diversification of funding for RF/CIS institutes as well as the critical role of forming and maintaining public-private partnerships

Indicators

National and international

- Private sector funding
- Public sector funding
- Foundation support
- Public-private partnerships

Attracting Young Talent

Rationale

Young scientists are critical to research vigor and excellence and to sustaining any S&T system

Observations

ISTC encourages and facilitates RF/CIS institutes to be open and networked, to produce world-class science, to engage in commercially oriented research, and to have multiple sources of funding: all of which are attractive to young talent

Indicators

- Recruiting, growing, and retaining young talent
- Young researchers' involved in Science Projects
- Young researchers' involved in Partner Projects
- Internship Programs: Graduate and Post Doctoral
- Career development and mobility of young scientists

National Purpose

Rationale

R&D funds and results should be applied toward national purpose, e.g., strategic R&D programs focusing on such topics as fuel cells, energy, environment, health, contributing to regional economic development

Observations

- Former RF/CIS weapons scientists have been redirected to areas of civil S&T for National Purpose
- ISTC's programs and activities have contributed to and are targeted to do more for RF/CIS National Purpose

Indicators

RF/CIS institute S&T contributing to

- Environment, Health, Critical Infrastructures
- Business growth and new business formation
- Wealth and job creation
- Defense

Societal Value

Rationale

World-class national S&T systems contribute to increased national and international public awareness of the role of S&T in solving global challenges

Observations

RF/CIS institutes are important to contributing to public awareness of S&T as critical to the well-being of nations in the 21st Century and to disseminate scientific methods to help solve global challenges

Indicators

RF/CIS S&T institutes are increasingly active participants and contributors to global scientific communities in solving global challenges including health, environment, energy, critical infrastructures, national disasters

All ISTC Programs Contribute to RF/CIS S&T SUSTAINABILITY

ISTC Program / Sustainability Pillar	Science Projects	Partner Projects	BMT	VSP	Workshops & Seminars	Patent Support	TSP	TDB	CSP
Open & Networked					H		H		H
Excellence	H								
Economic Value			H	H		H			
Multi-source Funds		H						H	
Young Talent	X	X	X	X	X	X	X	X	X
National Purpose	X	X	X	X	X	X	X	X	X
Societal Value	X	X	X	X	X	X	X	X	X

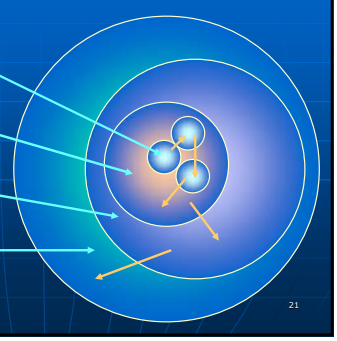
ISTC as an Important Catalyst and Networking Hub for RF/CIS Sustainable Nonproliferation

STAGE 1: Engagement of key Former Weapons Scientists (1994)

STAGE 2: Transformation of FWS through public/ private partnerships (1997)

STAGE 3: Evolution to balanced partnerships (2003)

STAGE 4: Self-Sustainable S&T Institutes & diffusion of "Best Practices" through-out RF/CIS (2012)



Stage 1: Engagement of Former Weapons Scientists and Research Teams through Science Projects (1994)

Travel
- Introduction to market economics
- Form networks outside labs
- International Visitors invited to labs

Training
- Market Economies
- Project Management
- Speaking English

Conferences & Workshops
In RF/CIS, US, EU & Asia
Learn by doing
- Presentations
- Networking
- Negotiations
- Global Marketing

Knowledge & trust increases over time

Stage 2: Transformation of Former Weapons Scientists and Their Institutes through Partners Program (1997)

Public & Private S&T Application

Funding FWS & Young Talent

RF/CIS Institutes

New Equipment Lab Certification

Knowledge Exchange
With RF/CIS and Global Research Partners

Stage 3: Evolution To Partnerships and Graduation to Self-Sustainability (2003)

Multilateral Nonproliferation and S&T Objectives

RF/CIS Institutes

Transition to business-scientific Relationships independent of ISTC
- Programmatic Approach
- Science Technology Targeting
- Developmental needs in conjunction with national priorities

Funding Parties & Partner Programs

INCREASED
- Need for Cooperation
- Importance of Business Principles
- Increased Expectations
- National and Global Competition

CHALLENGES
- ISTC Coordination Across Programs and Activities
- Partner Satisfaction – Speed and Responsiveness
- S&T Application: Public and Private
- RF/CIS National Scientific Priorities
- Attracting & Retaining Young Talent
- Multi-sourced Funding
- Intellectual Property Rights

Stage 4: Establishing and Diffusing Self-Sustainable Models and Metrics (2012)

- Sustainable Nonproliferation programs and activities diffused across RF/CIS
- RF/CIS institutes become full partners in R&D cooperation and commercialization with the public sector and industry from US, EU, Japan, RoK, and Norway AND within the RF/CIS
- RF/CIS governments developed as lead customers for cutting-edge technologies
  - For mission oriented programs (e.g., NASA and beginnings of Silicon Valley)
  - For modernization of government, critical infrastructures, health, energy, and environment

Stage 4: Establishing and Diffusing Self-Sustainability Models and Metrics (2012)

- Increased networking & partnering across RF/CIS academic and research institutes and with international science
- Increased networking & partnering across RF/CIS industry – large & mid-sized: Regional, national, and international
- Technology Venturing - Encourage & facilitate spin-outs, start-ups & regional technology-based growth

ISTC 2012:
Toward Sustainable Global Security

Part II: Key Observations & Recommendations

IC² Institute, University of Texas at Austin
Researchers from
EU, Japan, RF, and RoK
Expert Advisors

June 16, 2003

Key Observations

ISTC is an important creative and innovative experiment on how to organize and implement a multilateral consortia of scientific, political, and business interests that represent developed and developing regions to foster wealth and job creation through the civil use of science and technology.

In contrast to military intervention, ISTC provides an important alternative model for dealing with the threat of proliferation of Weapons of Mass Destruction

Public Relations and Branding

Key Observation

The general awareness and understanding of ISTC programs and activities is minimal within Funding Party:

- **Large, mid-sized, and small companies**
- **Universities and R&D organizations**
- **Cities and regions**

Public Relations & Branding

Key Recommendations

- **To enhance ISTCs visibility or Brand:**
  - **Publish and broadly disseminate a newsletter in electronic and hard copy form**
  - **Publish articles about ISTC in academic and popular press within Funding Parties [The International Research Team will assist in this regard.]**
  - **Develop an ISTC "Road Show" to visit Funding and Recipient Parties as well as other emerging and established technology regions worldwide**

Key Observation

A centrally important and limiting reality at the Secretariat is that since its founding ISTC has been working with and supporting increasing numbers of:

(1) Clients (Science Projects and Partners) &
(2) Supporting programs

without a corresponding increase in qualified ISTC staff as well as physical facilities

Key Observation

Adding to the challenges of being under staffed, lacking qualified staff, and key staff being over worked is the Secretariat's current and major organizational change efforts of:

(1) Evolution to Partnership (E2P) among Funding and Recipient Parties, and
(2) Accelerated self-sustainability of RF/CIS researchers and institutes.

SCIENCE PROGRAM

Key Observation

Maintaining and enhancing research excellence across the broad range of RF/CIS S&T Institutes including national and international partnerships

Accelerating Knowledge/Technology Transfer (KTT) for ECONOMIC VALUE and REGIONAL DEVELOPMENT within the RF/CIS as well as with the Funding Parties

Contributions to NATIONAL PURPOSE and SOCIETAL VALUE

The recruitment and involvement of YOUNG TALENT in RF/CIS Institute Science Projects

SCIENCE PROGRAM

Key Recommendations

Provide clear and objective feedback on Science & Partner Projects evaluation criteria for PMs, PPMs, and SPMs during concurrence and proposal review processes

- Include feedback on potential private/public applications of the S&T

Have Research Collaborators & Partners assist PMs, PPMs, & SPMs throughout the duration of the research project by suggesting targeted public/private S&T applications.

Provide research proposal review incentives for RF/CIS institutes that attract and train Young Talent

PARTNERS PROGRAM

A Note of Urgency

ISTC Partners Program is being increasingly challenged by excellent and low cost S&T global competition especially from China and India.

There is an urgent need for:

- ISTC's Partner Program to be more Customer Focused
- RF/CIS governments to understand the importance of minimizing bureaucratic obstacles to allow ISTC to be
  - More customer focused
  - A more effective stimulus for wealth and job creation within the RF/CIS

PARTNERS PROGRAM

Key Observation

While 50% of the Funding Corporate Partners report uniformly positive comments concerning their relations with ISTC, 50% were critical. The most common critique was:

The complexity of ISTC proposal review processes coupled with infrequent and poor communication about the reasons for and logic of these processes

PARTNERS PROGRAM

Key Recommendations

- Create an ISTC Partner Advisory Board composed of government and non-government partners
- Establish a "Help Desk" within the Secretariat that is easily accessible (email, fax, phone) and will champion the Partners' needs and concerns on a personal basis
- Systematic data collection on existing and potential Partners & ISTCs national and global competition to better determine how Partners value ISTC and RF/CIS Institute S&T capabilities

RF/CIS S&T APPLICATION

Key Observation

ISTC experience has shown that it is extremely difficult to achieve successful transfer and application of:

- Superior RF/CIS technology with identified market applications FROM
  - RF/CIS and ISTC-based locations TO
  - Established organizations within the Funding Parties

RF/CIS S&T APPLICATION

Key Recommendation

- Use Technology/Market (T/M) Brokers --- located within the Funding Parties --- to overcome K/TT challenges:
  - To identify specific market applications & partners
  - To bridge communication and cultural gaps during commercialization & application processes

  T/M Brokers should be:
  - Hired on the basis of deep and broad technology knowledge as well as an awareness of market needs and business networks in the targeted technology areas within the Funding Party
  - Paid on commission

RF/CIS S&T APPLICATION

Key Recommendation

- To Increase "Market Pull" of RF/CIS S&T the Secretariat should consider:
  - Being a catalyst for structuring and conducting S&T benchmark studies in select RF/CIS regions to assess key assets and challenges for accelerated technology-based technology growth
  - Forming partnerships between select RF/CIS S&T Institutes and SELECT regions within the Funding Parties
  - Establishing ISTC affiliated Technology Commercialization Centers (TCCs) within SELECT Regions within the Funding and Recipient Parties

RF/CIS S&T APPLICATION

Key Recommendation

- ISTC should assist Technology Commercialization Centers (TCCs) by leveraging its existing:
  - Programs and Activities
  - Networks with Funding and Recipient Parties
  - Corporate and Government Partners
- TCCs could shorten learning curves for SMEs and serve as "models for success" for fostering public/private collaboration within the Funding and Recipient parties

TECHNOLOGIES DATABASE

Key Observation

Technology Abstracts are at the front end of "GO" or "NO GO" decisions for a potential customer in deciding whether to pursue RF/CIS S&T to application. ISTC provided Technology Abstracts are overly complex, technology focused, and extremely difficult to assess in terms of potential market and public sector applications

TECHNOLGOIES DATABASE

Key Recommendations

- **SPMs/PPMs and perhaps others at ISTC (e.g., workshops) need to spend more time with PMs in crafting Technology Abstracts that are clear, concise, and application oriented**
- **Redefine the Technology Database Program as a technology "bourse" that will actively link customers with challenges/problems and market opportunities to needed RF/CIS S&T**

PATENT SUPPORT PROGRAM

Key Observation

Evolution to Partnerships (E2P) and sustainable nonproliferation centers on protecting IPR rights for RF/CIS scientists and institutes as well as ISTC Partners and the Funding and Recipient Parties

PATENT SUPPORT PROGRAM

Key Recommendations

- Clarify where the legal regimes of the Parties pose different if not contradicting responses to various IPR scenarios as well as where the legal regimes are harmonious
- IPR Training for PMs, PPMs, and SPMs so that ISTC and the Institutes will be up to the challenge of obtaining and protecting fair commercial value for RF/CIS S&T assets

Records of Invention (ROI) Technology Implementation Plan (TIP) & Private Sector Supplement (PSS)

Key Observation

When PMs complete these forms, they usually have inadequate market knowledge: "they don't know what they don't know," and they focus on what they do know, which is the S&T characteristics of their research project

Records of Invention (ROI) Technology Implementation Plan (TIP) & Private Sector Supplement (PSS)

Key Recommendations

- Revise the forms so they are more realistic in their information requests of PMs
- Have the SAC and the Recipient and Funding Parties review comment on potential public/private S&T applications during the proposal process
- Have Research Collaborators and SPMs suggest potential public/private applications during the the research project and not wait until the project is nearly complete

BUSINESS MANAGEMENT TRAINING

Key Observation

Future ISTC Training needs to be more integrated with ISTC program activities and ISTC staff needs, especially as:

- SPMs and PPMs move from being "proposal to transition advocates"
- The Secretariat evolves toward balanced partnering and technology commercialization for self-sustainability of RF/CIS Institutes

BUSINESS MANAGEMENT TRAINING

Key Recommendations

- Offer courses to SPMs/PPMs on:
  - Knowledge/Technology Transfer (K/TT) leading to ROI for established firms in Funding and Recipient Parties
  - Intellectual Property Rights of Funding and Recipient Parties
  - Fostering start-up and spin-outs, including venture financing and business plan development, especially with international partners
- Leverage the capability and resources of the best local and international training programs
- Become a "model & leader" in results oriented Computer & Internet based training for RF/CIS Institutes leading to public/private applications

COMMUNICATION SUPPORT

Key Observation

For the Secretariat as well as RF/CIS Institutes Communication Support is challenged to:

- Effectively identify, analyze, and implement needed and desired IT technologies
- Maintain adequate Computer and Information Technology (CIT) equipment and training
- Provide reliable and continued IT connectivity

COMMUNICATION SUPPORT

Key Recommendations

- Outsource contracts to provide needed CIT support services
- Utilize experienced and/or train SPMs/PPMS to assist with needed CIT support activities
- Budget Science and Partner Projects for RF/CIS Institute CIT needs and projected IT connectivity costs

SEMINARS AND WORKSHOPS

Key Observation

More complete and systematic pre-seminar and workshop planning and follow-up is considered important for facilitating evolution to partnership and self-sustainability.

SEMINARS

Key Recommendations

Have SAC Seminar Program Committees be more representative of the broad base of RF/CIS and international S&T experts in targeted fields

Collect more data on potential new science and follow-up research activities including commercial collaborations

Increase dissemination of seminar presentations through publications and use ISTC's web to increase the national and international impact of SAC Seminars

WORKSHOPS

Key Recommendations

Better selection and use of "ideal type" presenters for "selling" the applications of RF/CIS S&T

Better selection of "ideal type" workshop attendees who have the desire and needed resources to champion the RF/CIS S&T either within established firms or start-up companies

Use of "Technology/Market Brokers" selected from host country to represent and champion the technology with follow-up activities

TRAVEL SUPPORT

Key Observation

In light of ISTC's accelerated Evolution to Partnership (E2P) and sustainability goals, there is a need for increased travel funds to facilitate:

- Research excellence in targeted technology areas
- Successful commercial and public sector S&T applications within RF/CIS and Funding Parties

TRAVEL SUPPORT

Key Recommendations

In addition to providing increased travel funds there is a need for increased time for SPMs, PPMs, and PMs --- including staff support --- for:

- Pre-travel preparation for targeted S&T commercialization/application strategy
- Writing trip reports focusing on S&T commercialization/application results, possibilities, and lessons learned
- Follow-up activities after travel that may lead to successful S&T applications

NEXT STEPS

Consider how best to:

Disseminate the final report, conclusions, and recommendations

Leverage the acquired knowledge resource of The International Research Team to help facilitate key recommendations

ISTC 2012:
Toward Sustainable Global Security

Part III: Fast Track Action Plan

IC² Institute, University of Texas at Austin
Researchers from
EU, Japan, RF, and RoK
Expert Advisors

June 16, 2003

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes, and Regions

The world is overflowing with excellent S&T: The key challenge for ISTC is getting the "right" RF/CIS technologies moving downstream to successful market and public sector applications within the Funding and Recipient Parties.

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes, and Regions

To obtain early focus, success, and significant international and positive PR with existing financial and staffing limitations, S&T commercialization/application activities should focus on a limited number:

- Select RF/CIS S&T Institutes
- Select Regions/Institutions within the Funding Parties

The goal is to increase market/application-pull for select RF/CIS S&T to (1) established firms/organizations, and (2) fast-growth start-up firms within the Funding Parties and to stimulate Economic Development within select RF/CIS regions.

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes, and Regions

1 SELECT RF/CIS Institutes

"ROLE MODELS FOR SUCCESS"

Select S&T Institutes within the RF/CIS to be role models for successful Knowledge/Technology Transfer in targeted technology areas: bio-sciences, nano-technology, chemicals, manufacturing, etc. The focus is not necessarily high-tech, but successful S&T application within Funding Parties that ALSO stimulates regionally-based RF/CIS wealth and job creation in the short-term and globally competitive S&T in the long-term.

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes, and Regions

RF/CIS INSTITUTE SELECTION CRITERIA SHOULD INCLUDE:

- Track record of successful ISTC projects
- Desire to pursue defensible and workable IPR regimes for domestic & foreign markets
- Needed volume and quality of technology deals for targeted market applications

ISTC selection criteria should be transparent to encourage other institutes to follow these emerging models of success. ISTC would disseminate "best practices" and "lessons learned" to **ALL** ISTC Institutes

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes, and Regions

2 PARTNER SELECT RF/CIS INSTITUTES WITH SELECT REGIONS WITIHN FUNDING PARTIES: EU, US, JAPAN, KOREA, NORWAY

Select regions within Funding Parties (e.g., Austin, Texas) that will provide market-pull and champions for RF/CIS technology. These select regions will need to have the required "smart infrastructure" and technology absorptive capacity including large, mid-sized, and small technology firms. Win-Win transfers should be required to benefit both Recipient and Funding Parties.

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes and Regions

3 HAVE TECHNOLOGY/MARKET BROKERS CHAMPION RF/CIS TECHNOLOGIES WITHIN SELECT REGIONS

ISTC would require select Funding Party Partner regions to "hire" Technology/Market brokers to bridge the gaps between the targeted RF/CIS Institute AND firms, markets, finance, and talent within the select partner region of the Funding Party. These activities could be funded in the short-term from regional economic development funds of the Funding Party regions and in the long-term by commissions earned by successful S&T applications.

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes, and Regions

4 SELECT TECHNOLOGIES

Targeted technologies would receive "Quick Looks" from RF/CIS businesspeople and perhaps business and law students from RF/CIS universities as well as professional & educational institutions within the RF/CIS.

Improved "Technology/Market Abstracts" would be translated in the language of the Funding Party and reviewed for market and public sector applications by champions, entrepreneurs, business managers, venture capitalists, etc., within the selected Funding Party Partner Region.

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes, and Regions

5 EXISTING ISTC PROGRAMS WOULD PROVIDE COORDINATED SUPPORT TO ACCELERATE S&T APPLICATION SUCCESS & TO DISSEMINATE "LESSONS LEARNED"

- Science and Partner Programs
- Travel Support
- Education & Training
- Communication Support
- Patent Support
- Technology Database
- Seminars and Workshops

FAST TRACK ACTION PLAN

Evolution To Partnership & Self-Sustainable RF/CIS Researchers, Institutes, and Regions

Next Steps

Consider how best to:

- Select RF/CIS S&T Institutes as role models for successful E2P and accelerated self-sustainability
- Select Partner Regions within Funding Parties
- Select Technology/Market Brokers within Funding Parties
- Disseminate lessons learned across all ISTC supported RF/CIS Institutes

APPENDIX B: ISTC Programs and Activities

The following appendix reviews key aspects of ISTC Programs and activities with particular emphasis on their evolution over time, metrics for success, current challenges, and recommended actions initiatives with specific reference to global security and sustainability to the benefit of Funding and Recipient Parties.

The programs and activities reviewed are:

- Science Project Program – launched in 1994
- Partner Program – launched in 1997
- Seminar Program – launched in 1994
- Business Management Training Program – launched in 1997
- Technologies Database Program –launched in 1997
- Travel Support Program – launched in 1994
- Workshop Program – launched in 1997
- Communication Support Program – launched in 2000
- Valorization Support Program – launched in 1997
- Patent Support Program – launched in 1997

1. Science Project Program

The Science Project Program is the most comprehensive nonproliferation activity conducted by the ISTC that includes the solicitation of scientific project proposals from institutes throughout the CIS and providing funding and logistical support to project teams.

Project Selection

- Project is submitted to the ISTC for consideration and is accompanied by the written concurrence of the state(s) in which the work is to be carried out
- Letters of support from foreign institutions who will collaborate with the project are also included
- Proposals are assigned to ISTC Senior Project Managers who work with Project Leaders to ensure that the proposals meet ISTC guidelines
- If the project is selected for funding the SPM continues to monitor the project through to completion

Project Funding

- Completed proposals are forwarded to ISTC Parties for funding consideration and these decisions are made 3-4 times/year
- Individual projects are funded either entirely by one Party or by a combination of interested Parties
- Funding Parties make their funding decisions based on a range of factors including
    - Technical Merit

- Relevance to ISTC objectives
- Budgetary priorities

Project Monitoring

- Projects selected for funding are subject to a binding project agreement signed by the ISTC Secretariat and the CIS Institute management
- Funds and equipment are provided (as stipulated in the agreement) directly to Project Leaders and participants
- The average project funding amount is $320K and the average duration is 30 months
- ISTC SPMs carry out regular and periodic monitoring activities which include visits to the project site and on-going consultation
- Annual financial audits are carried out by ISTC auditors or auditors appointed by the funding parties

As of 1997 the ISTC Secretariat was receiving about 40 new project proposals each month from scientists and engineers throughout the CIS.

Traditional Metrics – 1997 – Engagement

- Since 1994 ISTC funds over $155 million for nonproliferation and over 17,000 former weapons scientists in RF and CIS receive grants to redirect their talent and energy to peaceful scientific projects
- In 1997 original Funding Parties contribute $33 Million to 159 new projects
- Since March 1994, ISTC has funds 500 projects employing over 17,000 scientists and engineers at more than 280 institutes
- 15 ISTC Projects (23 inventions) receive patenting support
- More that 200 technical monitoring trips conducted and 120 projects were subject to financial audits

CIS Institutes working on ISTC Projects – 1997

- Russian Federation – 233
- Kazakstan – 14
- Belarus – 12
- Georgia – 8
- Armenia – 6
- Kyrgyz Republic – 2

CIS Institutes working on ISTC Projects – 1998

- Russian Federation – 164
- Kazakstan – 23
- Kyrgyzstan - 4
- Belarus – 13
- Georgia – 9
- Armenia – 16

1998 - Metrics

- 330 new project proposals registered at Secretariat
- $30 million allocated for 147 projects and activities in Science Project Program
    - 70 Projects completed
- Direct payment of over 17,000 scientists, engineers, technicians, and team members is over $21 million
- 200 technical on-site monitoring visits conducted by ISTC Staff and members of ISTC Parties
- 120 projects subject to financial audits
- 17,115 scientists and their technical team members were paid at least one-day of activity on ISTC projects – 68 is the average number of days team members worked on an ISTC project
- Since March 1994 ISTC has funded over 650 scientific projects employing over 24,000 former weapons scientists and engineers at nearly 300 institutes in RF and CIS
- Areas of global importance addressed include
    - Environmental remediation and monitoring
    - Improved safety for nuclear reactors
    - Innovative methods for nuclear waste management
    - New vaccines and treatments for bacterial and viral diseases
    - Efficient concepts for future energy production

Areas of focus 2000

- Environmental monitoring and remediation
- Biotechnology Research
- Disposal and safeguarding of nuclear materials
- Efficient power production

Metrics – 2000

- 450 new project proposals registered at Secretariat
- 237 projects allocating $62 million
- 250 technical on-site monitoring visits
- 200 projects in 300 Institutes subject to financial audits
- $27 million in direct payments to 21,275 scientists and team members - paid for at least one-day of activity on ISTC projects – average number of days team members worked on an ISTC Project was 59 21,275 scientists and team members at 400 Institutes equivalent to 5,670 person-years
- Case Profile: Kazastan – 150 new full-time jobs created as a result of ISTC projects

Metrics – 2001

- $46 million for 176 New Science Projects
- 31 million for 104 projects provided by ISTC Partners
- Direct payments of $30 million to 22,704 scientists and their team members – total redirection supported by the ISTC equivalent to 6,020 full-time person-years

Science Project Program

- $45 million allocated to 176 projects
- Financial audits conducted on 244 projects through on-site visits to 367 Instititutes
- Three project audits by external agencies to review process of funding, monitoring, contracting, procurement, and accounting procedures
  - EU Court of Auditors – 13 projects funded by the EU were reviewed
  - US Defense Contract Audit Agency – 31 projects were reviewed
  - US General Accounting Office – 6 Institutes were selected for on-site visits
- 22,704 scientists and their technical teams were paid for at least one day of activity on ISTC projects – average number of days team members worked on an ISTC project is 58

2. Partner Program

By the end of 1997, 15 Partners were funding ISTC Projects. These Partners were:

- 3M
- *Burlington Bio-Medical & Scientific Corporation*
- *Dow Chemical Corporation*
- *Dupont de Nemours*
- *European Organization for Nuclear Research (CERN)*
- *Framatome*
- *General Atomics*
- *Hitachi Chemical Company, Ltd.*
- *Marubeni Corporation*
- *Rhône-Poulenc Industrialization*
- *Sandia National Laboratories*
- *Scientific Utilization, Inc.*
- *Swiss Agency for Development and Cooperation*
- *US Department of Energy*
- *US National Academy of Sciences*

Metrics - 1998

- $3.7 million in new funding through the Partner Program and addition of 29 new Partner Organizations bringing the total to 45 contributing nearly $8 million since mid-1997

2000

- 31 New Partner organizations – total partners at end of 2000 – 98
- 76 Partner Projects representing $24 million – (total contribution since inception of the program $41 million)
- Dominating Technical Focus
- Environmental and Personal Safety

- Biological and Ecological Saftey
- New Materials

2001

- 34 new Partner organizations join ISTC – bringing the total at the end of 2001 to 135
- 104 Partner projects were approved for funding
- Since program inception – total Partner contribution exceeds $72 million

3. Seminar Program

Prior to 2000, ISTC organized over 23 various seminars and workshops.

2000

- 3rd SAC Seminar – "Towards More Efficient Utilization of Research Results from Russian and CIS Research Institutions"
- Co-Sponsor, 10th International Conference on Laser Optics, St. Petersburg
- Co-Sponsor, Conversion of Scientific Research in Armenia, Yerevan

2001

- 4th Scientific Advisory Committee (SAC) Seminar on "Basic Science in ISTC Activities," Novosibirsk, Russia, April
- Co-organizer: Seminar on "Scientific and Technical Potential for Conversion in the Military-Industrial Complex of the Western Urals," Perm, Russia, June
- Co-Organizer: 17th International Conference on Coherent and Nonlinear Optics, Minsk, Belarus, June.
- Co-organizer: International Conference, "Holography and Optical Information Processing," Kyrgyz Republic, September.

2002

- Co-Organizer: SAC Seminar "Nanotechnologies in the Areas of Physics, Chemistry, and Biotechnology," St. Petersburg, Russia, May

2003

- Co-Organizer: International Seminar, "A Fresh Look at Nuclear Safeguards," Berlin, Germany, February-March
- Co-Organizer: 11th International Conference, "Laser Optics – 2003", St. Petersburg, June-July.
- International Conference, "Safety and Economy of Hydrogen Transport – 2003," St. Petersburg, August.
- Co-Organizer: 4th International Conference, "Plasma Physics and Plasma Technology," Minsk, Belarus, September.
- Co-Organizer: 12th International Conference, "Radiation Physics and Chemistry of Inorganic Materials (RPC-12)," Tomsk, Russia, September.

- Co-Organizer: "Ecological and Informational Safety with Special Focus on the Far East Region," Moscow, Russia, September
- 6th ISTC SAC seminar, "Science and Computing," Moscow, Russia, September.

4. Business Management and Training Program

1997

- 5 Business Management Training Programs in CIS

1998

- 90 CIS scientists trained under the BM Training Program in 3 cities
- Business and Management Training Program:
  - 3 training courses for 90 ISTC Project scientists in CIS
  - 3 for 250 Project Managers at ISTC
  - Project specific training for 20 project participants in EU
  - Publication of ISTC Training Manual in IP Rights

1999

- Eight regional training courses for 220 project managers from more than 75 CIS institutes with courses in 7 cities
- Five-month English language training course for VNIIEF project participants in cooperation with Sarov training institute
- Three training courses for nearly 300 new Project Managers and accountants
- Project specific training for 28 project participants
- Publication of ISTC training manuals on business planning and presentations to international scientific journals

2000

- ISTC facilitates the establishment of Regional Training Centers in 7cities in RF and CIS
  - 280 ISTC Project Participants received training at 12 courses on technology commercialization - conducted by RTCs
- 25 VNIIEF specialists receive 4 month training course on "Entrepreneurial Manager" in Sarov
- Seminar on "Commercialization of High Technologies" in cooperation with the Urals Education and Research Center for Innovative Business
- 120 participants received in IT and Software Engineering, Yerevan
- 2-week intensive English language course for ISTC project participants
- 2nd Edition of ISTC Training Manual on IP rights published
- 3 training sessions for 300 project managers and accountants of newly funded ISTC projects
- 26 project participants received professional training in labs in EU and US

2001

- Business Career Development subprogram was initiated to provide professional upgrade training for personnel in R&D Institutes
- 56 training courses for more than 700 ISTC project participants
- ISTC and Science and Technology Center, Ukraine jointly organized a training conference on IP in Tbilisi, Georgia for 25 ISTC project participants
- Interactive on-the-job training on commercialization of technology, Technopark, Obolensk
- 2 training courses on Technology Implementation Planning conducted by ISTC Secretariat for more than 80 participants from Georgia and Armenia
- 3 training courses for 200 project managers and accountants for newly funded ISTC projects
- 4-week training/mentoring project on technology commercialization for 2 VNIIEF experts in Texas, USA
- 2-week training on R&D management for 2 ISTC participants in Republic of Korea
- 1-month intensive English Language course for 9 employees of Central Analytical Laboratory on Monitoring of Chemical Weapons Elimination
- 8 project participants received professional training in National Nuclear Corporation, Manchester, England

5. Technologies Database Program

Metrics

1998

- Promising Research Abstract Program – 1260 abstracts were collected, formatted, and distributed on CD-ROM and ISTC website

2000

Technologies Database Program

- Version 3 of New Promising Research Abstracts with 1,410 abstracts
- Version 4 with 1,620 abstracts to be published in early 2001

2001

Technologies Database Program

- New CIS Scinece and Technologies Internet Portal opened with 6 organizations as initial portal participants [www.tech-db.ru]
- Version 4 of Promising Research Abstracts CD-Rom published containing more than 1,600 abstracts from 250 CIS organizations
- Support of national science and technology database creation in CIS countries

6. Travel Support Program

Metrics

1998

- Funding and travel support for 1,100 scientific team members
- Project Development Grant Program – 35 technical team members were sent to seminars and conferences worldwide
- US Biotechnology Travel Grant Program – 66 biotechnology specialists were sent to seminars and conferences worldwide
- Project Development Grant Program – 35 technical team members were sent to seminars and conferences worldwide

1999

- ISTC funds 143 Trips

2000

- 360 (or is it 153) individual international trips for over 1,590 scientific team members
- CIS scientists to participate in international seminar in Sarov

2001

- Funded 186 individual trips to collaborating organizations, seminars, and conferences worldwide
- 15 scientists funded for visits to European Partnering events through the European Union Mobility Support Fund

7. Workshop Program

Financed entirely by the Science and Technology Agency (STA) of Japan, the Japanese Workshop Program was introduced in June 1997. In 2000 the EU and RF also began offering workshops and in 2001 the US and CIS also offered workshops. The program sponsors travel of CIS scientists to participate in workshops on important scientific issues. The workshops are organized by host governments in cooperation with the ISTC to exchange information on technologies of global significance and to facilitate the development of ISTC projects related to these topics.

As of 2002 the ISTC regularly organizes workshops to highlight technologies and topics of global significance and to facilitate the development of project proposals and the inclusion of Partners and collaborators in ISTC activities.

Metrics
1997

- Two workshops held in Japan on biotechnology and materials science

1998

- Japan Workshop Training Program – 5 workshops: 2 in Tokyo (materials and energy), 2 in Tsukuba (chemistry and space station utilization), and 1 in Osaka (solid state electronics)

1999

- Japanese workshop for 15 CIS and 76 Japanese participants on IT and Computer Software
- Japanese workshop for 5 CIS and 30 Japanese on Dielectrics and Ferroelectrics in Device Applications

2000 – Additional country sponsored workshops are added

- Nine Workshops
  - Japan - 4
  - EU - 4
  - RF – 1

2001

- 18 workshops
  - Europe - 6
  - Japan - 5
  - Russian Federation - 4
  - CIS - 2
  - U.S.- 1

8. Communications Support Program

The Communications Support Program is centered on improving the telecommunication infrastructure of institutes where current capabilities inhibit the successful accomplishment of ISTC work and the development of commercial opportunities. Implementation activities include high speed Internet access, websites, and IT equipment purchases.

Metrics
2000

- Implemented support plans at 8 research institutes: 6 in RF and 2 in Kazakstan
- Technical support assessments in 2 Institutes

2001

- 13 research institutes were supported by ISTC with plans for high speed Internet access and websites: 10 in Russia, 2 in Kazakstan, 1 in Kyrgyz Republic.
- 4 institutes received a technical support assessment for later implementation

9. Valorization Support Program

Valorization Support is directed to projects whose results are considered to have commercial and scientific potential capable of producing long-term support for weapons scientists and engineers, thereby sustaining their redirection to peaceful endeavors. More specifically, the valorization support program provides resources for a variety of projects leading to valorization of project results and the transfer of technologies from ISTC projects. This includes outsourcing projects on assessment of ISTC programs, market analyses of specific project technologies, and design of new ISTC efforts such as the Innovation Territories Initiative.

Metrics

2000

- 3 laser and 3 surface modification technology projects were designated for market research and competitive analysis
- Technology assessment software was purchased to assist ISTC staff members in evaluating project commercial potential
- License and subscriptions to on-line technology transfer databases and market research added to ISTC valorization resources
- Monograph series on ISTC project results was established with publication beginning in 2000

2001

- Consultant companies, external to ISTC, conducted market research and competitive analysis 14 ISTC Projects that had previously been identified as having exceptional commercial potential – the exercise also was used to promote these technologies in world-markets
- Licenses and subscriptions were added to ISTC valorization resources of technology transfer databases and market research
- ISTC Monograph series on ISTC projects was funded with first publications in 2001
- Concluded a service contract with Center for Science Research and Statistics, Moscow to collect data on completed projects
- ISTC concluded a sustainability benchmarking and road-mapping project with a multinational group of specialists in innovation management, intellectual capital leveraging, and technology policy.

10. Patent Support Program

The Patent Support Program recognizes the contribution of ISTC projects and their participants to innovative technologies and ideas that have commercial value. The program was launched in March 1997 to provide financial support to project grant recipients to cover the costs of initial stages of obtaining patents for their work. The longer-term goal is to facilitate national and international patenting for inventions developed by ISTC project grantees. ISTC has a Patent Committee which assesses the

merits of individual patent cases and goes through a process of establishing in an initial registration should be funded.

Metrics

1997

- 15 ISTC projects encompassing 23 separate inventions received patenting support from the Secretariat.

1998

- Patent Review Committee received 31 applications and provided financial support to 12

1999

- Patent Review Committee received 44 applications and provided financial support to 28

2000

- Patent Review Committee received 29 applications and provided financial support to 21

2001

- Patent Review Committee received 33 patent applications and provided financial support to 25

APPENDIX C:
International Research Team & Expert Advisors

PROJECT DIRECTOR

Dr. David V. Gibson*
Associate Director, IC² Institute, The University of Texas at Austin, Texas

EUROPEAN UNION

Prof. Manuel Heitor*
Director, Center for Innovation, Technology Policy and Research, Instituto Superior Tecnico, Lisboa, Portugal

Dr. Robert Hodgson*
Non Executive Director, Segal Quince Wicksteed Limited, Cambridge, United Kingdom

Prof. Peter J. Idenburg
Dean, Delft TopTech, School of Executive Education of Delft University of Technology, Delft, The Netherlands

Prof. Giorgio Sirilli*
Research Director, Institute for Studies on Scientific Research and Documentation

JAPAN

Prof. Kiyoshi Niwa*
General Systems Studies, The University of Tokyo

KOREA

Prof. Tae Kyung Sung*
Professor of MS, The University of Kyonggi

RUSSIA

Dr. Leonid Gokhberg
Vice-Rector, Higher School of Economics, Moscow

Prof. Nikolay Rogalev*
General Director, Science Park, Moscow Power Engineering Institute, Moscow

Dr. Alexander Sokolov
Deputy Director, Centre for Science Research and Statistics, Moscow

USA

Dr. Eliza Evans
Program Manager for Research, IC² Institute, The University of Texas at Austin, Texas

Dr. James Jarrett
Senior Research Scientist, IC² Institute, The University of Texas at Austin, Texas

Dr. J. Bruce Kellison
Bureau of Business Research, McComb's School of Business
The University of Texas at Austin, Texas

EXPERT ADVISORS

EUROPE:

Prof. Jean-Pierre Contzen*
EU Member of ISTC's Scientific Committee and past Chairman of ISTC's Governing Board; Chairman of Institute of Advanced Studies, United Nations University, Tokyo; Vice-Chairman of the von Karman Institute of Fluid Dynamics, Brussels; and Special Advisor to the Minister, Ministry of Science and Technology, Portugal

USA:

Dr. George Kozmetsky* (1917 – 2003)
Founder of IC² Institute, The University of Texas at Austin, Texas; Executive Associate for Economic Affairs with The University of Texas System; Chairman of the Society for Design and Process Engineers; Co-Founder and former Executive Vice President of Teledyne, Inc.; awarded the National Medal of Technology in 1993.

*** These advisors and members of the International Research Team are IC² Institute Fellows – a network of over 200 leaders in academic, business, and government sectors, from 19 nations.**

PROFESSIONAL PROFILES:

Dr. David V. Gibson, Project Director

Associate Director, IC² Institute
The University of Texas at Austin, USA

David V. Gibson is Associate Director and the Nadya Kozmetsky Scott Centennial Fellow, IC² Institute. In 1983, he earned his Ph.D. from Stanford University in organizational behavior and communication theory. He is Director of the Multidisciplinary Technology Transfer Research Group at The University of Texas at Austin. During the 1999-2000 academic year Dr. Gibson served as a Fulbright Scholar at Instituto Superior Tecnico, Lisbon, Portugal. He teaches graduate courses on knowledge/technology transfer and adoption, and regional technology-based economic development. His research and papers have been translated into Mandarin, Japanese Korean, Russian, Spanish, Italian, French, German, Finnish, and Portuguese.
Areas of Expertise: Dr. Gibson's research and publications focus on the strategic management of knowledge; cross-cultural communication, management, and technology transfer; the management and commercialization of technology; and the growth and impact of technopoli or regional technology centers. He is a consultant to businesses and governments worldwide and has made numerous professional presentations in the U.S., Europe, South America, and Asia.

Dr. Eliza Evans

Program Manager for Research
The University of Texas at Austin, USA

Dr. Evans received her Ph.D. in 2001 from the University of Texas at Austin where she studied socio-economic development, entrepreneurship, and organizations. For her dissertation research Dr. Evans conducted a comparative study of microenterprise support programs in India. Dr. Evans lends to IC2 research a specialization in developing regions and has managed research projects in the Canary Islands and on the US/Mexico border. 2002 will be the inaugural for the Annual Interdisciplinary Conference on Technology, Innovation and Policy at the University of Texas, an initiative by Dr. Evans to assist graduate students in developing and presenting their work to a broad audience of academicians and practitioners. Dr. Evans' research experience also includes three years of education and labor policy analysis in Washington DC as both congressional staff and consultant.

Dr. Manuel Heitor

Director, Center for Innovation, Technology Policy and Research
Instituto Superior Tecnico
Lisboa, PORTUGAL

Dr. Manuel Heitor was appointed Full Professor at the Insituto Superior Tecnico (IST), the Technical University of Lisbon, in 1995. He is the co-editor of several books, including Combusting Flow Diagnostics and Unsteady Combustion, and the author of several scientific papers in the area of experimental combustion and related aspects of energy. Manuel Heitor served as Deputy President of the IST from 1993 to 1998. He has coordinated the organizing committee of a series of international conferences on technology policy and innovation, which have been held annually since 1997 in Macau, Lisbon, and Austin. He is the Director of the IST's Master of Science Program in Engineering Policy and Management of Technology, which he launched in 1998. He is also the Co-founder and Director of the IST's Center for Innovation, Technology and Policy Research.
Areas of Expertise: Dr. Heitor's current interests include systems and policies of knowledge creation and diffusion, with emphasis on higher education policy, and techynologies for the sustainable environment.

Dr. Robert Hodgson

Non Executive Director
Segal Quince Wicksteed Limited
Cambridge, UNITED KINGDOM

Dr. Hodgson recently changed his role from Executive Director to Non Executive Director at SQW, a private consultancy specializing in science, technology, and entrepreneurship, based in Cambridge, U.K. At the end of 2000, he started Zernike (U.K.), a joint venture to replicate the services of the Dutch-0based Zernice Group BV in the U.K. The Zernike Group provides facilities management for new technology incubators and parks, seed and start-up funds for new technology-based firms, and commercialization and consulting services. He is an economist and works extensively internationally7; currently he is working with SQW and the World Bank on a project in Turkey and with IC² Institute and the World Bank in Armenia. He is a frequent speaker at international conferences. He previously spent nine years with Coopers & Lybrand and four years in government after a three-year spell in graduate work at two U.K. universities.
Areas of Expertise: Dr. Hodgson's interests span S&T policy, technology commercialization, entrepreneurship and SME development, technopoli, institutional strategy and management, and innovation finance.

Prof. Peter J. Idenburg,

Dean, Delft TopTech,
School of Executive Education, Delft University of Technology
THE NETHERLANDS

Dr.Peter Idenburg is Dean of Delft TopTech, the School of Executive Education of Delft University of Technology. He spent most of his career in business, where he became Managing Director New Business Development and Member of the Group Council of Van Leer, Packaging World Wide. He has been a non executive director of companies such as Royal Fokker Aircraft Company, AEGON Insurances (Vereniging Aegon) and Royal Brill publishing company. From 1993-1998, he served as deputy Director General of Industry in the Dutch government, assuming responsibility inter alia for (inter)national Technology Policy. He was a member of the Eureka High Level Group and chaired the preparatory meetings of member country representatives for the EU Fifth Framework programme. From 1970-1972 he worked in Brussels for the Commission of the European Communities. He has been engaged in business transactions in more than 50 countries and has been a visiting professor at the University of Michigan, Ann Arbor, Institute of Technology, Bandung, Shanghai, and the University of Singapore. He has lectured widely, published many articles and has written and edited various books. He holds an MA of Leiden University, a PhD of Utrecht University (Dissertation on Know-how and Technology transfer) and an MBA of Insead, Fontainebleau.
Areas of Expertise: Strategic Management, Entrepreneurial Strategy and Management of Technology. He speaks Dutch, English, French, German, Spanish and Russian.

Dr. James Jarrett

Senior Research Scientist, IC² Institute
The University of Texas at Austin, USA

Dr. Jarrett specializes in public sector program evaluation and research involving benchmarking of R&D resources, telecommuting by disadvantaged populations, and innovative programs by governmental agencies. He has been co-principal investigator of a national US project that examined the role of crime in relocation decision-making by business owners and directed several studies involving the siting of low-level radioactive waste and high-level nuclear waste repositories. He served as Director of Research of a state agency and performed research for eight years at the national Council of State Governments, a non-partisan, non-profit research and service organization. He has authored or co-authored more than 60 articles, reviews, reports, and book chapters. Dr. Jarrett studied at the London School of Economics and the University of Michigan, and received a doctorate from the University of Pennsylvania.
Areas of Expertise: Dr. Jarrett's research interests focus on program evaluation and organizational effectiveness, benchmarking and metrics, entrepreneurship in regional economic development, distance work, and innovative public sector programs.

Dr. J. Bruce Kellison

Associate Director, Bureau of Business Research
The University of Texas at Austin, USA

Dr. Kellison has been Associate Director of the BBR, an applied economic research center, since 1998. He holds a PhD in political science and wrote his thesis on the political economy of the Russian oil sector and has published two book chapters on the role of political and economic decentralization in the Soviet collapse. He has traveled extensively in Russia and the former Soviet Union, including research trips to Ekaterinburg, Novosibirsk, Tyumen, Nizhnevartovsk, and Moscow. His work at the BBR includes editing *Texas Business Review*, a bi-monthly journal summarizing scholarly business research for Texas business owners, policymakers, and legislators.
Areas of Expertise: applied economic research, Russian political economy, and the natural resource development.

Professor Kiyoshi Niwa

General Systems Studies
The University of Tokyo, JAPAN

Dr. Kiyoshi Niwa is a professor in the department of General Systems Studies at the University of Tokyo. Before joining the university, he served with the Advanced Research Laboratory (1985 to 1994) and the Systems Development Laboratory (1972 to 1985), both at Hitachi, Ltd., Japan. From 1989 to 1991 he was a visiting professor in the Engineering Management Program at Portugal State University. He has published in journals such as IEEE Transactions on Engineering Management; IEEE Transactions on Systems, Man, and Cybernetics; A1 Magazine; Knowledge Engineering Review; and the Journal of the Japan Society for Management Information. He is the author of Knowledge-Based Risk Management in Engineering: A Case Study in Human-Computer Cooperative Systems (1989) and Technology Management Strategy (1999) and the co-editor of Technology Management (PICMET '91), Innovation Management (PICMET '99), published by IEEE in 1991, 1997, and 199, respectively. He serves on the editorial boards of IEEE Transactions on Engineering Management, Knowledge Engineering Review, and The International Journal of Decision Support Systems.
Areas of Expertise: Dr. Niwa's research and teaching interests include technology and research management, knowledge management, organizational intelligence, and human-computer cooperation.

Dr. Nikolay Rogalev

General Director, Science Park
Moscow Power Engineering Institute
Moscow, RUSSIA

Dr. Rogalev is Senior Scientific Researcher at the Moscow Power Engineering Institute (MPEI). He also serves as General Director of the university science park. He is a member of the board of directors of the Commonwealth of Independent States Association "Technopark" and a member of the R*D program committee "Technoparks & Innovations" of the Ministry of Education of the Russian Federation. Dr. Rogalev has worked on related projects for the federal Ministry of Fuel and Energy, the Ministry of Education, the Ministry of Science and Technology and a range of international consulting and training projects. His publications include two books and more than 70 journal papers, conference papers, book chapters, and reports, funded by various government institutions and industrial corporations.
Areas of Expertise: Dr. Rogalev's research interests focus on science and technology commercialization, innovative support infrastructures, energy, energy-saving technologies, and environmental control.

Prof. Giorgio Sirilli

Research Director, Institute for Studies on Scientific Research and Documentation
Professor of New Economy and Industrial Systems, Tor Vergata University
Roma, ITALY

Professor Giorgio Sirilli is Research Director at the Institute for Studies on Scientific Research and Documentation, and Professor of New Economy and Industrial Systems at the Tor Vergata University in Rome. He received a laurea degree in economics from the University of Rome and has worked as Research Fellow at SPRU (1978) and the OECD (1980). He is actively involved in international organizations (OECD and the European Union) as a national delegate and consultant. He is Chairman of the OECD Group of National Experts on Science and Technology Indicators. Professor Sirilli has published 170 scientific publications and is currently engaged in three European projects: the Community Innovation Survey, the expert network on the Evaluation of RTD, and the expert group on benchmarking national RTD policies.
Areas of Expertise: Professor Sirilli's research is in the areas of science and technology policy and indicators, economics of technical change, R&D and innovation management, R&D evaluation.

Prof. Tae Kyung Sung
Professor of MIS
Kyonngi University, KOREA

Tae Kyung Sung is a Professor of MIS at Kyonggi University, Korea. He received his Ph.D. in MIS from the University of Texas at Austin and his B.B.A. from SungKyunKwan University. Dr. Sung has been actively involved in professional services in both public and private sectors. He also received numerous research grants from Korean Research Foundation, Ministry of Information and Communication, and private corporations. He also works in fraud prevention and detection as CFE (Certified Fraud Examiner). . Dr. Sung received IC² Institute's Researcher of the Year Award for the academic year of 2000-2001. Dr. Sung has papers published in journals such as *Journal of MIS*, *Technology Forecasting and Social Changes, Journal of MIS Research, Journal of Industrial Studies, Journal of Management Education and Research, Management Science, Korean Management Review, Journal of Information Processing, International Business Review*, and others

Areas of Expertise: Dr. Sung's research interests include information systems strategy, planning, & management, data mining and applications, business innovation, venture & entrepreneurship, fraud prevention& detection, and knowledge/ technology/ information sharing and transfer

CONTACT INFORMATION:

Dr. Eliza Evans
IC² Institute, UT at Austin
2815 San Gabriel
Austin, Texas 78705 USA
eliza@icc.utexas.edu
Ph: 512/475-8941,
Fax: 512/475-8902
www.ic2.org

Dr. David V. Gibson
IC² Institute, UT at Austin
2815 San Gabriel
Austin, Texas 78705 USA
davidg@icc.utexas.edu
(assistant: margaret@icc.utexas.edu)
Ph: 512/475-8941, or 8921
Fax: 512/475-8902
www.ic2.org

Dr. Leonid Gokhberg
11, Tverskaya str.
Moscow, 103905 RUSSIA
gokhberg@csrs.ru
Ph: 7-095-229-1662
Fax: 7-095-924-2828
7-095-882-0587
www.csrs.ru

Dr. Manuel Heitor
Instituto Superior Tecnico
Av. Rovisco Pais, 1049-001
Lisboa PORTUGAL
mheitor@dem.ist.utl.pt
Ph: 351-21-841-73-79, ext. 67
Fax: 351-21-849-61-65
http://in3.dem.ist.utl.pt

Dr. Robert Hodgson
Segal Quince Wicksteed Limited
The Grange
Market Street Swavesey
Cambridge CB4 5QG
UNITED KINGDOM
bhodgson@zernikeuk.com
Ph: 44-0-1954-231931
Fax: 44-0-1954-231767

Prof. Peter J. Idenburg
Dean, Delft TopTech
Delft University of Technology
P.O. Box 612
2600 AP Delft
THE NETHERLANDS
Assistant: p.vanderhout@delft-toptech.nl
Ph: 31 15 278 80 19
Fax: 31 15 278 10 09

Dr. James Jarrett
IC² Institute, UT at Austin
2815 San Gabriel
Austin, Texas 78705 USA
jj@icc.utexas.edu
Ph: 512/475-8922
Fax: 512/475-8902
www.ic2.org

Dr. J. Bruce Kellison
Bureau of Business Research
The University of Texas at Austin
Austin, TX 78712 USA
bruce.kellison@bus.utexas.edu
Ph: 512/475-7813
Fax: 512/471-1063
www.ic2.org

Professor Kiyoshi Niwa
Department of General Systems Studies
The University of Tokyo
3-8-1 Komaba, Meguro-ku
Tokyo 153-8902 JAPAN
niwa@idea.c.u-tokyo.ac.jp
Ph: 81-3-5454-6792
Fax: 81-3-5454-6990

Dr. Nikolay Rogalev
Moscow Power Engineering Institute
14, Krasnokazarmennaya
Moscow 111250 RUSSIA
spark@aha.ru
Ph: 7-095-362-7415
Fax: 7-095-362-7415

Prof. Giorgio Sirilli
National Research Council of Italy
Via Cesare De Lollis, 12-00185
Roma ITALY
sirilli@isrds.rm.cnr.it
Ph: 0039-06-44879214
Fax: 0039-06 443836

Dr. Alexander Sokolov
11, Tverskaya str.
GSP-9, K-9
Moscow, 101999 RUSSIA
sokolov@csrs.ru
Ph: 7-095-229-8227
Fax: 7-095-924-2828
7-095-882-0587
www.csrs.ru

Prof. Tae Kyung Sung
MIS Department, Kyonggi University
#94-6 Yiui-Dong, Paldal-Gu
Suwon 442-760 KOREA
Ph: 82-31-249-9457
Fax: 82-31-249-9401
tksung@kuic.kyonggi.ac.kr

APPENDIX D: PARTNERS' VIEWS Of the Partners Program *(Non-Governmental)*

The results from two data collection efforts with current ISTC partners are presented in this section. The initial information is from non-governmental (industrial) partners that fund projects through ISTC. The second set of information is from non-governmental (industrial) partners that do not currently fund projects but serve as collaborators or partners.

Each of the two data collection efforts is organized as follows:

- Description of the data collection methodology
- Summary of the responses
- Detailed listing of all responses
- Other comments/extended comments

Readers are strongly encouraged to review all of the partners' comments to grasp the diversity of views and to determine for themselves if other actions may be in order. At the end of this section, data collection instruments are provided.

FUNDING PARTNERS' VIEWS *(Non-Governmental Partners)*

This data collection instrument was designed to be completed by non-governmental ISTC Partners who fund projects. Respondents were promised confidentiality and that their comments would be aggregated with others. All information, which could reasonably be used to identify the company, its location, or specific institutes, has been deleted.

Each respondent has been assigned a set of letters, e.g. AAA, DDD etc. To track that respondent's responses, please see the entry under each of the questions for that letter. If no information is provided, the person did not respond or the question was inapplicable.

The purposes of this data collection was to:

1. Determine ISTC program performance against the needs and expectations of industrial companies who have participated as an ISTC partner
2. Provide systematic feedback to ISTC about potential changes they might consider in working with industrial partners in the future.

Responses were collected from 21 industrial partners in the EU, Japan, Korea, and the United States. Data was collected by different members of the international research team, using slightly different approaches in data collection. Some researchers obtained information via telephone interviews, using the instrument as a prompt for soliciting information during the interviews. Other researchers interviewed in-person the company contacts and then prepared the responses. Another researcher sent the instrument in

advance to companies, conducted the interview by telephone, and then prepared a summary which was reviewed by the companies. In the case of Japanese companies, the instruments were sent and returned via facsimile.

While the data collection methodology was variable to some extent, the companies' views were always quite clear, when each company's response was read in its entirety. One researcher aggregated the responses and prepared the following material, based to the extent practical on actual comments from the companies and researchers. A summary of the responses is provided initially, followed by a detailed listing of the responses for each company, for each question or item. The survey instrument is provided in an accompanying appendix.

Summary of Responses from Funding Partners *(Non-Governmental)*

This is a summary of the responses to the questions on the survey instrument. This summary is intended only to provide a quick overview for readers who choose not to read the in-depth, rich material from partners. The individual questions have been altered from those on the actual instrument for sake of brevity.

1. Number of agreements you (your company) has been involved with – There is substantial variation and no real pattern across the respondents. Some partners have one agreement while others have had as many as eight.

2. Time period of the agreements – The respondents comprised three groups, about equal in size: (a) those with more than five years of working in Russia, (b) those with agreements between 2 and 5 years; and (c) those with agreements in last year or so.

3. How did agreements begin? There are two sets of reasons: technical, administrative. Examples under each include:

Technical

- General interest in Russian technology;
- Personal or organizational relationships (or by reputation);
- Visits to institutes/ISTC activities

Administrative

- Desire of Institute personnel to use ISTC
- Collaborators who became funding partners
- Tax and administrative mechanism

Few agreements were identified as having resulted directly from ISTC outreach activities.

4. The primary goal or expected outcomes of the Partner Projects are:

14	Basic research
11	New products/processes
10	Interest in Russian technology generally
6	Cost Savings

6	Process improvements
6	Product improvements

Partners were allowed to designate multiple items and most did, although only several designated more than three.

5. What is the anticipated magnitude of cost savings or economic benefits from the agreements? Most have resulted in no actual benefits either because the research did not turn out as planned or because the research results have yet to be determined. A number of companies pointed out the imprecise nature of trying to determine potential benefits from research that may not be commercialized for 5 to 10 years.

Examples of positive outcomes which have been, or are expected to be, achieved include:

- Cost avoidance in allowing the company to eliminate further research in the field
- Cost savings of 1 million/euros
- Progress in materials technology
- Potential savings of 10 of millions of dollars/euros
- Potential class of new products (2 companies)

6. Is there a possibility of the Partner Agreement leading to IP?
Slightly more than half of those responding (8 of 15) said yes. (The other six companies did not answer this item.) A variety of responses covered reasons why IP is unlikely. Several indicated they were completely satisfied with how IP was resolved. Two large partners expressed concerns about how IP is handled: (1) one said ISTC's IP policy is fine for basic research but not for research with more commercial potential, so the company funds an institute directly for those types of projects; (2) another said IP was of great concern to them for a number of reasons.

7. What was accomplished in completed projects? Partners generally report that technical and scientific research has been conducted according to their expectations, and that they have been satisfied overall with the outcomes, even if results were not always what they had hoped for. Some dissatisfaction was directed toward the institutes (too much bureaucracy, outdated equipment, culture of the past). One said results were excellent and had attracted follow-on projects.

8. How have the active projects been progressing? The three main responses were: (a) just getting underway; (b) satisfactory progress; (c) projects were slow to start.

9. Best results of the partner project experience(s). "Nothing unexpected" was noted by about one-third of the respondents to this item. Other responses included matchmaking assistance of ISTC; understanding of Russian institutes and ability to work with Russian scientists who are leaders in their field; some positive technical surprises.

10. What have been the disappointing results of the experience(s)? Three companies noted aspects of slow administrative procedures while all of the other items were mentioned by one company each: low productivity by researchers; supplier; general

communication problems; ISTC lack of responsiveness; ISTC lack of timeliness and ISTC performance led to delays; ISTC did not fulfill one or more parts of the agreement; ISTC needs to do more with concurrence process; ISTC translation problems; lack of contract monitoring by ISTC; exaggerated expectations as to commercial value.

11. Will your company (you) enter into additional agreements through ISTC?

Yes	10
No	6
Unsure	4

Several companies said they will continue to fund through ISTC while also funding research directly with institutes, private researchers, or through CRDF. Others said they will not fund through ISTC because the company has better alternatives, they will be going only through CRDF, they have stopped funding research entirely, or they do not believe they will be funding research in Russia in coming years.

12. Would you recommend ISTC to an associate?

Yes	14
No	2

The large majority would recommend ISTC to an associate. The primary reasons are because ISTC provides access to Russian expertise, direct funding of research with institutes is inappropriate for companies of their size, and ISTC is an appropriate administrative vehicle. Many of those who would recommend ISTC, would do so with caveats however. A lack of responsiveness and delays in facilitating the start of projects were mentioned repeatedly as drawbacks.

13. What can be done to improve future agreements at ISTC? Four companies identified improvements in responsiveness and communication. Three companies said improvements in some aspect of IP would be helpful. Three companies hope for reductions in time delays, and improved technical translations by ISTC. Other hoped for improvements related to: customs facilitation, better search process, improved contracting process, assistance with government concurrence process, training in quality assurance for partners, and enhanced monitoring of projects by ISTC.

14. Respondents also were asked what could be done to improve future agreements at the Institutes, in working with organizations within Russia, and for innovative suggestions. Few companies responded to these three items and no patterns emerged.

15. What financial changes, if any, should be made in the current partner agreements? About half of the companies responding to this question considered ISTC's policy of requiring full funding for projects within 10 days of the project start date to be a negative. A majority of those companies had negotiated different payment conditions, and one other company said it only entered into one-year projects because of

the policy. Several companies felt there should be funding subsidies on partner projects. The administrative fee imposed by ISTC was considered reasonable by all but one of the companies that mentioned it.

16. How do you see the future role of the ISTC? General satisfaction with ISTC was noted by half of the companies which responded to this question. About the same number of companies felt ISTC should become more responsive and more efficient or had specific discrete issues for ISTC to address.

17. What would increase ISTC's value to your company? There were 9 responses with no real pattern.

18. Does your company perform similar projects in Russia or the CIS with other such organizations? Of the 17 companies responding, 8 said they do work with other organizations. Eight said they work only with ISTC, and one didn't know. A number of the companies also included comments about directly funding research in Russia, with no pattern for those. .

Several respondents provided comparisons between ISTC and CRDF. One said ISTC had a lower fee structure and processed new projects quicker. Another respondent said CRDF required less red tape, provided matching funds, and was easier to work with because of time zone differences in communicating with ISTC. Another respondent said CRDF is better at shipping equipment than ISTC. A fourth respondent said his company prefers CRDF at the moment because they provide a higher level of service, although they have a different IP policy.

21. Other Comments: A final section provides additional specific comments from respondents. They illustrate the diversity of opinions about ISTC and cannot be easily summarized. Please see the comments, if interested in further detail.

Detailed Responses From Funding Partners (Non-Governmental)

A. FACTS AND BASIC INFORMATION

How many agreements have you (your company) been involved with?

AAA	One currently. Have overseen 3-4 ISTC projects.
BBB	The company has funded research in Russia for about 10-12 years. The first ISTC project began in 2000 at the Institute (name). That project did what they expected but didn't uncover anything to justify a second phase. The project cost AP about $50k. Never had any face to face with the researchers.
CCC	Three agreements; each of the projects was around $50,000.
DDD	This is one of the company's projects. The company has a number of others which are underway in the NIS. This project involves testing for possible use in a family of new products for the company. It involved substantial shipping of materials across borders, and involvement with Russian customs officials.
EEE	This is one of the company's projects. The respondent, a bench scientist, has known the PM for more than a decade, and this represents work that originally began in 1991. Since 1991 the respondent has made 8 or 9 visits to institute, usually for two weeks each.
FFF	One.
GGG	Two.
HHH	Many as a collaborating company. Only one as a funding partner.
III	The company initiated one project last calendar year and hope that its second partner project will begin later this year.
JJJ	Two
KKK	One
LLL	Two, one completed and one just beginning.
MMM	One.
NNN	Seven
OOO	One
PPP	Five.
QQQ	One
RRR	Three
SSS	One.
TTT	Two currently with another about to start.
UUU	8 in total.

Time period(s) approximately:

AAA	Several years.
BBB	Two new agreements are just getting underway. If the one project turns out as planned, the company will have a new more reliable product to replace the one they currently sell. Each of the new projects will cost the company about $40,000-$60,000.
CCC	All three were completed in 2001. Each was one to two years in duration.
DDD	Project was first considered for funding in 1997. For a variety of reasons, including delays in securing approval of third-party financial involvement in this partner project, the project was delayed nearly three years. It began in March 2000 and was expected to conclude in March 2001. A three-month no-cost extension was approved to June 2001. There is still approximately $10,000 (of the $100,000) remaining in the budget which the company would like Institute to utilize for wrap-up activities. Since June 2001, there has been no formal answer from ISTC whether this can be done.
EEE	This project involves a new process technology (equipment) which the company hopes will lead to new materials, which in turn will enable them to produce new products for sale.
FFF	September 1998 to September 1999. The project provided more than $300,000 in funding to the Institute(s).
GGG	The company has been active since 1995.
HHH	The company has been working in the RF for more than a decade and has a rather large group of staff in Moscow. It took nearly two years to implement the partner project.
III	First project began last calendar year.
JJJ	The first project occurred from 1998 to 2000 (approximately). The second took place from summer 2001 through summer 2002 (approximately).
KKK	Started in early 2001.
LLL	June 1999 through the present.
MMM	Since mid-2001.
NNN	1999 to current
OOO	Project will start soon and last approximately two years.
PPP	Between 1998 and 2002.
QQQ	August 2000 – August 2001
RRR	Between 1998 and now, depending on the project.
SSS	Between 1999 and 2001
TTT	Since November 2000.
UUU	1998 to1998.

How did the agreement(s) begin?

AAA	The company takes a very pragmatic approach to their projects. They fund "test projects" with the institutes and researchers directly at first to determine dependability, performance, and overall feasibility. Then company proceeds to fund a second project through ISTC or CRDF with the same institutes and researchers. They also tend to fund initial projects which are low risk and in which they already know what the results are likely to be. All the projects are small, i.e. less than $100,000 per year.
BBB	All three projects came about because the company's senior executives decided several years ago they were not taking full advantage of the research talent in the RF. The respondent's predecessor provided him some information about ISTC and USIC. The respondent investigated both and decided to pursue the ISTC. (This company does a lot of government contract work but didn't think they needed any US funding or involvement of federal laboratories which would have been important for using USIC.)
CCC	These were different types of projects focused on quite different issues, e.g. improving the business environment in RF, particularly with regard to customs improvements. The company also coordinates a group interested in conversion issues and focused regional development.
DDD	The Institute, with which the company worked, has been a leader in this sub-field for more than two decades. The company was aware of their work and they pursued the opportunity through ISTC primarily for two reasons: (1) a financial contribution from DOS; (2) promise by ISTC in facilitation with the shipping issues which were anticipated to be a major concern throughout the project.
EEE	The company paid about $60,000 for 2 years of work on redesigning the equipment which was under development prior to their involvement. Because the PM and his team wanted the project to go through ISTC for financial reasons, the respondent believes the beginning date was postponed by nearly a year; consequently, the respondent said a two-year scope of work ended up taking three years.
FFF	They received a proposal from the PM, and based on a recommendation by the Consortium's law firm, they eventually decided that ISTC was the only mechanism they should use to fund research in the CIS. They felt there were too many unanswered questions and potential problems in their funding research directly (transfer of funds, are the people doing the research actually receiving the funds, how can the details of project activities be overseen etc.) The project itself was considered very promising, and two members of the company spent three weeks in Russia in fall 1997 performing due diligence.
GGG	Using the ISTC offers the company four advantages: • Mechanism for financing R&D • Government shares the risk, which is attractive to them • Tax efficiency (low taxes) • Money security (company's resources go directly to the researchers)
HHH	Because of its extensive experience as a collaborating company, it has been familiar with ISTC's programs and as an organizational mechanism. The large number of company staff in Moscow work primarily with another division. Besides directly employing a sizeable number of Russian engineers, that group does extensive contracting with Russian entities. However, most of the work is production oriented, while the activities through ISTC are more basic science.
III	The company concluded that ISTC would be a good mediator between CIS institutes and their operations.
JJJ	We visited Russian Institutes to determine if research partnership would prove beneficial.
KKK	The company was introduced to ISTC through a staff person. The company has been seeking to: (1) gain access to superior basic science technology of Russia (2) expand its technology network in Russia
LLL	The company was approached by the research team at the research institute. They offered their special technological experience.
MMM	Our partner research institute suggested channeling the contract and payment via ISTC.

NNN	Projects were identified at several workshops in Russia. The company needed an administrative organization in Russia to pay researchers directly rather than pay institutes.
OOO	A combination of previous collaboration and the need for fundamental research in this field. The partner institute has developed some techniques that might be applicable for our needs.
PPP	Direct knowledge of Russian laboratories' capabilities and the fact Russian capabilities, which are not available in (country-region), could be accessed. To promote some (country-region) projects and to solve some technological problems.
QQQ	Previous direct contacts with Russian laboratories and through fellowship schemes through which Russian researchers join (company) labs. Also the (country-region) has been interested in military technologies at the (name of institute).
RRR	The company has had an interest in obtaining results from the Russian technology.
SSS	We were looking for a partner who has a Russian technology in our field. As a result of our investigation, (name of institute) was found.
TTT	A client of the company suggested that we conduct the research and do it through ISTC.
UUU	Our initiative to encourage greater intergovernmental interest in this topic.

B. OUTCOMES

What is/was/were the goal or expected outcomes of the ISTC agreement(s)? (Check all that apply)

14	Basic Research
10	Interest in Russian Technology generally
6	Cost Savings
6	Process improvements
6	Product improvements
11	New products/processes
	Unknown
2	Other (specify, e.g. Corporate decision (1), (non-proliferation (1)
1	Non-economic reasons

If appropriate, please answer the following questions.

What is the anticipated magnitude of cost savings and other economic and non-economic benefits from these technological improvements?

AAA	Cost Avoidance (On at least one project, the results turned out not to be as promising as they had hoped, although the results will keep them from spending larger sums to develop a new product, so they felt the project was helpful in that regard.)
DDD	Unknown.
HHH	Yes. Very difficult to estimate because the results may not implemented, if they work out as hoped, for at least 5 years, and possibly, 10.
KKK	Outsourcing the development of basic science and technology in Russia
	at reasonable costs will produce cost savings.
LLL	The company cannot provide an estimate as it is a high risk research project that may lead to a new technology, which in turn, would enable better quality in a class of products.
MMM	Totally new product and process. If it works this will be beneficial for a range of new products.
NNN	So far very disappointing, claims were over the top. At least 5 out of 7 projects never generated any cash at all. Technology is the main focus. Potential savings – if successful – might be of the order of 10 of millions of dollars/euros.
OOO	Hard to assess. If there is successful completion of this speculative project, the cost savings might be $100,000 per annum.
PPP	It is difficult to evaluate the real cost savings, but technological progress is expected in materials technology and in basic science.
QQQ	The project goal was the reduction of the time required to achieve the technological objectives and the availability of a proven technology. The cost of the experimental equipment for which the Russian expertise was required was approximately 4 million; even though it is difficult to make an accurate estimate, the cost saving was of the order of magnitude of 1 million.
RRR	Given the typology of the projects involved (mostly basic research) and of (name of company), cost savings are not one of the main objectives of the activities. A quantification of the impact of the achieved (or to be achieved) results is very difficult.
TTT	Distribution and sales would be worked out with the client that is most interested in the research results.
UUU	Cost-savings and other economic benefits were unlikely.

Is there any possibility of the agreement eventually leading to intellectual property (patents) and commercialization of a new product?

Yes	8
No	7

If yes, what is the anticipated magnitude of sales?

AAA	Company thinks the ISTC IP policy for basic research is fine. However, for any company work involving experimentation or potential proprietary products, they fund the project(s) directly.
BBB	Unspecified
DDD	The IP situation was resolved very quickly and to the company's satisfaction because they received approval to proceed by a (name of Russian ministry). The IP was worked out in 1998-1999.
EEE	The IP situation is murky because of a host of issues, involving a possible theft of IP by individuals at a US federal lab, filing of mass patents by an Italian company years ago, and the company's desire to patent the new materials rather than the equipment.
FFF	The company does not believe there will be IP in the future. At the time, they had no concerns about the IP structure, based on an evaluation from their legal staff.
HHH	Yes, the IP issue is of concern for several reasons: (1) difficulty of estimating magnitude of sales in the future; (2) corporate policy is different that ISTC royalty regulation of 10-15%; (3) three-way negotiation process (ISTC, researchers, company) was complicated; (4) company has some concern about confidentiality of IP because of review by Parties; (5) unspecified reasons, probably related to company perspective on fairness of IP.
JJJ	There would be basic patents on new materials and their applications.
LLL	Yes, IPR could come out of this development. Could be up to $30,000 per year.
MMM	The company will own IP rights. Exclusive arrangement.
NNN	For 6 out of 7 the answer is NO; one of them had IP potential, but Russian partners had already published and because of that, they ruined their patent potential. Still, 1 project which might have some IP potential, but it is too early to tell.
OOO	No, not directly. Better understanding will benefit modeling expertise used in support of sales in this field.
PPP	Too early to be defined.
QQQ	The company's attempt to put together a Russian group able to sell an integrated technology has failed. This was basically due to two concurrent reasons: the propensity of partners in industrialized countries to look for the expertise from individual researchers rather than to enhance the formation of project groups, and the lack of autonomy of individual researchers within (name of institute), who lack entrepreneurial skills and whose management imposes a heavy centralization.
RRR	IP is not relevant in this field as it is not envisaged to sell any products.
UUU	The agreements would not likely lead to IP and commercialization.

C. PARTNER METRICS

For Completed Projects: What is your view about what was accomplished?

AAA	They utilize the Institutes for considerable theoretical work and for modeling primarily. There is some work supported also involving experimentation. They are satisfied.
BBB	Results were fine but no reason to continue work.
CCC	Very Satisfied with two of the projects. Somewhat satisfied with the third project. The difference in satisfaction was attributed primarily to the differences in the outlooks and perspectives of the institutes, rather than to the individual research teams. Two of the three institutes were viewed as more forward-looking and entrepreneurial.
DDD	Technical results from the Institute met their expectations. • The company was and is extremely dissatisfied with ISTC performance throughout the project period, up to this time. ISTC did not fulfill their promise to help with shipping and customs. Eventually, the materials were moved through other means. • The company said the monumental delays in getting the project underway, has significantly reduced the importance of the research to them. They are unsure but believe the window of opportunity may have closed for them. • Also, the company was very frustrated by the lack of responsiveness of ISTC staff. "Between our PM and us, we'd write 5 or 6 letters and maybe get one response months later. It was very very frustrating. They have to become much more responsive as that won't work for industry or even for many universities." • The company also disliked the "caste system" which appears to operate at ISTC. "Our Russian PM couldn't see certain people but if I tried, I could, just because I'm with a non-Russian company."
FFF	The one project proceeded as planned but there was no need to go to a second phase. The company eventually concluded that the approach was not a "candidate technology" which should be pursued.
GGG	Outstanding.
HHH	None completed.
JJJ	The research confirmed the hypothesis about the stability and structure of the materials.
LLL	Considerable attention had to be given by the company to: project management; establishment of workplan; adherence to milestones. Also, the language problems complicated the project. Despite these drawbacks, the project goals have been fully reached, all milestones have been fulfilled. Satisfied with scientific content.
NNN	Some interesting insights into the Russian way of research.
PPP	Different views for the different laboratories! Good for (name of institute) (a former closed city where there is a culture of productivity, even though delays in delivering the results is a structural problem) and (name of institute); less positive for (name of institute).
QQQ	The cooperation has been successful. However, much more could have been done.
RRR	The completed Project has given good results in the expected time, mainly due to the efficiency demonstrated by the participating Russian Institution and the Project Manager.
SSS	We are satisfied with our partner's achievement.
UUU	Projects were excellent and attracted follow-on projects.

For Active Projects: How has the project been progressing?

BBB	Just getting underway.
GGG	Fine, no complaints.
HHH	Not much activity yet as it has taken two years to initiate. Process was delayed by several months because of scheduling problems due to September 11 events.
KKK	Satisfactory progress on the existing project. The second will start soon.
LLL	No results yet.
MMM	Since start-up, good progress has been made. But the company must constantly monitor progress, put pressure on researchers to meet agreed deadlines. There seems to be bureaucratic elements in the system, which cause slowdown (military?)
NNN	Slow. Three projects continuing.
OOO	It has taken almost as long as the intended project to sort out paperwork—the bureaucracy is excessive.
PPP	Four projects are good while one is not progressing as well.
RRR	The two projects started with a delay (both in the procedure of signing the contract and in scientific and experimental activities) and are currently under way. They involve experimental activities to be carried out with large facilities in Russia.
TTT	They didn't make as much progress as we had hoped because of technological limits that everyone seems to be encountering. However, they've made sufficient progress that we are likely to extend the research for another year.

What have been the best results of the experience?

BBB	Nothing unexpected.
CCC	Nothing unexpected.
FFF	It went as planned. Nothing unexpected.
HHH	The matching assistance provided by ISTC has been very valuable. ISTC enables nearly all of the company's resources to be used for direct support of scientific work, rather than having a substantial chunk of the resources siphoned off for indirect expenses and institutes' activities.
JJJ	We now understand the level and activities of Russian Institutes in this field.
KKK	Not yet.
LLL	Expected material properties have been found on some samples.
NNN	Couple of very unexpected surprises.
QQQ	Some technical suggestions have been found very useful.
RRR	The possibility to benefit from a close collaboration with Russian scientists who have a remarkable experience in the field. No unexpected results.
SSS	To construct the Russian (name of technology) system.
TTT	Progress with the research, and our client seems satisfied.
UUU	Breakthrough research findings.

What have been the disappointing results of the experience?

DDD	"It was a bottomless pit, dealing with them. And I never could understand why my project was assigned to the (name of DED), when I am with a company from (country-region). The DED had no interest in this project."
FFF	The company felt the productivity of Russian researchers was quite low or that they ended up paying for individuals who did not work on the project—they were told 22 scientists and technicians were being supported, while the respondent said the project output was similar to other projects they funded which had only 4 or 5 scientists.
GGG	Speed toward completion occasionally has been a problem. Slow at ISTC, but also slow due on the country-region side.
HHH	IP negotiations have proven more complicated and less satisfactory than anticipated.
JJJ	It takes a long time to start a new project.
KKK	Slow responses.
LLL	Problems came up due to raw material provided by Russian suppliers, quality assurance missing on supplier side.
MMM	Too early in the project to draw conclusions.
NNN	Problems with changing contract texts. For unknown reasons, ISTC was unable to send consistent documents as versions were mixed etc.
QQQ	Some technical difficulties, which required expensive modifications to the circuit after its implementation in (country-region), could have been avoided through a better communication during the review of the project. This is the responsibility of the actors (company and institute) but also ISTC, which could have assured better coordination.
RRR	The insufficient role played by ISTC in monitoring the performance of the activities, especially the scheduled time. This is the main reason why the success of a project seems to depend too much on the internal efficiency of the Russian Participating Institution. If the activities are not carried out by the designated scientists mentioned in the contract, but by other scientists in the Russian Institution; this change should be agreed upon and notification should be made to the financing institution and to ISTC.
SSS	No special problems.
UUU	Exaggerated expectations as to commercial value.

Do you anticipate entering into additional agreements with ISTC?

Yes	10
No	6
Unsure	4

If yes, why? If NOT, why not?

AAA	The company will have new projects through ISTC, new ones through CRDF, and directly funded projects using the company's Moscow office.
BBB	Probably
CCC	The challenge for this company is the legal status of ISTC. It is NOT on the list of international non-profit organizations which caused problems with the first set of grants and is preventing the next round of grants from going through ISTC. Instead, the company is now attempting to utilize the CRDF, which does have status as a non-profit internationally. For the first round of grants, the company obtained resources from an organization that knew ISTC was not legally a non-profit, but the company's legal and financial advisors, despite serious concerns, allowed the funds to be transferred to ISTC. The company's advisors have advised against using ISTC in the future, unless they obtain the international non-profit status.
DDD	No new projects will be going through ISTC. The company is now working with CRDF on several projects and anticipates as many as seven projects will be funneled through CRDF in the short-term.
EEE	Unsure. In retrospect, the project required a lot of effort for little research activity.
FFF	No. The company is no longer funding any research. The company had very high hopes and expectations for Russian research and concluded that there was/is extraordinary science occurring on a limited basis only, as is the case in country-region. Respondent feels the large majority of researchers and the science being conducted in their field in Russian is of medium quality, as it is in the country-region.
GGG	The company is likely to conduct projects through more private direct contacts with Russian companies, instead of with ISTC, as confidence in the Russian commercial sector improves. Their contacts with individual researchers, private companies, and institutes in Russia are increasing, over time. As their confidence grows, so will the number of, and size of contracts that they execute directly with researchers, private companies, and institutes in Russia.
HHH	Yes, the company is likely to go ahead with future projects, though at reduced funding levels, if IP issues cannot be resolved to their satisfaction.
KKK	One of the best sources for outstanding basic science and technology development.
LLL	Follow-up program with better specified raw material, aiming for reproducible material quality
MMM	If this project is successful, others will follow.
NNN	For new projects, ISTC is probably too slow, and we have better alternatives which give me a better feeling with respect to obtaining government concurrence. ISTC is weak in generating government concurrence and compares unfavorably with CRDF and other schemes. It is also important for the company that government concurrence is obtained in a legal and auditable way. Government concurrence obtained by institutes in "illegal" ways is not in line with our business principles and can later cause damage for the institute and the company.
OOO	Possibly because of Russian expertise in this field.
PPP	One project will be extended. On another project, there has been an unsatisfactory exchange of information and weak capability of project management.
QQQ	The expertise at the institute is high level and useful.

RRR	Because it is the simplest way to arrange agreements with a large budget. This is due to our company's administrative regulations whereby large projects should have an institutional framework like ISTC. For projects of a smaller size, contracts can be placed directly to individual persons or research centers without the involvement of institutions such as ISTC.
TTT	After the new one, that will give us three. Beyond that, we are unsure if there will be others.
UUU	We anticipate the (name of company) will help with on-site monitoring and procurement capability.

Would you recommend to a business associate that he explore a new agreement through ISTC? If yes, why? If NOT, why not?

AAA	Yes. The primary criteria for determining if projects go through ISTC or CRDF are (1) Speed—CRDF is faster in general and has fewer approvals, including the 45 day country approval for partner projects; (2) Size of budget—ISTC is cheaper on overhead—5% vs. 7-9% for CRDF depending on the size of the project.
BBB	Yes, with the following caveats: Responsiveness of ISTC could be improved significantly. The company would like to have results from a matchmaking request within 2 weeks but that doesn't happen. (He gave them approximately 20 requests to investigate and they filtered back responses.) (He thought the Technologies DB CD was probably out of date and thought the better route was to have ISTC do the matchmaking rather than his staff.) The speed of processing agreements is unlikely to meet industry standards because of HGC and 50 day negative concurrence periods.
CCC	Yes.
DDD	No. Lack of responsiveness. The respondent believes that staff from other countries who begin working at ISTC become "Russified" and take on the negative habits of the culture. Also the change in funding for Partner Projects (no Party $$) means that the company's decentralized R&D units would need to pay the full cost of new projects. Because of the way the company is organized into numerous small divisions, which is atypical of many similar-sized companies, small divisions are less able to fund projects because they are much higher risk.
EEE	The question is moot at this time because of the severe R&D cutbacks within the company. Also, the respondent felt this was a rather unique situation because of his familiarity with the PM.
FFF	Yes, there is no alternative from their perspective, as direct funding does not make sense for a small company. ISTC was generally excellent with the exception noted below.
GGG	Yes, because it is a good program for companies to access Russia expertise.
HHH	Depends on the company's needs and if the expertise exists within the Institutes.
JJJ	Yes. They could obtain sophisticated research and a novel approach in their field.
KKK	Yes, because it allows access to outstanding researchers in basic science.
LLL	Yes, for financial (tax) reasons ISTC is recommended, but contracts are complicated, decision process on contracts is slow. There is clearly additional potential for collaboration with (company name) in other domains.
MMM	ISTC was involved upon recommendation by company's purchasing department, exclusively to deal with paperwork and payments.
NNN	No, the way in which government concurrence is obtained by a partner (Russian universities) is not auditable by our internal standards. That process may be OK for projects proposed by ISTC, but so far we have no experience with them. All the company's projects were partner-initiated.

OOO	I would suggest it as an option—it is an efficient (albeit slow) way of funding.
QQQ	Yes, but with a recommendation: the improvement of the quality system in drafting the documentation and in the performance of experimental trials; the improvement of the communication system.
RRR	Yes, but great attention should be paid to the selection of the Russian Participating Institution. The success of the agreement is very much linked to the quality of the Participating Institution, which is basically beyond the control of ISTC.
SSS	There are many superior researchers in Russia.
TTT	We have had a pleasant experience and would recommend others use ISTC as long as they realize it takes a while to process everything.
UUU	Yes, to prevent financial losses.

What can be done to improve future agreements from your perspective?

A. At ISTC

AAA	The company's Moscow office provided the following information regarding administrative procedures--There is room to improve in timeliness. The company considers the ISTC staff somewhat passive in waiting for feedback from the US, EU, and Japan rather than being more aggressive in seeking responses. While company staff believe ISTC staff work fast, the lags in the system are real, and ISTC should be "less shy" about seeking to move projects forward. Also, ISTC assistance with Russian customs clearance could be improved. ISTC, in short, should try to do more to overcome the Russian culture and Russian bureaucracy which impede more efficient processing, according to the Moscow office staff. ISTC SPMs are considered to be very hard working, and (company name) said they could not hope for more in dealing with the ISTC.
DDD	Lack of responsiveness is a "deal killer." Also he still does not know whom he should contact to resolve the issue about the $10,000 as he's already talked to a new DED and someone who he knows in finance, but the problem still remains.
FFF	The company felt there was/is a need to improve the technical translations from Russian to English. The company was quite dissatisfied with written communications in general and with the translation of some technical materials specifically. They attributed that to growing pains in working with partners, as the Partner Program was just beginning.
GGG	IP is the biggest problem. Even a small amount of funding entitles the holder to IP, and this affects the wording and reporting, since there is then incentive to hide IP. From the company's point of view, delivery of a device or other equipment as a deliverable is always preferable to simply a report in which IP is cited.
HHH	The IP structure may prove to be a continuing problem. Company has begun looking into the IP language in the ISTC agreement.
JJJ	Involve Russia's academic societies.
KKK	Faster response and communication; More access to available technology and scientists (better search process);
LLL	Make contracting easier, clarify IPR issues, speed up decision process on contracts (decision on changes in text, decision in ISTC or (country-region) institutions on project proposals).
MMM	No insight
NNN	ISTC should arrange government concurrence rather than the institutes. There needs to be better workflow within ISTC so that there are no problems with contract versions. Maybe ISTC people are not adequately involved with the content of the contracts. Administrative organization is sloppy, address database mix-up, contract version etc.

OOO	Much faster procedure for setting up contract.
QQQ	Recommend imposing a Quality Guarantee (quality control) on the participating Russian Institutes. Nowadays, with ISO and other quality systems it is unacceptable to have serious collaborations, both in market and in technological transactions, without quality assurance. ISTC could help introduce the quality culture in the Russian scientific system. Select projects which have market prospects after the research activity financed through the party agreement is over. My experience has beeen that Institutes are keen in providing their technological capabilities to answer specific questions (basically recycling their stuff), but they are ill equipped to answer complex market problems (because of lack of integration of competencies and entrepreneurship). ISTC initiatives in training of researchers in the field of management look good, and should be pursued.
RRR	Pushing ISTC to pay more attention to the monitoring of the activity, not only in preparing the formal agreement and in bank-like activities (transfer of money from the Partner to the Russian Institution); Continuing to play the very relevant role of promoting the access of Partners to the institutions supervised by Minatom.
TTT	Don't believe anything needs to be changed.
UUU	Reduce processing time.

What can be done to improve future agreements from your perspective?
B. At the institutes

LLL	Relieve them from extensive negotiations with Russian ministries, teach them how to plan a project, present their work, improve their English for negotiations. The institutes must still gain credibility in executing the details of what has been agreed. Management structure of the institutes (bureaucracy) is a complicating factor.
MMM	No insight
NNN	More transparent organization would be nice. Organization charts. Role of institute management.
QQQ	More autonomy: the research group should have the possibility of developing and exerting their own managerial functions with autonomy. Sometimes agreements are negotiated with high-ranking people who have scant technological knowledge, whose vested interests do not coincide with those of the researcher in charge of the performance of the project.
UUU	Improve procedures for obtaining Russian government concurrence.

What can be done to improve future agreements from your perspective?
C. In working with organizations within Russia

LLL	Stop the complicated method of invitation /visa application. Visas should be given for project duration.
MMM	Eliminate red tape.
OOO	Much faster procedure for contracting.

What can be done to improve future agreements from your perspective?

D. Any innovative suggestions for improvements and changes?

LLL	ISTC should play a pro-active role in "managing" the ministries involved. ISTC should gain further credibility.
MMM	There are too many bureaucrats involved, also at the institute level. However, ISTC ensures reliable money flows.
NNN	Guidelines for payment schedules.
UUU	Don't push the commercialization envelope too far lest it look like money laundering for commercial deals.

D. FINANCIAL & OTHER CONSIDERATIONS

What financial changes, if any, in the current structure of agreements would you recommend?

AAA	Because of the requirement that projects be fully funded within 10 days of their start, the company creates only one-year, rather than multi-year, projects.
BBB	The company believes strongly that the current procedure of partners paying full project amount within 10 days of the beginning of the project is unwarranted. He suggests that half be paid at the beginning and half in a second installment, which would enable corporate R&D budgets to support the project from TWO fiscal years, rather than one. That spreads the risk and could result in more projects being funded. He said ISTC resisted that because it would require additional work internally by its accounting staff, an argument he didn't see as very strong.
EEE	It is almost imperative for future company projects that some other organization provide research funds. Otherwise the research will not be approved within the company because of the budget situation for R&D.
FFF	Company believes the requirement of partners paying full project amount within 10 days of the beginning of the project is unwarranted and would have prevented them from funding the project they did. In fact, the company felt it needed leverage, as it did with all its outside funded projects, and paid half up front and half upon receipt of the final report.
GGG	None
HHH	(1) Company has negotiated payments based on milestones for this multi-year partner agreement. (2) Company thought financial contribution from Parties should be considered for Partner projects.
KKK	Some kind of funding for small and medium-sized company partners (for the future).
LLL	The idea of paying for the whole project at the beginning is impractical. Payment in advance for instance, for a two-year period does not seem to be a practical stance on behalf of ISTC. Find a better way of providing money on a 3-month basis.
MMM	Project is carried out in phases, with every 3-4 months a next phase. Payment is made after successful completion of previous phase.
NNN	ISTC overhead on contracts are in line with rates of other organizations—no changes are needed.
PPP	ISTC charges too much (10%) for the services they provide. From the point of view of (company name), however, ISTC agreements allow us to avoid paying taxes which amount to 20-30%. In this sense ISTC makes the collaboration cheaper.
TTT	Nothing needs to be changed at ISTC. They seem to be saddled and hand-cuffed by circumstances beyond their control.
UUU	Okay as is.

What other changes, if any, in the current structure of agreements would you recommend?

AAA	None
BBB	Believes any company which anticipates multiple awards should develop a Project Agreement template or form which fits their needs at the outset rather than taking the ISTC agreement. IPR has to fit the corporate policy and any other special needs of the Partners, and ISTC should be flexible in adapting to requirements of Partners.
HHH	IP.
KKK	None at this time.
LLL	Administrative charge at ISTC seems reasonable.
NNN	We always make our own contracts. Sometimes ISTC employees are not neutral (they are biased against the company), which is cause for concern.
PPP	Too long and too heavy procedure!
UUU	Okay as is.

E. CONCLUDING COMMENTS

How do you see the future role of the ISTC?

BBB	"ISTC is positioned for tremendous growth **if** it could become more customer-friendly and responsive to industry."
EEE	Respondent said the PM has asked him several times for assistance in setting up some type of legal entity outside of the institute. Respondent does not feel capable of providing such advice and suggested PM contact ISTC staff. The respondent said he doesn't know if that has happened. Respondent doesn't feel the PM is ready to create his own company or seek financing but is in a transition zone between proof-of-concept and business—in a pre-business stage where ISTC should be providing help.
FFF	The company was satisfied with ISTC. (The respondent called them "excellent" at one point and at another point, said he didn't think they knew of the time pressure that some partners face in conducting projects and showing results.) He was both positive and slightly critical about ISTC in a second proposal which the company nearly funded. In that case, the proposed research was eventually identified as being beyond the capabilities of the PM and the Institute, and it was concluded the prospective PM had misrepresented the Institute's capabilities to perform the research. The ISTC was praised for their role in preventing a potentially embarrassing and disastrous project. He was unsure why it took so long for this misrepresentation to be determined, however.
GGG	The company wants ISTC to stay the same. Its role in funding scientists continues to be needed. And the company likes the government sharing the risk on high-risk projects.
HHH	ISTC complements the company's other current activities in the RF. It provides access to research scientists that the company has not accessed regularly heretofore. Also it provides a mechanism for most of their research resources to be devoted to scientists conducting the work, rather than paying overhead and institute expenses.
JJJ	The future of ISTC is important to our company. When we try to collaborate with Russian Institutes directly, there are a lot of problems. Those problems will not be solved in the immediate future.
NNN	If ISTC will not facilitate the process to obtain government concurrence in Russia for projects, then I guess that their role for our projects will come to an end for pure research projects.
OOO	I suggest ISTC review the protracted delays on this project and see what they might do to speed up things in the future.

PPP	Overall, ISTC should become more efficient. In particular it should: 1. monitor the programs on the basis of appropriate information about the activities to be performed, 2. become an infrastructure which really links up the two partners, 3. make sure that results are delivered in due time, avoiding undue delays.
RRR	ISTC should play a key role in monitoring scientific activities and in evaluating the results both in terms of quality and, in particular, in the ability of meeting the deadlines (often time is not considered a key dimension in Russian scientific institutions, and delays in delivering the results are quite possible). Let me put a proposal forward: the fee which is currently paid to ISTC for legal and administrative support (10%) could be raised (to, say, 15-20%) and used to provide additional coordinating and management services. These services could help bridge various gaps between partners due to the physical distance, cultural differences, linguistic problems, etc.
SSS	To arrange for projects between (country-region) and not only Russia but also other east European countries.
TTT	It is fine as is and does not need any changes.

What would increase its (ISTC) value for your company?

CCC	If the ISTC obtained international non-profit status, it would make this company's life easier and ISTC may be able to obtain funding from foundations to support commercialization/partner pilot projects, according to the respondent.
EEE	Respondent said he is looking into government sources of funding which could be used as leverage for company funds.
III	The paperwork required for a partner project requires a lot of time and effort to prepare. That should be improved. Also, the ISTC should provide more assistance to the Institutes so they can submit more quickly their requests for Russian government concurrence.
KKK	Better access to excellent basic science and technology in Russia Better match between corporate partner and research institute(s) Better communication among corporate partner, ISTC, and research institute(s) Provide financial support to really needed science and technology rather than merely supporting all scientists
LL	See above. Russia should realize it is part of a global competition and collaboration will be judged on benchmarked performance, e.g. with Chinese institutes. The ISTC assistance in finding partners and obtaining a realistic tax status for projects should be extended towards production-related contracts. This should not be limited to basic research.
QQQ	Enhancement of the quality guarantee culture in Russian Institutes. Improvement of the support for communication between partners. Make sure that the research groups, who are viable on a technological and commercial basis, are supported without the mediation of their bureaucracies.
SSS	Same as above.
TTT	Nothing needed as the ISTC staff has been easy to deal with.
UUU	More valuable for public sector rather than private sector organizations

Does your company perform similar projects in Russia or the CIS with other such organizations?

Yes	8
No	8
Unsure	1

If yes, how does ISTC compare with these other organizations?

AAA	The company has some experience with the STCU. There, the problem has been procurement, a problem they have regularly on R&D contracts in the (country-region). Procurement people want to use competitive bid for securing materials, equipment, and items but R&D projects usually require specialized equipment and specifications which are not understood by purchasing people. The STCU procurement process has delayed work there, while the ISTC projects generally have not dealt with procurement issues.
BBB	The company says there are three ways of conducting research: (1) thru ISTC; (2) Directly with institutes; (3) Directly with researchers. The new full-time person the company has hired is a reflection of the potential they see in the institutes for valuable research. The new person will be more responsive than ISTC could ever be (respondent's term), he will be much more knowledgeable about corporate needs (he will be spending two weeks this fall with the company's researchers to learn more about their needs and priorities) and then searching institutes for possible projects. The company still intends to use ISTC when the ideas for projects come from them. It is unclear whether they will use ISTC as a strictly administrative vehicle in the future.
CCC	The respondent said ISTC provides two key advantages over CRDF: 1) Lower administrative fee (9% at CRDF and 5% at ISTC, which was waived for them for some unknown reason); 2)Administratively less complicated. (It required about 6 months to start projects through ISTC while it is nearly a year with CRDF, according to this respondent.) The company does not consider directly funding work at the Institutes as a viable option because they estimate there would be heavy taxes, on the order of 30-50% of the total budgets.
DDD	CRDF offers the company a faster process, less red tape (they're going through the process with two projects now), and some matching funds. Also CRDF staff are in the US, which allows easier interaction. (The 9 hour time difference has proven a real problem because staffing cutbacks in R&D at the company means that the company person now has very limited time to devote to the dozen or so tech transfer projects on-going in the NIS.) This respondent also had sponsored two projects in the Ukraine through the STCU and found the staff there more responsive than at ISTC. He found, however, that the "caste system" existed there too--Ukrainian scientists were not accorded the level of interaction as he was because of being with a partner company.
EEE	No personal experience with the other organizations.
GGG	CRDF is better than ISTC in shipping equipment to the U.S.; ISTC is cumbersome.
HHH	Other parts of the company probably do but this division does not.
III	The company also funds projects directly with institutes. That decision was made because of their desire to shorten the time needed to implement a contract for supporting a research project.
KKK	We have projects in Russia, Ukraine, Belarus, etc. Since these relationships are based on direct contact, the level of satisfaction is higher than with ISTC projects.
MMM	The company has many more projects.
NNN	Yes, CRDF. Prefer CRDF at the moment because of their higher level of service, but CRDF has different IP policy and arrangements.
OOO	No.

OTHER COMMENTS

(Note that this material is a combination of comments prepared by researchers after the interviews and direct quotations from respondents' written survey responses. The latter are identified by quotations.)

AAA	This company does not appear to place a great deal of emphasis on the research prospects in Russia and the CIS, with a total of fewer than 10 current projects through the ISTC and CRDF combined. Their approach is low-risk and pragmatic, in selecting the institutes and research projects, and in their expectations of potential payoffs. They also have determined that doing business in Russian and CIS involves conditions which they and international organizations can do little to change at this time. Therefore, they do not conduct any R&D there in which speed is a high priority, or one would suspect, in which they are truly worried about proprietary information being shared.
BBB	This company believes the economics of conducting research in Russia are compelling -- instead of $175,000/yr. for a fully loaded researcher (Ph.D. with technician, so .5 full-time equivalent of each), it is $8,000-10,000/yr. in Russia. The issues are whether (1) quality is the same, and (2) if the poor business conditions in Russia are covered by this difference in costs. So far, they've concluded it is advantageous. In fact, they are stepping up their investment through hiring of a full-time, former scientist and deputy institute director, as their representative for institute projects. In the future, the company anticipates funding directly with institutes and funding through ISTC when that is advantageous.
CCC	This respondent's opinion is that ISTC could obtain funds from several foundations if ISTC were to secure international non-profit status. This company was told that ISTC looked into the non-profit status but was told there was some concern within the Secretariat that a non-profit status would interfere with partner projects and commercialization. The company was told that the non-profit international possibility was dropped. If the ISTC had the international non-profit status, this company would be using ISTC for its next set of projects.
DDD	The respondent has a Russian background and speaks Russian.
EEE	The severe R&D cutbacks at the company have led to resources being expended only on quick, high payoff projects which are low risk. The respondent said it is now very hard to obtain R&D resources from his company for any research which will require a longer payback period or which is higher risk. Also the company is used to buying services and not paying for research. And the company is used to working on tech development projects with partners who can provide some portion of the resources, so this type of project where the partner provides expertise only is unique.
FFF	The company was created to concentrate on the (1) practical deployment of near-term candidate technologies rather than (2) theoretical, basic research. They have concluded generally there isn't anything novel being done currently in this field so they have discontinued research.
GGG	The respondent is a native Russian, and from the science sector. He still works his contacts to set up direct links, and he does not feel ISTC has been that helpful to his company in creating new contacts. In general, his company feels most comfortable with smaller contracts (under $50,000) with researchers directly.
HHH	The company's representatives said they are generally satisfied with ISTC as it is, and that ISTC's staff has been very helpful overall. Most of the problems the company has had appear to be related to IP issues in the agreement and statute, outside the control of current staff members.
III	This company was misclassified as a non-funding partner in the ISTC database. They funded their first partner project last year and are in the process of funding a second one.
NNN	Additional comment from respondent: "There are many different possibilities with respect to project execution and contract which are not dealt with in this form and which are in my opinion essential. I have been involved in some 14 projects in Russia and there are a lot of things that can be of interest, but it would require too much time to write them all down, since it is not clear to me what your real interest is (ISTC proposed projects, own partner projects, ISTC as admin service provider, ISTC legal advisor, payment organization, overall customer satisfaction etc.)."

PPP	Additional confidential comments from respondent: "ISTC looks like a slow, large bureaucratic organization. ISTC offers just a meeting place in Moscow (sometimes even coffee is not served) and travel authorization. It seems that for some Russian functionaries the ISTC job is a sinecure, and they rarely show up. In one case an old lady was in charge of the cooperation, and she did very little for it."
QQQ	Additional confidential comments from respondent: "In this case the objective of the project was a real collaboration between (name of company) and the Russian partner, rather than "shopping" on the list of technologies, materials, equipment developed by the institute. The agreement called for the company – not ISTC – to pay the Russian researchers both in Russia and in (country-region). This is possibly the reason why time delays have not been felt as a real problem. It has been observed that the lack of quality guarantees penalizes Russian institutes, which are cut off from international initiatives."

NON-FUNDING PARTNERS' VIEWS *(Non-Governmental Partners)*

Self-Administered Data Collection Instrument for Partners and Collaborators

This short data collection instrument was designed to be completed only by ISTC Partners who serve as collaborators or formal partners, but do not fund any projects through the ISTC. Respondents were promised confidentiality and that their comments would be aggregated with others. All information, which could reasonably be used to identify the company, its location, or specific institutes, has been deleted.

The survey instrument was sent via fax or email to all non-governmental partners classified as collaborators and partners (which are not funding projects) in the ISTC database. A letter from one of the ISTC Deputy Executive Directors, on ISTC letterhead, and a listing of the international research team members accompanied the survey instrument. A cover letter for the faxes and email letter for the emails, explained the purpose of the data collection process. Those materials are provided at the end of this document. (Note also that this packet was used by many of the researchers in the data collection from the Funding Partners as well.)

An excerpt from the ISTC Deputy Executive Director letter appeared in the email letter to encourage responses. As stated in the email letter, the purpose of this research is to determine the ISTC Partner Program performance against the needs and expectations of the Industrial Partners. The area of most interest is the relationship of the Industrial Partners with the ISTC as an infrastructure for research and development. All companies received an original packet. Two additional follow-up emails (faxes) were sent several weeks later to each of the companies to enhance the total number of responses.

Responses were received from 23 industrial partners in the EU, Japan, Korea, and the United States. An additional 10 industrial partners responded but their information is not included for a variety of reasons: five partners indicated they did not have sufficient contact with ISTC to respond or were about to become a funding partner and didn't want to respond and another five companies and individuals indicated the person who had been responsible for ISTC had left the firm and no one had replaced that person, or in two instances, individuals did not feel responding on behalf of their former company was appropriate. The total response rate, taking into account database errors, was (35/49) or approximately 70%.

A summary of the responses is provided initially, followed by a detailed listing of the responses for each company, for each question or item. In the detailed listing, each respondent has been assigned a letter, e.g. A, or D. To track that respondent's responses, please see the entry under each of the questions for that letter. If no information is provided, the person did not respond or the question was inapplicable. Two companies provided extended comments, and they appear at the end of the detailed listing.

Summary of Responses *from Non-Funding Partners (Non-Governmental)*

1. How long have you been a partner with ISTC? (Years Or Months) About two-thirds of the responding partners had been formally associated with ISTC for less than two years, with most having been a partner for only about a year.

2. Why did you become a partner? Why are you interested in being a partner? Many of the respondents are interested in Russian technologies in their field. A smaller number of companies listed ISTC as an administrative conduit for projects. The responses suggest that many of the non-funding partners may become funding partners in the future. That specific question was not asked.

3. What involvement, if any, have you had with ISTC? About two-thirds of the companies have been involved with ISTC on myriad activities. Most of the responses are positive in some way. About 20% of the companies have had minimal contact and involvement.

4. What involvement, if any, have you had with Russian/CIS institutes or researchers funded by ISTC? A healthy majority of the companies have had some contact with Institutes, and about a third have had extensive contacts or have funded research directly.

5. What has ISTC asked of you, if anything, in being a partner? About half of the partners indicated that ISTC has not asked them to do anything up to this time. The others have been involved in various activities.

6. and 6.1.1 Do you fund any projects directly with Russian or CIS Institutes (not via the ISTC)?and Why do you fund directly instead of going through ISTC? Thirteen of the companies do fund projects directly while 10 do not. Most of the companies say they do so because their projects were established before they became aware of ISTC or they pre-dated the existence of ISTC. Several other reasons for not using ISTC were (1) less paperwork in direct funding; (2) IP and confidentiality issues at ISTC: (3) size of projects and type of project do not fit ISTC mission; and (4) preferences of PM not to use ISTC.

6.1.2 and 6.2.1 **No summaries needed.**

6.2.2. What can the ISTC do, if anything, in the near- or longer-terms to encourage your company to fund research directly with the Institutes. Of the companies responding, most indicated ISTC could not do anything for them at the present time as they were waiting for, or searching for, possible institutes with whom to partner.

6.2.3. Are there information sources or activities, either new or existing, which would aid your company's funding and research efforts directly with the Institutes and researchers? Four companies responded affirmatively and an equal number negatively. Two companies said the ISTC homepage helps them keep informed.

7. Is there anything else that you wish to communicate about your experiences in being a partner with ISTC? Ten companies said they wanted to communicate more about their partner experience. Two respondents' comments were negative about ISTC. Another respondent's comment contained both positive and negative elements, but was

negative on balance. A fourth respondent had negative comments about Russian customs and ISTC's role with customers. A fifth respondent hoped ISTC could shorten the concurrence time requirements. Another individual made a negative comment about Russian export controls. One respondent provided a uniformly positive comment about ISTC. One comment solicited information and another provided a suggestion for a different partner structure process.

Extended Comments: Two individuals provided extended comments, and they are presented at the end of the detailed listing of responses. One pertains to a partner's view about ISTC's lack of responsiveness and inability to understand the timeframes of businesses. A second respondent described their negative experiences with customs and how that affects significantly a research project which relies on transportation of materials and quick changes in a project's work activities.

Detailed Responses *From Non-Funding Partners (Non-Governmental)*

1. How long have you been a partner with ISTC? (Years Or Months)

A	1 year
B	1 year
C	1 year
D	1 year
E	4 years
F	2 years
G	1 year
H	Less than one year
I	About 3 years
J	About 4 years
K	1 year
L	8 years
M	I know our company has a partner status, but ISTC, though asked a few times, could not tell me the date or send a copy of the partner agreement.
N	A few months.
O	16 months
P	10 months
Q	About 1 year
R	6 months. (Name of company) will become a foreign collaborator on the project (name).
S	11 months
T	It is almost one year.
U	1 year
V	1 year
W	3 years

2. Why did you become a partner? Why are you interested in being a partner?

A	To find technology
B	Was solicited by "BISNIS" US Dept. of Commerce to investigate an opportunity for a specific technology and possibly partner with the Russians. Looked like a good business opportunity.
C	To be able to utilize ISTC contacts with Russian scientists and review the feasibility of a strain development projects for the production of industrial enzymes
D	So we could conduct business with ISTC and its Russian partners.
E	Might solve problems of bringing samples and money in and out to fund Russian research projects
F	We are interested in helping {name of Russian organization) in finding sources of funding.
G	Contact to Russian institutes working in the same area as we do. Funded project pointing towards an area which we can´t cover today but might offer future relevance
H	Our activity in Russia
I	Because we were interested in the facilities and benefits that ISTC offers to partners. You can think of facilities regarding sending samples, money etc.
J	We are involved in the (names of companies and institutes) , with (name of institute) doing most of the development. This work is therefore perfectly in line with ISTC objectives of employing Russian scientists in Russia. (Name of institute) is developing several advanced components in that context
K	(Name of company) joined the partner program to obtain access to the results of newly completed fundamental research. In addition, should (company) choose to take on the commercial development of recently completed research, the Directors felt that any political or execution risk connected with the possible transfer of any technology invented as a result of such ISTC funded research would be significantly minimized.
L	Research programs in line with activities within (company name).
M	In order to get access to new projects.
N	We are interested in the potential of Russian scientists through our academic interactions with them mainly in two fields. Many of them express concern on the possibilities of getting funded by ISTC, hence we are almost compelled to join ISTC.
O	First, it is clear that the project budget expenditures in Russia are strictly watched by ISTC, which is hard for us to do because of location and lack of knowledge of Russian local regulations. Second, we can get more information on Russians activities through a dialogue with ISTC representative in Moscow.
P	Because we have thought that we would like to gain Russian institutes' cooperation for developing and commercializing a (product description) , and ISTC recommended a partner to us. However we have found that there are problems, so our project has been on hold.
Q	We are interested in Russian technology.
R	We are very interested in the Russian technologies because Russian has a lot of excellent technologies in our field.
S	I visited Russian Institutes in 2001 and I understood Russian Institutes have high level of science technology but not advanced engineering technology. After the visit, ISTC people contacted me to introduce options for collaboration.
T	We had a nice conversation with a professor from Russia. When he visited us, we found several R&D projects that can be done together. That was the start of the partnership.
U	Because of possible assistance in communication with Russian partners and benefits of tax deductibility etc.
V	We are interested in the information and communication technology, nano-technology, material technology and energy technology in Laboratories in the Russian Federation
W	Our company began in 1990 to develop direct cooperation with several organizations of the CIS. The ISTC presented interesting opportunities for some of our partners in Russia.

3. What involvement, if any, have you had with ISTC?

A	Provided ISTC with technology search orders.
B	Two trips to Moscow, meetings with ISTC and VIINEF. They assisted us all the way through the process of ISTC partner program. Received excellent guidance throughout the process of partnering with VNIIEF..
C	We have reviewed various projects submitted and become a partner on some. We have assisted in evaluations of Russian bio weapons factories reviews regarding the conversion and economics to non weapons uses.
D	Lots, they have joined our CIS High Technology Partnership Initiative™, and we are advisors to them in its technology valorization program.
E	Have been collaborator firm on ISTC funded program
F	I have visited them several times and found these visits very useful.
G	Some discussions in Moscow and in (country-region)
H	For 4 years, we are deeply involved in several "collaborator programs" funded by (another source).
I	We had a couple of meetings with the people in the office in Moscow. We received an overview of past and current projects. I have been acting as a referee for ISTC projects already for many years (at least 5).
J	I had several meetings with Russian institutes in the ISTC offices in Moscow. Some meetings also took place in (country-region).
K	(Company) personnel and advisors constantly review the ISTC database, communicate with ISTC personnel and wherever possible attend ISTC seminars and conferences both within the CIS and elsewhere. While (company) has not, as yet, decided to fund the commercial development of any completed ISTC research projects, it is hoped suitable candidate technologies will soon be forthcoming.
L	Roles identified on specific ISTC projects
M	Negotiations about a project with an institute, assisted by ISTC and associated people.
N	In the course of contact with ISTC, I became acquainted with a (country-region) representative of ISTC in Moscow, and helped them organizing seminars. That's our only involvement with ISTC.
O	Actually we have had no involvement until recently but that changed in the last month. (Descriptions of the two projects.)
P	None
Q	None
R	Only about becoming a partner.
S	I contacted ISTC about the possibility of collaboration and they gave me information about suitable institutes and arranged my schedule of visits.
T	Unfortunately, the project has not yet started.
U	We made use of the website and research list to find interesting research topics.
V	None
W	(Name of company) has been involved in several "standard" actions since 1998 (funded by ISTC). Some other actions were proposed but not started. No action has been initiated by (the company) as a "ISTC Partner."

4. What involvement, if any, have you had with Russian/CIS institutes or researchers funded by ISTC?

A	None
B	Executed a Letter of Intent, a non-disclosure, a supplemental agreement with (the institute), and a partner agreement with the institute. Standing by for implementation of the partnership.
C	We have hosted tours of our factory here in the (country-region).
D	With a company called (name of company).
E	About 12 years and about 30 projects
F	We have worked with the (name of center at university)
G	We`ve many contacts with Russian institutes and companies. One of those is closely working together with ISTC. This is due to our field of activity which involves international contacts.
H	Monitoring of projects
I	We discussed with researchers the plans and/or results of some of the projects. We never had specific contacts with institutes.
J	I had a lot of meetings with (names of institutes).
K	(Name of company) has discussed the possible commercialization of a number of technologies directly with ISTC funded researchers. In addition, (company), and our associated companies have been asked on several occasions to act as a foreign collaborator on ISTC funded projects, a role we have accepted on several occasions.
L	(Company) organized a specific training course for group of scientists.
M	30 month project, very successful, as a collaborator.
N	We have already been listed in several applications by Russian scientists to ISTC as a possible partner for cooperative research.
O	None
P	None
Q	None
R	None.
S	I am planning to visit the Institutes later this year.
T	Our company has worked in Russia for more that 30 years. We have had several R&D collaborations with the Russian Academy of Sciences.
U	I have funded research outside of the ISTC framework.
V	None
W	Two projects listed by number.

5. What has ISTC asked of you, if anything, in being a partner?

B	Travel, meetings. Light paperwork.
C	To host plant tours of Russians visiting the [country-region] and we have had discussions regarding product feasibility.
D	Nothing other than applying.
E	Only to fund projects. I was also asked if I would help audit ISTC funded projects, but then was never actually asked to do it
F	They did ask us to finance but we do not have funds at present.
G	We´ve got all information to overview ISTC activities.
H	We were a collaborator and now we are a partner, at our request.
I	ISTC has asked our attention for their activities. Especially {name of staff person) has been quite active in this. Up till now, however, we haven't able to identify an ISTC project that would fill in gaps in our R&D portfolio.
J	Mostly follow up on the correct progress of work supported by ISTC
K	Other than to review ISTC funded projects for their suitability within the company business model, the ISTC had not asked for anything.
L	Nothing specific.
M	Only formal letters, I guess. There were a lot of them required even for a collaborator.
N	Nothing else.
O	There were no particular questions from ISTC but we had questions from staff of (government agency in country-region) , which works with ISTC. The (government agency) asked about our company's products, our previous involvement in Russia, and other miscellaneous items. The meeting went fine as far as I can remember.
P	None
Q	Nothing
R	Nothing beyond being a partner/collaborator.
S	ISTC asked that my company allocate at least $20,000 for the collaboration fund.
T	Nothing special. They are very cooperative. They try to help us in partnering.
V	Nothing
W	Nothing (to my knowledge).

6. Do you fund any projects directly with Russian or CIS Institutes (not via the ISTC)?

Yes	13	(Skip to Question 6.1)
No	10	(Skip to Question 6.2)

6.1.. If you do fund projects directly ……

6.1.1. Why do you fund directly instead of going through ISTC? (e.g. corporate policy, lack of familiarity with ISTC procedures, your own personnel in Russia and the NIS, etc.)

A	On going projects that predate ISTC
C	I am not sure, it was just easier to start without involving ISTC. (less paperwork) We could have I guess, but just started working directly with the Russian company.
E	ISTC paperwork is so long and complex and seems to delay project start by about one year
G	At the moment we did, we didn´t know ISTC.
H	Our activity began in Russia prior to the creation of ISTC. Some of our projects are beyond the mission of ISTC. Some of our Russian Partners do not accept ISTC as an intermediary.

I	First of all there are historical reasons: we started collaborating in Russia in 1992. Secondly I think that ISTC projects often have a size/volume that surpasses our normal project management abilities/attention.
J	We had direct commitments before the ISTC existed. Besides, there are some intellectual property reasons which made us prefer such an avenue in some circumstances.
K	(Name of company) has its own personnel in Russia specifically retained to search for promising areas of technological research. It should be noted that company believes that, wherever possible, ISTC projects should be selected ahead of direct contacts since there is greater political certainty and improved channels of redress when dealing with ISTC projects.
O	There were two reasons. One is that we met very strong resistance from the Russian counterpart because they didn't want the budget to be controlled by ISTC. The other reason is that it takes longer to obtain the concurrence and approvals. We had to complete the project within 3 months.
R	We had contact with Russian Institutes before our relationship with ISTC.
U	We were not a partner of ISTC at that time.
V	ISTC was not established at that time.
W	Lack of familiarity with ISTC procedures. Our own personnel in Russia; confidentiality issues.

6.1.2. How did your company make the decision to fund directly?

C	It wasn't really a conscious decision – it just happened that way.
E	Low cost access to world class experts.
G	We made a visit, got an offer, like usual business
H	This decision was prior to the creation of ISTC.
I	In the beginning there was nothing else. In the meantime we have built up strategic alliances that fit our needs.
J	Policy decision to move faster.
K	Company follows a hybrid "Stage Gate" process of technology development from initial review through to commercial negotiations. Minimal initial funding is generally supplied if a project owner can meet a number of pre-defined criteria set internally by (company). Having reviewed a number of ISTC funded projects it is evident, at the beginning of any initial review that the vast majority of ISTC projects meet with 90% of these pre-defined criteria. Historically and when dealing direct, it has taken considerable time to ascertain which criteria have been met, with most projects meeting between 40% and 50% of pre-defined criteria.
O	We tried to persuade the counterpart to do the project through ISTC but after we understood that it might require 3-4 months to obtain the concurrence, we gave up on doing it through ISTC.
U	Because the content of research was good.
W	After evaluation of the Confidentiality/flexibility issues

6.2. If you do not fund projects directly with Russian Institutes…
6.2.1. Is your company possibly interested in funding projects directly?

Yes (or Maybe)	5	(Skip to Question 6.2.2)
No	3	(Skip to Question 7)
Don't Know	2	(Skip to Question 7)

6.2.2. What can the ISTC do, if anything, in the near- or longer-terms to encourage your company to fund research directly with the Institutes?

A	Nothing. We are waiting for the "right project."
B	Communicate as to what projects are available.
C	1) Find qualified scientists with strain development facilities. (but I have concluded these may not exist as we once hoped) 2)Help with cost estimates for research cost. 3) Help with cost subsidies
F	We can only help find funding as we are without our own funding sources
H	Having constant relationships with a lot of Russian Institutes, ISTC has the capability to encourage links, while coordinating large R&T activities as a whole.
I	Keep us informed. We will keep our eyes/ears open for possibilities to mention to Russian Scientists the ISTC initiative.
K	Essentially, (company) does not fund fundamental research but provides funding for the commercial development of the results of fundamental research. We would always prefer to fund in conjunction with the ISTC or other similar organisation.
L	Recently we started funding through ISTC.
M	Clarification of legal and tax items, especially: contacts with ministries that have to give their approval for new projects, help to speed up the decisions of ministries, and using their (ISTC) influence to enable clearer and more positive tax conditions.
S	Nothing. We plan to fund through ISTC if negotiations proceed satisfactorily.
T	We really need a good institution to make the joint work smooth and reliable! I believe the ISTC will make this possible.

6.2.3. Are there information sources or activities, either new or existing, which would aid your company's funding and research efforts directly with the Institutes and researchers?

Yes	4
No	4
Unknown/Not sure	0

Please identify the activities that would help:

B	Possibly more communication
H	For instance: www.istc.ru actually helps us greatly; some conferences and meetings also
L	Not applicable.
M	The ones listed in 6.2.2.
O	We are interested in metal surface modification with nano metallic powder coating by hollow cathode plasma system.
T	ISTC home page is important so we know their activities.

7. Is there anything else that you wish to communicate about your experiences in being a partner with ISTC?

Yes	10
No	10

B	Very Impressed with the people of ISTC. Hard working and professional. However, company has been dissatisfied with their interactions so far. (See extended comments)
C	When a project is rejected we would like a reason. The ISTC is still kind of hard to understand how the programs and terminology works. My favorite ISTC term for a project is "approved with out funding" which of course is the same as "rejected" in terms of being able to proceed.
E	From collaboration experience it seems that the moving of samples advertised doesn't work well. The project after taking one year to complete start paperwork, then took 6 more months (25% of total program) to get the initial chemicals into Russia so work could start. (See extended comment.)
H	Neither phone nor e-mail would be an adequate means to communicate in depth about our experience in Russia.
J	Present export control procedures of Russia make it very inconvenient to work with Russian Institutes. No timetables can be established due to this uncertainty.
K	While (company) has, as yet, not taken on any ISTC funded projects, we firmly believe that the ISTC plays an important role in the support of the Russian scientific community and provides international companies that are looking to be involved with the Russian scientific community with a safe, stable and structured environment within which to work.
O	Basically we prefer for projects to go through ISTC. It is most important for us to obtain the concurrences in a short time. We hope that ISTC will have a dialogue with the Russian government to speed up the procedure to obtain concurrences. Right now, we are very satisfied with the communication we have with ISTC representatives in Moscow.
R	We would like the length of time to affect a contract to be shorter.
T	It would be very useful if the ISTC set up a series of partner project structures. Namely small projects to big ones. For a company, it is risky to invest big money for an initial project with ISTC. We would like to start a small feasibility project to see if the collaborator can really partner with us. Such a small project may cost approximately $10,000per year for one to three years. We knew that the Russian scientists and researcher need more investment. However, this process cannot be avoided.
V	We want to communicate about material technology and energy technology.

EXTENDED COMMENTS

Correspondent B. This respondent wished to talk by telephone after he was contacted to clarify certain items in its original response by email. This company does substantial amounts of work internationally, and the respondent was ready to leave for a lengthy overseas trip.

1. Respondent was rather disturbed about being categorized as a non-funding partner because he said their intention from day one was to fund a project. I suggested that they probably were categorized that way because their project has not yet been consummated.

2. No communication—He said he never was sure what was happening with the proposal for the project as he rarely received any communications from anyone at ISTC. He said, if he had known how long this would have taken, "I would have made provisions for babysitting this more. I would have planned on going to Moscow several other times just to move this along faster."

3. Despite believing that most ISTC employees are hard working, he said they are bureaucrats and have no real stake in putting themselves out for moving projects along faster. He said they just don't understand the timeframe of businesses and partners.

The company has not backed away from this project because it would be a huge win for his company "If it works." He said the company not only would use the device for themselves but also would sell to other companies. He's ready to put in substantial resources.

Correspondent E. (Customs Problems.) Respondent's words: "It is an ISTC project on which we are the collaborator. ISTC was asked by the institute to find the problem, several times I think, while they were waiting to start, but I don't know the answers they got if any. Since we were not funding, only collaborating - but a very interested collaborator - we didn't get copied on the correspondence etc.,

As I understood the delay, the two reasons are intertwined. It is such a hassle to get through customs that ISTC collects enough requests until they can justify having a truck bring the stuff from Germany and pass customs one time for hundreds of samples. It takes time to collect enough orders, then once the order goes to Germany, maybe 15% are backordered so the order is probably held until all the materials are available, then the truck comes in through customs, then it gets inventoried in Moscow and notices sent to the scientists and then they come and get their stuff. It sounded to me like the customs delay actual at the border might be only a few days, but the rest of the procedure - necessitated by the customs issues - forces a situation with a very long cycle time. As our scientists are used to ordering one afternoon and getting the chemicals the next morning, of course to them the process seems unbearable.

Let me add one other insight? Research goes according to plan for no more than a few days and then the first info forces an adjustment of the plan. That adjustment means the need for different materials and experiments. Here we can adjust the plan then once a day - 24 hour cycle on getting the materials for the new experiment. When the cycle time for getting a chemical to run a one day experiment is 6 months, then the plan can be changed twice a year. Assume 200 working days and the flexibility of work in US is about 100 times that of Russia. Since that flexibility is the core of effectiveness, it just makes it almost impossible for the Russians, no matter how good they are to be efficient. Result: they can only be given unimportant projects for which there is no serious need. And as a corollary no serious funding.

By funding directly we can bypass a lot of that. Remember to get the ISTC project in place also adds 9-12 months on the front end of the program. The final effect is that what takes 3 years to put in place and execute in Russia can be done here in the U.S. during 2-3 months. The tragedy is that it shouldn't have to be that way."

INTERNATIONAL
SCIENCE AND TECHNOLOGY
CENTER
Luganskaya ulitsa, 9
PO Box 25, 115516 Moscow,
Russian Federation
Tel: +7 (095/501) 797-6010
Fax: +7 (095/501) 797-6047
E-mail: istcinfo@istc.ru;
http://www.istc.ru

I S T C

М Н Т Ц

МЕЖДУНАРОДНЫЙ
НАУЧНО-ТЕХНИЧЕСКИЙ
ЦЕНТР
Луганская улица, 9
А/Я 25, 115516 Москва,
Российская Федерация
Тел: +7 (095/501) 797-6010
Факс: +7 (095/501) 797-6047
E-mail: istcinfo@istc.ru; http://www.istc.ru

Our Ref.: DED3-VAL-02 25 June, 2003

To Whom It May Concern:

Subject: ISTC project "Assessment of and Strategy for ISTC's Programs & Activities"

Dear Sir or Madam:

You may be contacted by representatives of the IC^2 International Research Team, which has been conducting an in-depth assessment of ISTC Programs including Partner Program. This research is of a great importance for the ISTC. We will greatly appreciate your valuable help and cooperation to perform it.

The purpose of this research is to determine the ISTC Partner Program performance against the needs and expectations of the Industrial Partners. The area of IC^2's interest is the relationship of the Industrial Partners with the ISTC as an infrastructure dedicated to facilitate / foster the Partnership. The issues related to technology development are beyond of the scope of this research and will not be addressed.

The ISTC contracted with the IC^2 (Innovation, Capital, Creativity) Institute, the University of Texas at Austin, to perform a Project entitled "Assessment of and Strategy for ISTC's Programs & Activities: Toward Global Security and Sustainability". The IC^2 International Research Team (see Appendix #1) signed the Mutual Confidentiality & Non-disclosure Agreement Addressing to the Exchange of Information with the ISTC. In addition, in order to avoid public disclosure of ISTC's Confidential Information, the IC^2 will submit any prepublication materials to the ISTC for review and comment prior to submission for publication.

In case you have any questions, please contact Maria Douglass, ISTC Senior Technology Implementation Manager, or me at the contact points listed below.

Thank you in advance for your cooperation and assistance in this matter.

Sincerely,

Lawrence Wright
Deputy Executive Director
International Science & Technology Center, Moscow
Tel.: (095) 321 4261
Fax: (095) 797 6014
E-mail: wrigth@ istc.ru

CC: Maria Douglass
Senior Technology Implementation Manager
Tel.: (095) 797 6025 E-mail: douglass@istc.ru

INTERNATIONAL
SCIENCE AND TECHNOLOGY
CENTER
Luganskaya ulitsa, 9
PO Box 25, 115516 Moscow,
Russian Federation
Tel: +7 (095/501) 797-6010
Fax: +7 (095/501) 797-6047
E-mail: istcinfo@istc.ru;
http://www.istc.ru

I S T C
М Н Т Ц

МЕЖДУНАРОДНЫЙ
НАУЧНО-ТЕХНИЧЕСКИЙ
ЦЕНТР
Луганская улица, 9
А/Я 25, 115516 Москва,
Российская Федерация
Тел: +7 (095/501) 797-6010
Факс: +7 (095/501) 797-6047
E-mail: istcinfo@istc.ru;
http://www.istc.ru

Appendix #1
to Ref. #DED3-VAL-02

IC^2 International Research Team involved in the ISTC project
"Assessment of and Strategy for ISTC's Programs & Activities"

The ISTC and the IC^2 Institute (see below the list of people involved in the project) agreed to exchange certain invention and business-confidential or otherwise proprietary information within the scope of the project entitled "Assessment of and Strategy for ISTC's Programs & Activities: Toward Global Security and Sustainability" according to the Agreement #UTA01-529 between the ISTC and the IC^2 signed 14 November 2001.

The term 'business-confidential or otherwise proprietary information' includes without limitation: confidential project information, patent applications, unpublished research information, know-how, technology marketing and business plans, organizational information, financial data, cost and pricing information, terms and conditions, know-how, and other information not distributed in the public domain.

Core Research Team
USA IC2 Institute, The University of Texas at Austin

- Dr. David V. Gibson, Director of Research and Associate Director, IC^2 Institute.
- Dr. James E. Jarrett, IC2 Institute, Senior Research Scientist
- Dr. Eliza Evans, Research Engineering Scientist Associate
- Dr. Bruce Kellison, Associate Director, Bureau of Business Research

International Research Team
Europe
Instituto Superior Tecnico, Lisboa, Portugal

- Prof. Manuel Heitor, Director, Center for Innovation, Technology Policy and Research

Delft University of Technology, Netherlands

- Prof. Peter J. Idenburg, Faculty of Technology Policy and Management

Institute for Studies on Scientific Research, Italy

- Prof. G. Sirilli, Research Director

Segal Quince and Wickstead, Ltd., England

- Dr. R. Hodgson, Executive Director

Japan
The University of Tokyo

- Prof. Kiyoshi Niwa, Professor, Department of General Systems Studies

Korea
Kyonggi University, Seoul

- Prof. Tae Kyung Sung, Department of Management Information Systems

Self-Administered Data Collection Instrument for Partners and Collaborators

This short data collection instrument should be completed only by those ISTC Partners that serve as collaborators or formal partners but do not fund any projects through the ISTC. If your company funds projects through the ISTC, please do not complete this. Please return this form via email to the person whom sent it to you. Thank you in advance.

1. How long have you been a partner with ISTC? (Years Or Months)

2. Why did you become a partner? Why are you interested in being a partner?

3. What involvement, if any, have you had with ISTC?

4. What involvement, if any, have you had with Russian/CIS institutes or researchers funded by ISTC?

5. What has ISTC asked of you, if anything, in being a partner?

6. Do you fund any projects directly with Russian or CIS Institutes (not via the ISTC)?

NO _____ (Skip to Question 6.2.)
YES _____ (Proceed to 6.1.)

6.1.. If you do fund projects directly ……

6.1.1. Why do you fund directly instead of going through ISTC? (e.g. corporate policy, lack of familiarity with ISTC procedures, your own personnel in Russia and the NIS, etc. …….)

6.1.2. How did your company make the decision to fund directly?

6.2. If you do not fund projects directly with Russian Institutes, ……

6.2.1. Is your company possibly interested in funding projects directly?

NO _____ (Skip to Question 7)
DON'T KNOW _____ (Skip to Question 7)
YES (Or MAYBE) _____ (Proceed to Question 6.2.2.)

6.2.2. What can the ISTC do, if anything, in the near- or longer-terms to encourage your company to fund research directly with the Institutes?

6.2.3. Are there information sources or activities, either new or existing, which would aid your company's funding and research efforts directly with the Institutes and researchers?

No _____
Yes _____

Please identify the activities that would help:

7. Is there anything else that you wish to communicate about your experiences in being a partner with ISTC?

No _____
Yes _____
Yes _____ I'd prefer to talk by phone. Please call me at:

Again, thank you.

Please send this back via email to James Jarrett at: JJ@icc.utexas.edu

PARTNER VIEWS

The purposes of this short survey are to:
(1) determine ISTC program performance against the needs and expectations of industrial companies who have participated as an ISTC partner
(2) provide systematic feedback to ISTC about potential changes they might consider in working with industrial partners in the future.

Your identity, that of your organization, and project specifics will remain confidential.

Company _____
Name _____Position_____
Phone/Email _____
Date: _____

A. Facts and Basic Information
How many agreements have you (your company) been involved with?

ISTC Agreements By Number:

By Title(s):

Time period(s) approximately:

How did the agreement(s) begin?

B. Outcomes
What is/was/were the goal or expected outcomes of the ISTC agreement(s)? (Check all that apply)

- _____ Basic research
- _____ Interest in Russian technology generally
- _____ Cost savings
- _____ Process improvements
- _____ Product improvements
- _____ New products/processes
- _____ Unknown
- _____ Other (specify, e.g. corporate decision, rather than research and development decision)
- _____ Non-economic reasons

If appropriate, please answer the following questions.

What is the anticipated magnitude of cost savings and other economic and non-economic benefits from these technological improvements?

Is there any possibility of the agreement eventually leading to intellectual property (patents) and commercialization of a new product?

Yes _____ No _____

If yes, what is the anticipated magnitude of sales?

C. Partner Metrics

For Completed Projects: What is your view about what was accomplished?

For Active Projects: How has the project been progressing?

What have been the best results of the experience?

What have been the disappointing results of the experience?

Do you anticipate entering into additional agreements with ISTC?

Yes _____ No _____

Would you recommend to a business associate that he explore a new agreement through ISTC? If yes, why? If no, why not?

What can be done to improve future agreements from your perspective?

E. At ISTC
F. At the institutes
G. In working with organizations within Russia
H. Any innovative suggestions for improvements and changes?

D. Financial & Other Considerations

What financial changes, if any, in the current structure of agreements would you recommend?

What other changes, if any, in the current structure of agreements would you recommend?

E. Concluding Comments

How do you see the future role of the ISTC?

What would increase its value for your company?
Does your company perform similar projects in Russia or the CIS with other such organizations?

Yes _____ No _____

If yes, how does ISTC compare with these other organizations?

Thank You.

APPENDIX E: Case Profiles

PROJECT NUMBER	TITLE
1. Case 076	Migration of Aerosol Effluents from Nuclear Power Plants
2. Case # 079	Condensed Carbon and Immunoderivatives
3. Case 0101 A, B, C:	Ocean Nuclear Database
4. Case 201	Aircraft Wake Safety Problem
5. Case 204	Silicon Carbide Semiconducting Material for Sensors and Electronics
6. G-10	Development of Building Blocks of Semi-conductors Based on GaAs and Related Compounds for Apparatus and Systems
7. Case 767	Low-Energy Positron Source
8. Case A-122	Superconducting Polymer Ceramics
9. Case 254	Research and Development of an Analog Microelectronic Component Basis for Radiation Detector Signal Processing
10. Case 636	Development and Investigation of Materials with Giant Magnetroesistance as Basis for Sensors and Devices Controlled by a Magnetic Field
11. Case 737	Optical Superradiance and Transient Processes in Extended Resonance and Optical Waveguide Media
12. Case 781	Development of the Technical Project of a Device for Fine Purification of Gas Flows from Particles

The projects presented in this report are not recent. They were chosen in order to present an assessment of impact. Since these projects were initiated, evolutions in management have occurred, and projects in the 2600 series are no longer managed as in Cases 079 or 0101.

KEY FINDINGS AND RECOMMENDATIONS

Internationally Opened and Networked

Project Managers were very supportive and enthusiastic of opportunities to travel and attend workshops and seminars within the CIS and abroad. Such opportunities are frequently the gateway to sustain research collaborations, which have yielded commercial linkages, both productive and nascent. Network productivity is difficult to measure but ISTC should consider devoting some resources to systematically documenting the relationships that evolve from meetings, particularly those abroad; this activity is important not only for evaluation purposes but also for the purpose of encouraging follow-up and exchange on the part of PMs. Perhaps a checklist of some sort that the SPMs can complete regarding networking could be implemented, one that would indicate whether the PM understands the significance of prompt follow-up of leads, contacts, and consistent collaboration with international colleagues.

Needless to say, the ISTC communication program is critical to PMs in maintaining relationships outside of their respective institutes. Communication failure and restriction was identified as an insurmountable barrier to turning contacts into productive relationships.

From the case studies, it is clear that the better a researcher's facility with English, the easier it has been to establish international contacts with foreign researchers. English proficiency may be a significant barrier to international networking, so ISTC should encourage language training and perhaps testing.

Research Excellence

Given the self-reported publication data (from the survey) and reprints Project Managers shared with us, there is reason to believe that there is a good deal of scientific productivity that is unmarked and unmeasured by ISTC. ISTC should consider instituting bibliometric methods of research evaluation, as it is an economical, unobtrusive, and accepted metric of research excellence; however, as our case studies illustrate, publication is also a mechanism for realizing more immediate ISTC goals. First, joint publication is a means of building relationships as well as a measure of the productivity of these relationships, particularly with scientists outside the CIS. Second, publication is an effective marketing tool and has been the means by which academicians and businesses alike have located expertise within the CIS. Third, publication in peer-reviewed international journals is a critical first step in establishing credibility and legitimacy, the perceived lack of which significantly impedes scientific and business collaborations.

Several of the case studies indicate that Russian scientists who pursue the world's leading researchers as collaborators establish immediate credibility that helps open doors to new funding opportunities. SPMs should ensure that PMs are aware of the world's leading institutes and researchers in their fields and assist PMs in making initial contacts

whenever possible. In addition, research a mature scientific field often yields more international contacts because of the ready supply of international research done in that area. Russian or CIS researchers, previously unknown to the global scientific community, can more quickly establish contacts with other researchers than can a researcher in a more esoteric field.

Economic Value

Of our twelve case studies there are two standout commercial successes and a handful of promising but as yet unrealized cases of successful technology transfer.

ISTC might consider incorporating into the science program something along the lines of an exit strategy and assist research teams in formulating and planning a research agenda and the means to support it post-ISTC. Whether or not commercialization is an explicit part of that agenda, the future success of the team is dependent upon the ability of the Project Manager to cultivate the interest of prospective funders, mobilizing the support and endorsement of other researchers and balancing the need to protect intellectual property with the necessity of submitting ideas to public scrutiny. ISTC might consider helping researchers with established research teams explore new organizational forms, such as joint stock companies, in which R&D can take place separately from their existing institutes. Two of the most successful cases in terms of economic value had established joint stock companies in which to run their contracts, either inside or affiliated with their institutes. This model could provide research teams both with independence to set their own research agendas while at the same time maintaining the stability of the existing connection with their current institutes.

Diversified Funding

It is no surprise that the most entrepreneurial Project Managers have been the most aggressive in pursuing outside funding. Some have cobbled whole research programs by successfully seeking grant support from a number of internationally funded non-proliferation and science programs. Others have been successful in forging partnerships and contract opportunities with the private sector. It is also that case that many of the research teams headed by the PMs we interviewed just manage to get by once the ISTC funded project ended. Several submitted second and third ISTC applications; some were successful and some not but in either case the prospect of subsequent ISTC funding and the long application process served as a disincentive for seeking other funds. "Approved without funding" status is particularly perplexing to Project Managers who somewhat naively hold out in the hope that ISTC funding is immanent.

However, at least one PM expressed surprise that we asked about repeated ISTC funding for his work. He took pride in the fact that he had not returned to ISTC for funding and had understood that he was to use ISTC support as a temporary bridge toward a new science and technology regime. ISTC should directly encourage researchers to find outside funding, perhaps by offering monetary incentives.

Young Scientists

Project Managers find it exceedingly difficult to recruit and maintain young talent without on-going research support, yet younger scientists are vital to the successful completion of ISTC-funded projects. Young scientist are not the target constituency of ISTC programs but it is worth exploring coordination of intervention efforts and funding with international programs that do focus on young scientists. Our cases studies reveal that in general, the projects that result in devices that can be sold to foreign companies or governments are able to attract younger researchers, and the more on-going commercial activity in a lab or on a research team, the more attractive it is to younger scientists. Conversely, case studies revealed that older PMs with little interest or experience in marketing or commercializing their work were extremely unlikely to be able to attract younger scientists. In addition, young scientists may return to scientific endeavors as experience with the vagaries of the CIS marketplace become more familiar. That is, young researchers who may have abandoned their research field during the 1990s may return once they realize that more rewarding careers, however defined, cannot be found outside science.

National Purpose

Projects that address an environmental problem seem to be able to attract foreign funding and collaborators more easily. With the understanding that interest in Russia's "historical liabilities" on the part of foreign governments and firms may fluctuate over time, more ISTC attention might be given to finding foreign collaborators to do research on issues in environmental issues that have global implications.

Case 076 Migration of Aerosol Effluents from Nuclear Power Plants

PM:	**Trifonov, Alexander Georgievich**
Lead Institute:	**Joint Institute of Power and Nuclear Research, Minsk, Belarus**
Foreign Collaborators:	**Brookhaven National Lab, NY (Vasily Svenakis, in BNL's Department of Ecology Assessment)**

Introduction and Project Objective

This project designed software to track air-born and water-born emissions from nuclear power plants. The technologies employed have wide-ranging environmental, public health, risk assessment, and biotech applications. Dr. Trifonov, a Belorussian citizen, also works on energy-saving projects, like heat exchanges and mass-transfer devices. A new ISTC project (#393) will develop multi-dimensional software for judging radiological damage in river systems but also in the entire biosphere, and a new collaborator from a private company in the Netherlands will do much of the hydrological research. The EU has funded the $136,000, 3-year project, with additional funds from a Dutch company (NRG Kema). His institute runs other ISTC projects and has 600 people on staff, including 400 scientists, down from 1000 in 1990.

Economic Value

With the help of the ISTC grant, Dr. Trifonov has created a real-time online decision support system. Dr. Svenakis at BNL, his collaborator, has introduced him to U.S. companies, but no contracts have been signed yet, partly because, according to Dr. Trifonov, there has been so much tension between the governments of the U.S. and Belorussia. He copyrighted, but did not patent, his software developed during the project. Exxon, he says, has discussed a broad application of his software with him, but they wanted proprietary control of information in the U.S. market, which was a stumbling block early on in the discussion. Dr. Trifonov has another smaller project, stemming from his ISTC research, that radiologically tests poison levels in animals and berries before they reach the market. There are three other researchers involved with this project on Russian/Belorussian side.

Diverse Funding

His institute has a budget of $1 million and about $63,000 comes from ISTC annually. Both he and his institute have received support from other funding sources, including from the TACISS and Copernicus programs, and also from the Agency for Atomic Energy in Vienna.

Young Scientists

Dr. Trifonov reported that many young people have left his institute, and there are not many new graduate students coming in. But the entire country of Belorussia, he says, has a difficult time recruiting scientists.

International Cooperation and Networks

Dr. Trifonov's institute had a relationship with BNL prior to the ISTC grant. During the project, he traveled twice to New York, and he still works closely with Dr. Svenakis, his main collaborator, but only privately, he says, because of U.S.-Belorussian tension (he cited Belorussian President Lukaschenko as a barrier to dealing with the EU and U.S.). They are working on an article to be published in a U.S. journal. He has published three papers in European journals and two in the U.S. during the ISTC project.

Lessons Learned

- **Politics in the former Soviet republics, and between states, can interfere with project development and international collaboration.** Dr. Trifonov mentioned more than once that international tension between funding states can interfere with communications, travel, funding, and a host of other aspects of scientific research.
- **Language and other communications skills for PMs need to be stressed and developed.** Dr. Trifonov had difficulty with English in our interview and often could not make himself understood in English. PMs should be required to take advantage of ISTC's seminars on presentation skills and receive language training, if necessary.

Case # 079 Condensed Carbon and Immunoderivatives

PM: **Kotosonov, A.S.**
Lead Institute: **NIIGrafit, Moscow**
Supporting Institute: **INEOS in Moscow was a supporting institute on the project and where the case interview was conducted. Drs. Vinogradov, Kisilov, and Romanova present.**
Foreign Collaborators: **France, United Kingdom, Portugal, Germany**

Introduction and Project Objective

Project #079 explored ways of developing and producing materials with unusual electrophysical properties. The research team hoped to made devices from these materials that would find markets in the electronics industry, including nanotubes of pure carbon, but they were not successful in finding foreign contracts and support for their results. Dr. Kisilov said one of the reasons for this failure was that the carbon compound needed for their work is prohibitively expensive, at $1000 per gram. In one of his labs, he has one of the three best microscopes in Russia, but now he needs something stronger, and he goes to Oxford to use new microscopes. The research team was already together prior to the project's start and remains a unit.

Economic Value

The team members said there is no mechanism to develop business ideas generated by their research at the institute. They repeatedly asserted that there are commercial applications for their work, but they could not really identify them and were vague about specific industries that might use them. Dr. Romanova applied for two Russian patents but did not secure them.

Diverse Funding

Project #1024.2 is a second ISTC project that contains members of the project research team, but the second project is not really related to #079. Dr. Kisilov did identify Mer Corporation (US) as a company that makes pure carbon nanotubes, but the research team was not able to affiliate with Mer, for some reason. Again, the team members were vague.

Young Scientists

Dima Sakharov was a young researcher on their team, very bright, but he left for Berkeley. This team does not seem to be successfully attracting young talent and is generally low on enthusiasm and energy.

International Cooperation and Networks

Professor Vinogradov credits ISTC with redirecting his work through this grant. "ISTC gave me the right direction." He has an American colleague who supports his work in cash, probably off a grant, but he doesn't know. He doesn't know anything about how the STIMs work at ISTC, or the sustainability group. The team did seminars and conferences during the project, and they had contacts with international collaborators with whom they

had not previously worked, and they remain working together, but on what it was not clear. And these contacts do not seem to have led the team to new sources of funding.

Other Comments

The researchers complained that there is no official apparatus at their institute to help research teams locate and apply for funds. They have used another institute to apply for patents. “Each researcher is on her own,” Romanova said.

Case 0101 A, B, C: Ocean Nuclear Database

PM: **Lavkovsky, Stanislav Alexandrovich (also met with Vadim Sodovenko and Mr. Kobziov, on the team)**
Lead Institute: **Lazurit Joint-Stock Company, Nizhne Novgorod**
Foreign Collaborators: **Joint Research Center of the European Commission (Italy)**
SGN (France)
University of Edinburg (Scotland)
Martin Marietta Corporation (USA)

Project flagged for diverse funding

Introduction and Project Objective

This project has developed a database to track and forecast the movement and effects on aquatic ecosystems of nuclear waste in the Barents and Kara Seas and in the Sea of Japan. The "A" phase started in 1995 at Lazurit in Nizhne Novgorod (the formerly closed city of Gorky) with a small feasibility grant from the U.S. and EU. The "B" phase was approved in Brussels for the EU Commission, and the team subsequently received an extension for the "C" phase, which is now close to completion. The research team is monitoring nuclear waste and fuel from a total of 21 sunken nuclear submarines (16 in the Kara Sea and 5 more in the Far East). In addition, during the "C" phase of the project, researchers have discovered another "package" of nuclear fuel in the sunken ice breaker "Lenin" that contains 60 percent of all waste in the Kara Sea. Lazurit has a new project (#2254), funded by the U.S. and Norway, to work on mapping and monitoring this package. Lazurit bought 7 workstations, including one that hosts a web site that provides information on nuclear remediation sites (www.lazurit.nnov.ru). Other institutes, like Kurchatov, have used the models developed at Lazurit that use C++ language, and Lazurit has developed training courses on their proprietary software for use on other projects. They update their databases twice a year. Lazurit obtains the data for the database by contracting with other institutes, such as Typhoon in Kaluga, and then develops software to analyze it. This ISTC grant currently employs about 40-50 people, but the team used to have 143 people working on the project. Lazurit itself has shrunk from 2000 employees to 500 currently. One key issue for the team is to keep the databases updated. They estimate that it costs $50,000 for two years to do the updates, but funds for this are not available from the Russian Federation, as it decommissions the Russian nuclear sub fleet by 2007.

Economic Value

Lavkovsky has overseen the transition of his unit within the institute into a joint-stock company, through which much of the contracting with other institutes, grant-making institutions, and foreign governments takes place. (The larger Lazurit Institute itself is still one of Russia's premier submarine design centers.) The company does some classified work, but mostly their work is open and on contract. The "Golden Share" in the company belongs to the state, and staff and management have shares, as do outside investors. The company also has a marketing and patenting office. Lavkovsky made this

transition in 1992 and says he has no regrets. "For us, it was the right thing to do, at the right time." Why don't other institutes re-form as joint-stock companies? He said it depends on the larger institute's relationship with the lab/unit. "It's not a perfect arrangement, but it has worked for us, providing some measure of independence from institute directors whose interests don't always coincide with our own." There are no access or sales restrictions on anything that the joint-stock company researches or produces that is not classified.

Diverse Funding

The joint-stock company structure has helped them obtain contracts for software databases, and now, only 5 percent of their people work on RF defense contracts. For instance, the Institute of Applied System Analysis (IASSA) in Laxembourg, Austria, has a contract with Lazurit to upgrade their nuclear waste database. They have another contract with the Joint U.S.-Russian Ecological Safety Project (U.S. Energy Department) to buy computers.

International Cooperation and Networks

Lazurit's contacts within the Russian submarine sector, not surprisingly, are already very good. Some Russian experts came to the project without the direct involvement of their institutes but with their permission. Some institutes, however, such as the Kurchatov Institute, do have contracts with them. How did a closed institute like Lazurit, in a closed city, find foreign collaborators initially? Some of their foreign collaborators have come to them as a result of submarine and platform rescue and recovery operations in which Lazurit was involved. Lazurit researchers wrote a fact book about underwater rescuing operations that attracted the interest of Perry Technologies, in Florida. Perry contacted ISTC about doing joint research and has been closely involved with Lazurit for years, jointly building a mathematical model of nuclear fuel release into ocean environments. Lavkovsky admitted that they do not have trouble attracting foreign collaborators on their projects but could always use more grant and contract financing. They have sent researchers to conferences in Copenhagen, Hamburg, and the UK that have been very beneficial (Britain and Russia both have serious offshore nuclear waste crises). Currently, Lazurit is very involved in an effort to build a new mathematical model that would standardize methods for monitoring ocean environments for nuclear threats with Western researchers. And they participated recently in Woods Hole's "Aim Up" project. Mr. Kobziov mentioned that joint publications do occur with foreign collaborators, but that most of their publishing is done in Russian journals.

Public Interest (defense; government benefit; historic liabilities)

Certainly, this project contains enormous benefit for the Russian federation in addressing "historic liabilities," and for dozens of foreign countries affected by the potential for nuclear fuel and waste that was dumped by the Russian fleet. Interestingly, however, Lavkovsky described the current situation of spent fuel, waste, and sunken reactors in the Kara, Barents, and Far East as "not threatening" to the environment.

Lessons Learned

The joint-stock company model may provide entrepreneurial researchers with a way to run contracts and grants separately from their institutes without actually resigning their posts. By providing the institute with shares, this model may help reduce friction between PMs and their institute directors by contributing overhead and other remuneration to the institute; may attract and help retain young scientists with the promise of increased pay; and may help specific parts of institutes re-tool with new equipment while others are closed or shut down.

Other Comments

Lavkovsky credits David Gibbons, their first SPM, with providing harsh "schooling" under his guidance. Gibbons strongly encouraged Lazarit to get private partners.

Case 201 Aircraft Wake Safety Problem

PM: **V. Vyshinsky**
Lead Institute: **TsAGI**
Supporting Institute: **none**
Collaborators: **Japan Aircraft Development Corporation**
National Aerospace Laboratory NLR, The Netherlands
Boeing Technical Research Center, RF
AIRBUS Industrie, France
ONERA, France

Project flagged by MD for economic value.

Introduction and Project Objective

Project 201 was the first in a series of three ISTC-sponsored science projects designed to address the issue of wake turbulence generated by aircraft during take-off and landing. This area of inquiry is a particularly relevant at a time when airports are quickly reaching capacity and are expected to absorb annual growth rates in passenger and cargo loads of 5 to 6 percent. Understanding of vortex wake problems and development of technical solutions could play a major part in improving flight safety and increasing airport capacity. The research carried out by the TsAGI team investigated aerodynamic models of the vortex wake, aerodynamic loads of encountering aircraft, and structural strength and flight dynamics. ISTC-supported research as well as related research supported by INTAS has lead to the consideration of concrete measures to address the vortex wake problem such as early warning systems, improved aircraft design, and flight simulators to aid future research.

In addition to the potentially significant scientific and technical development resulting from this line of research, through participation in the ISTC science and partner programs the PM has made significant efforts in institutionalizing processes that will lead to the long-term sustainability through the creation of a Scientific Innovation Laboratory.

Economic Value

From the outset the economic potential of the research was clear; it was the Moscow office of Boeing that initially put the TsAGI team in contact with ISTC. The research team is nearing completion of a partner project with DFS Deutsche Flugsicherung on practical applications. There is a good possibility of continuing the partnership with DFS as well as other private sector partners.

Diverse Funding

The TsAGI team has been very successful in diversifying its sources of funding.
In addition to the two ISTC science projects and one partner project the research team has also been awarded 4 INTAS grants. Despite the improved financial health of TsAGI the research team is no less keen to pursue outside funding. Generally, there are two possibilities: body shopping and off shore science. Both of these are more difficult for those involved in weapons. First, partner projects are difficult to initiate within the ISTC

framework: "We had partners, they were ready to pay, we were ready to work, but it took ISTC a year and a half to approve the projects. A normal partner will not wait so long and we also find it difficult to wait." There is also the possibility of working directly through international contract. Although the prospects look good for developing and continuing partnerships with Eurpean and Japanese companies there is no guarantee that TsAGI leadership will permit companies to work with TsAGI scientists within the laboratories.

Young Scientists

"The center of gravity of research is leaving the institutes and moving to universities. They have the young specialists and grants" and the PM finds it difficult to recruit and support young talent.

International Cooperation and Networks

The Project Manager's recognition of ISTC assistance in developing international business and research contacts was unequivocal. Several members of the research team have traveled abroad for conferences and meetings, have written joint papers, and maintain communication. However, the team has discovered that maintaining fruitful partnerships is very difficult due to the constraints on electronic communication within TsAGI. One potential business partnership with a US company failed due to these communication problems and now the team focuses on only those companies with a presence in Moscow.

ISTC supported foreign and domestic business trips and scientific conferences but the primary support for developing and maintaining relationships across domestic research institutes was the INTAS program. In these programs the TsAGI team was better able to incorporate non-weapons scientists and recruit talent on an as-needed basis.

Public Interest

Increased flight safety.

Other Comments

ISTC experience: While wholly supportive of the ISTC program the PM expressed some frustration with the application process. He observed that the INTAS proposal process is shorter and smoother and that the ISTC process is prolonged due to required government approvals and changing and inconsistent procedures. He also noted that ISTC compensation procedures were appropriate and prompt and was perhaps the strongest component administratively. If payments were delayed, as INTAS payments are, or were directed through the institute the level of compensation would be diminished. The PM fully acknowledged that some bureaucratic delays were due to TsAGI itself; for instance, it took three months to receive approval for submitting a report on CD when sending the same information in paper format would have been a relatively simple process.

Institutional change: While TsAGI is better able to pay its scientists the survival of the institute is a significant challenge: " Our large institutes are dieing; they are dinosaurs.

The infrastructure costs so much to maintain. The delay in reconstruction is long overdue. Every director is concerned with the survival of the institute." Many TsAGI research teams are working with local offices of foreign firms but money is not the only challenge. Due to infrastructure deficiencies teams have difficulty performing their own experiments. Here too contacts with foreign research units are crucial and this research team has received experimental data from collaborators and partners; however in applied fields the inability to conduct experiments is a significant barrier to scientific investigation and sustainability.

Within the institute there is significant resistance to conversion, civil applications, and new structures that would facilitate working with the private sector. At the same time without regular pay and social guarantees it is difficult to attract young scientists. "TsAGI has many contracts but the money received is not what is in the contract. You don't know when or how you will receive the payment. Sometime it is the practice that the last payment will disappear."

The Project Manager's long-term solution to the problem is to establish a Scientific Innovation Laboratory (SIL) that will operate independently of TsAGI; he sees it as a natural extension of his ISTC-supported research and contracts. Through this entrepreneurial endeavor the research will be continued, young scientists can be attracted and supported, and experienced scientists can better engage the private sector. The SIL will be located either within a university setting or will operate independently with support from the airline industry and will be comprised of three laboratories--a Computational Mathematics Laboratory, Computational Physics Laboratory, and Computational Fluid Dynamics Laboratory. The SIL currently exists virtually, linking scientists across institutions. When realized the SIL will largely maintain this virtual structure and will involve specialists from various institutes on an as-needed basis to support a core laboratory of 10 scientists and a few support staff. The SIL will be the hub of specialized, joint research activity as well as seminars, workshops and publication that will link foreign universities and industry, domestic universities and research centers. The organizational, human, and intellectual capital required to realize the SIL are all founded upon the research team's experience in the ISTC science and partner programs. The SIL is currently being coordinated through the ISTC.

Lessons Learned

This case illustrates a circumstance shared by many commercially oriented or promising projects. Applied research can be more costly—in this case particularly in terms of infrastructure requirements--than the basic research that proceeds it but lack of funds can preempt the development of a market-worthy idea, technology, or process; at the same time the research is not developed to the level where it might attract outside investment. This experience is by no means particular to the RF and CIS context. Other regions have begun to address the issue by establishing institute-based seed funds explicitly for proof of concept and prototype development in order to diminish the risk for potential investors and thereby make the technology more attractive to investors.

Case 204 Silicon Carbide Semiconducting Material for Sensors & Electronics

PM: Tairov, Yuri
Lead Institute: St. Petersburg Electrotechnical University
Russian Collaborator: Physical and Technical Institute of Silicon-Carbide Structure, St. Petersburg
Foreign Collaborators: University of Linkoping, Sweden; Siemens AG, Germany; OKMETIC ltd, Finland; Sandia National Labs, USA

Project flagged for Networking

Introduction and Project Objective

From the start of his professional research career, Dr. Tairov says he has always worked closely on industry problems. His work with silicon carbide, which can improve semiconductor efficiency, has wide industry application beyond the military sector (where it can be used in weapons like high-frequency electronics that can survive a nuclear blast). Silicon carbide is important for basic science too: since each poly-type has its own electro-chemical properties, they are frequently used in physics. Project #204 began in 1994 and finished in 1997 and focused on improving the quality of the silicon carbide in the production of different types of devices, like high-voltage equipment. Dr. Tairov said he could have lost his research team if he had not found ISTC funding in 1994, and by the end of the project, he had dramatically expanded his international and commercial contacts and now has many more funding possibilities than he did prior to 1994. He has a research team of 15 now, plus 5-10 student researchers, which is 60 percent lower than it was in the 1980s but, he says, "considerably leaner and better attuned to industrial demands." Like most research on silicon carbide in other labs and companies around the world, his team focuses on making incremental advancements and does not expect major breakthroughs in the field.

Economic Value

He has had tremendous success in obtaining contracts for building devices based on his research, primarily for private companies like Union Minière (Belgium) and SK (Korea). He said that a couple of Chinese companies interested in his devices for military applications. Dr. Tairov has also worked with Siemens, but recently Siemens changed its policy and will not work with foreign researchers. He has considered forming a joint-stock company from which to run his lab, but he says this structure is not well-suited to the university environment. However, he has formed what he calls a "research lab" company within the university to do small research project contracts. On other production projects, he affiliates with other Russian companies to sign production contracts. "I've had no trouble signing contracts to build devices, either in my lab or for other companies, but I only work on one at a time."

Diverse Funding

Clearly, Dr. Tairov has been very successful in supporting his research with a variety of funding sources, and since #204 ended in 1997, he has not returned to ISTC for funding and instead has relied on external contracts to fund his lab. Nor, he says, has he had the

opportunity to suggest colleagues use ISTC. “It just has never come up.” He arranges research contracts between his university and other schools, but also between his team and private companies, domestically and abroad. “It is my ideology that it is not necessary for Russian researchers to receive government support, because science is international. The best Russian science should stand on its own, with outside support. It’s necessary to work with foreign colleagues on common problems.”

Young Scientists

Dr. Tairov says he attracts young researchers to his team “without difficulty.” “15 years ago,” he says, “graduates stayed in my lab. Now, they go to work for foreign companies in Sweden, Germany, and Japan, which is a very healthy development for Russian science. Russia cannot use as many high-level scientists as before [the collapse] because high technology development requires so much capital, which the country does not have.” So even as he loses researchers, new ones come in to work with him, and then move on.

International Cooperation and Networks

His research team had contacts with foreign scholars prior to 1994, primarily with Americans. He has published extensively abroad (300 articles), and it is through his publications that international companies found him during and after the ISTC project. He has been a visiting lecturer abroad and has traveled as a consultant.

Lessons Learned

- **Projects that result in a marketable device needed by industry might more easily achieve success criteria (international cooperation and networks, diverse funding sources, young scientists) than those that do not**.

- **Publishing in foreign journals provides foreign companies with easier access to Russian expertise.** ISTC may want to more strongly encourage PMs to publish abroad to increase exposure of the research and expertise of Russian scientists.

- **Work in a scientifically mature field enhances international exposure to previously hidden Russian expertise.** In this case, the research team makes incremental advancements in a field (semiconductors) that is extremely important to industry worldwide and is able to tap not only into a global market but also into many other research teams in other countries. On the contrary, more esoteric research in which fewer scholars and scientists work may limit exposure of the research results.

Case G-10 Development of Building Blocks of Semi-conductors
Based on GaAs and Related Compounds for Apparatus and Systems

PM: **Khuchua,, Nina Pavlovna**
Lead Institute: **Tbilisi State University, Research and Development Complex, Electron Technology**
Foreign Collaborators: **Fraunhofer Institute of Solid State Physics, Germany**

Project flagged for networks

Introduction and Project Objective

The ISTC science project supported research into the use of gallium arsenides in integrated circuit and semiconductor technology. Research continues but the project was the starting point for a long-term and beneficial foreign collaboration and for a commercialization strategy for the Research and Production Complex (RPC) of Tblisi State University. The project supported 43 people in addition to some specialists outside of the Electron Technology unit.

This project and Dr. Khuchua's research team is a testament to the resources that can be generated by providing the financial and institutional support for enabling productive partnerships and expanding the knowledge-base and world view of project participants.

Economic Value

According to PM Dr. Khuchua "RPC's philosophy is to elaborate the enabling skills to create and to sustain job opportunities and economic growth. This enabling philosophy is not to acquire ships but rather a shipyard, making available tools, know-how and training to put people in the position to build, operate, and repair ships."

At the beginning of the project the team only had general understanding of what commercialization was and Dr. Khuchua made every effort that she and her staff came to a better, more complete understanding. In parallel with the project's research component the team began to investigate market possibilities. After completion of the project in 1997 it was clear that market potential would rely on expanding the nomenclature of the technologies under development. Through numerous partnerships, collaborations, and consultations, over a five-year period the team developed a marketing strategy that would work in the Georgian context. The team cannot compete with Siemens and the like and that is not the goal; rather, the team developed a technology that would enable them to address specific client needs rapidly, flexibly, and cheaply.

Due to the cultivation of long-term personal contacts and the establishment of new contacts the RPC is on the verge of becoming a viable commercial entity complete with state of the art western production equipment and capable of meeting the design and production demands of an ever changing and demanding industry. Upon completion of a new ISTC project with the Fraunhofer Institute the RPC will be the suppliers of the semiconductors for their microsystems.

Diverse Funding

Subsequent to G-10 support the research team as awarded a second ISTC grant; the three-year project will receive 722,000USD, half of which will be provided by the Fraunhofer Institute. The team also received a NATO Science for Peace grant to develop fabrication technologies for GaAs-based integrated circuits. This project has been particularly significant in improving the technology infrastructure of the entire Research and Development Complex as well has being useful in establishing ties in other European countries, particularly Greece. The project team has also received funding from the STCU to support a joint project with the Institute of Technical Mechanics of the National Academy of Sciences of Ukraine. Research team members have also received travel support to establish business ties in the United States from CRDF.

International Cooperation and Networks

In the early 1990s financial support for the Research and Production Complex had all but disappeared and the team realized they needed significant assistance to orient themselves to these new circumstances. By Dr. Khuchua's reckoning it is the international personal contacts to which the research team's success can be attributed. The ISTC project gave Dr. Khuchua the means to reconnect with German physicists whom she first encountered in the 1960s. The relationship with the Fraunhofer Institute of Applied Solid State Physics proved to be enormously productive. The collaboration was preceded by mutual visits to the Fraunhofer Institute and the RPC and a number of consultations with scientists there to develop scientific and personal contacts. Dr. Khuchua's experience has led her to conclude, "Without human contacts no work is possible."

The ISTC project was also critical in enabling the research team to reestablish ties with scientists in other CIS countries.

Young Scientists

Recruitment and retention of young talent has been a particularly perplexing problem for the research team. There are no young scientists on the research team and it is well recognized that the long-term health and continued growth of the organization will require new scientists. That said, the RPC is in a position to send scientists abroad to Germany and Greece for three-month training programs in integrated circuit design.

Institutional Change:

Dr. Khuchua is mindful of the continued commercial success of the team and is considering a number of institutional arrangements and models that would best facilitate growth. There is a good possibility of the business components of the laboratory developing into a joint stock company or limited liability corporation; however, there is a shortage of marketing expertise as well as young scientists and professionals. There is no barrier to forming a small company. The university is not in a position to assist financially but assists insofar as it is able; it does not present any barriers.

Other comments

True to her self-sufficiency Dr. Khuchua notes that despite all the support the team has received from ISTC over the last few years, "Not everything depended on ISTC; much

depended on us."

Lessons Learned

The experience of the PM is a testament to the efficacy of international ties and the self-sufficiency to which they can lead. Dr. Khuchua's equal attention to process as well as results have led to significant rewards. This case also illustrates that the extreme financial challenges faced by the institutions that house the research teams are surmountable provided the organizational culture is supportive, or at least does not interfere, of entrepreneurialism on the part of the research team.

Case 767 Low-Energy Positron Source

PM:	**Mezentsev, Nikolai Alexandrovich (e-mail: mezentsev@inp.msk.su)**
Lead Institute:	**Budker Institute of Nuclear Physics, Akademgorodok, Novosibirsk region**
Russian Collaborator:	**VNIITF, Snezhinsk, Chelyabinsk region**
Foreign Collaborators:	**Three Japanese institutes**

Project flagged for Diverse Funding Sources; Economic Development

Introduction and Project Objective

Professor Mezentsev's physics research team set out in 1998 to create a high-quality, slow positron source by building a superconducting "wiggler" with a magnetic field between 8 and 10 Tesla on a "SPring-8" storage ring for use in labs around the world. The project, which finished in 2000 but continues through direct contracts between the Japanese collaborators and the Budker Institute, resulted in a unique machine that Professor Mezentsev and three colleagues from Akademgorodok will commission in August 2002. At a total funding amount of $1.35 million, Project 767 combines basic scientific research with significant economic development and diverse sources of funding in an example of ISTC's high impact on the lives of scientists and the future survival of their research labs.

Economic Value

Professor Mezentsev's institute began 40 years ago in basic science, but now researchers there build commercial devices with wide application, proving, he says, that investment in basic science is paying off. He reported that his international publications with his Japanese collaborators on the project have attracted the attention of officials at BESSY-II, one of Germany's top nuclear physics research centers, as well as Italian government researchers. As a result of the German contacts, his institute has negotiated with BESSY-II to build 4 devices similar to the one about to be installed in Japan, each worth $500,000. His team has already completed a similar machine for LSU and a researcher there named Ben Kraft that was 7 Tesla, for $400,000. Mezentsev's institute is currently in talks with Taiwanese researchers about yet another similar device.

Professor Mezentsev told us that the Budker Institute is considering a plan to form a joint stock company (JSC) that would operate the part of the lab producing these devices. [Bruce following up on whether in fact they've already formed the company---my notes say the Institute has a 40 percent share.] He said the idea had been floated before, but prior to this year, he and his colleagues had feared the institute would not survive such a chaotic and unstable transition. The economic situation, he now feels, is more secure than before, and that perhaps by creating a special division of the institute inside a JSC, they could broaden the applications in which his devices are used beyond physics to potentially include genetics and medicine. In radio-chemistry, for example, certain chemicals can be irradiated to make them more effective in pharmaceutical solutions for blood clots. His colleagues at Budker have already built 100-200 commercial accelerators

that irradiate insulation in cable, kill insects in grain, and reduce pollution. Some of their accelerators, which are not high-energy devices like the one built for Japan in this project, have been sold to China for installation in power plants to reduce smog. He knows of one U.S. company that is considering buying an industrial accelerator from them that would kill bacteria with radiation, although he's not involved directly. Other companies produce accelerators, he says, but his institute's accelerators are more competitive in design, expense, and reliability.

Diverse Funding

Over time, contracts for accelerator devices have replaced state funding for his institute and enabled his team to stay afloat. In 1990, he estimated that 70 percent of his institute's budget came from the state. That share has dropped to 40 percent in 2002, with 60 percent coming from grants and contracts. He's hopeful that state money will increase in the future, but he acknowledges that it will never reach 1990 levels.

His team has a new ISTC project (#1928; $800,000; funded by Japan), but he is not the Project Manager (Yuri Shotunov is the PM). KEK (a Japanese High Energy Physics institute) is the new foreign collaborator. The project will work on a 13 Tesla system.

Professor Mezentsev said that other ISTC programs have been crucial to making international contacts that have increased his opportunities to find new funding sources. In September 2001, he took five team members to Japan for a communications workshop with private companies. As a result of that trip, Budker has begun negotiations with Kawasaki, which apparently is exploring a product shift toward electronics. They are developing a partner project proposal, "Adaptation of Russian Technology to Japanese Industry," and Kawasaki is weighing the possibility of opening an office at Budker.

Buying modern lab equipment, he says, is absolutely crucial to his institute and of critical importance to building devices. He likes the ISTC program's flexibility and appreciates the capacity to change equipment purchases as the need arises during the project. Compared to five years ago, he can now do many more high-quality jobs because he's been able buy equipment with ISTC funds.

The Siberian Academy of Sciences has a tech transfer office located at his institute that helps with industrial relations.

Young Scientists

From 1992 to 1997, his institute suffered a big loss of young researchers, but since then, young scientists are returning to do PhDs. Why? He believes some are "turned off" by commercial sector, but he's not sure why. He thinks that Arzamas, his Russian collaborator, has not lost many researchers and has been stable, but their budget is more stable at Arzamas. There are 3000 people in his institute. Personally, five researchers have left his lab, he says, from low salaries and poor living conditions in Siberia, and Russia in general.

International Cooperation and Networks

His team began researching the concept of a low-energy positron source in 1989. There are 3 big storage machines in the world: Argon Lab in Chicago; Grenoble, France; and SPring-8 in Japan. He knew the collaborators in Japan prior to starting #767, but since the project launched, a few of his co-workers at his institute have emigrated to Chicago, where they currently work at Argon.

Public Interest (defense; government benefit; historic liabilities)

They didn't have a relationship with Russian collaborator VNIITF before the project began, but they are very glad they asked them to participate. The two labs split project tasks very efficiently and communicated well---if mostly by phone and e-mail. On the new ISTC project, Budker will collaborate with Arzamas, not VNIITF, but only because researchers at Arzamas are more qualified than those at VNIITF to perform the work required by the new project. Mezentsev is absolutely convinced that ISTC is responsible for putting him in touch with other Russian researchers with whom he would not otherwise have been able to work.

Other Comments

He's used ISTC's Business Management Training 2-3 times.

He's never had any problems with his SPM and is very appreciative. The SPM's specialty is physics and is always closely involved.

His institute is collaborator on other ISTC projects.

Case A-122 Superconducting Polymer Ceramics

PM: **Davtian, Sevan Paruirovich**
(Dr. Anahit accompanied him in interview)
Lead Institute: **State Engineering University of Armenia, Yerevan**
Foreign Collaborators: **Georgia Institute of Technology, Atlanta, GA USA**

Project flagged for Networking

Introduction and Project Objective

Drs. Davtian and Anahit moved to Armenia in 1991 from the Chernogolovka institute in Moscow around the time of the collapse out of a desire, they said, to help their homeland of Armenia. They found out about ISTC after doing a web search for funding sources. The project was funded by the U.S. for $100,000 in 1998 and ended in 2001, even though research continues without ISTC (or any other domestic or international) support. The research goal was to achieve zero-resistance electrical flow from their polymers. When these polymers are used in micro-electronic devices, a three-litre cylindrical power reactor could replace a much larger power plant. They claimed to have built a successful prototype of a superconducting material together with an application, and they have extended the list of possible new products in which their application can be used. They said the next stage of research will involve nano-composites for industrial uses. Their research team employed 12 people, some of whom he said have emigrated to Iran and other Arab countries on missile projects. Another has retired, but otherwise the team is stable. They have a new project proposal for $180,000 that they are preparing. They continue their relationships with scientists in Moscow, and they go to seminars in Moscow and send students there. They've not considered switching professions, because they like what they do, but they have certainly made sacrifices: their salary from their institute, they said, was $20 per month, and both have recently sold their apartments in Moscow to make ends meet.

Economic Value

Someone named Gregorian from ISTC, and a person from Los Alamos, they said, expressed interest in commercial applications arising from their research, but Davtian said he's "waited a year without following up" with these people. Kamarkov, his SPM, helped them to the TIP on their project, but there was no follow up either on his part or ISTC's, he said.

Young Scientists

They've sent their graduate students to do research in Germany, and one woman on their team moved to Germany permanently.

International Cooperation and Networks

Davtian mentioned that they had a collaborator from an American microelectronics company that went bankrupt. They looked then for another collaborator with ISTC help but didn't find one. The official collaborator on the project ended up being from the University of Nevada and now with the Georgia Institute of Technology in Atlanta, but

they couldn't remember his name, which indicates that they didn't have much contact with him during the project. Prior to the project, they had not had significant contact with foreign scientists because of the militarily sensitive nature of their work. Davtian reported trouble traveling to the U.S. because of visa difficulties, so they went to Germany to a conference, instead. For the next project, he said that he has had a number of positive responses to requests to U.S. collaborators to whom he's sent his international publications (he's published in the *Journal of Polymer Science*, and European journals, too).

Lessons Learned

- **Older researchers may need more specialized attention from SPMs.** Davtian seemed not to understand the role that SPMs and STIMs could play in commercializing their technologies, and it was clear that Davtian expected the STIM to take the initiative in contacting them. Davtian admitted not fully understanding how markets functioned, nor did he seem to have taken a great deal of initiative in finding collaborators, either domestic or foreign. He spoke of "generational differences" as a reason for not understanding markets, as well as for not getting more out of the other ISTC programs like business training and seminar preparation training. He'd had very little exposure to foreigners before the collapse and transition, and now it was difficult. And he's had no success finding other funding for their work. The importance of collaboration, both domestically and internationally, seemed difficult for them to understand.

- **Networking, both domestic and international, should be consistently stressed as a key element in improving the quality of the science in ISTC projects.** Networking seems not to have been given a high priority in this project (despite getting flagged for networking as a case study). They claimed to have had two Russian collaborators (from Chernogolovka) and two from Armenia, but they got "turned down," and they understand that they should NOT propose collaboration with Russian researchers next time. This is confusing to us but certainly fits the pattern in this case of the researchers not being very good about establishing networks of new scientists with whom to collaborate.

Other

They both said that the ISTC in Armenia is not very helpful to them, but that their Moscow-based SPM was extremely cooperative during the project, and that they had excellent communications within the team as a result of computers bought with ISTC grant monies. E-mail is now a vital part of their work, which would not be possible without their computers.

When asked if their university administrators are supportive of their research, they replied, "At least they're not hurting us." They've not explored other ownerships arrangements outside the university structure, such as forming a joint stock company, because "we don't have the capital." Now, they don't have any defense contracts, and the Armenian government has no money for ANYTHING related to technology. Their prior positions at Chernogolovka, in Moscow were almost totally defense related.

Case 254 Research and Development of an Analog Microelectronic Component Basis for Radiation Detector Signal Processing

PM: Volkov, Yuri
Lead Institute: MIFI
Supporting Institutes: NIIT
NII Pulsar
Research Institute of Production Engineering and Automation
Foreign Collaborators: GSI, Germany
Instituto Nazionale de Fisica Nucleare

Project flagged for networking

Introduction and Project Objective

Previously the research team members built electronic equipment for monitoring nuclear tests. Over night they were made obsolete when Russia stopped doing tests. NIIIT is converting to wholly peaceful research in monitors for medical and ecological applications. ISTC funds several projects at MIFI and this particular research team has been involved in projects 254 and 1275. Both projects involved three other RF research institutes and were awarded 650,000USD and 400,000USD respectively. The objective of project 254 was to develop integrated circuits for measurements in nuclear experiments, materials monitoring, and reactor control. The objective of project 1275 was to develop a new detector, a solid-state electronic multiplier, for use in photodetectors, scintillation spectrometers and high-speed timing detectors.

Economic Value

The economic value of this project is as yet unclear due to the early stage development of the technology and some false starts with foreign collaborators and potential partners. The team also had an unlucky encounter with Russian customs when they tried to fulfill a contract with GSI for some integrated circuits. ISTC was instrumental in resolving the customs issues and the delivery proceeded. The team now has a MOU with GSI through 2005.

The commercial potential of the solid-state electronic multipliers is also unclear due to the early stage of development but it is hoped that there will be a wide variety of applications in the area of radiation detection. These SSEM devices are designed to take the place of vacuum photomultipliers, which are costly and resource-intensive. The SSEMs requires only 25 volts as supply, several orders less than the existing technology. One potential commercial application is in tomography. The idea to connect a huge amount of detectors to get data and integrate the data at the smallest amount of space and still maintain sensitivity.

Diverse Funding

The MIFI research team is pursuing a potential partner project with Deutsches Elektron-

Synchrotron (DESY). Hamamatsu also expressed an interest in the SSEMs but there have been no substantive developments. While the team pursues these leads they have submitted a third ISTC proposal, which has been approved without funding.

No one office at MIFI is responsible for coordinating or assisting with additional funding; rather this is carried out on a departmental level. There is no office for technology transfer. There is a patent office to deal with the changes in Russian patent law. Volkov would like to get a patent and is in the process of negotiating this with DESY. They will apply for a joint patent but as yet it is undetermined who will pay for it.

International Cooperation and Networks

Prior to ISTC grant the four RF institutes had a working relationship but the ISTC project brought coherence to their effort and turned the participants into a team. The team also had a working relationship the foreign collaborator, GSI, prior to the project but the project enhanced the relationship and lead to others, specifically a collaboration with Instituto Naxionale di Fisica Nucleare, Italy. The team has published widely in foreign journals and other publications on the topics of ISTC work.

The research team attends conferences only with the help of ISTC. The Hamamatsu lead was developed during a workshop visit to Japan organized by ISTC.

Public Interest (defense; government benefit; historic liabilities)

Potential for improved and cheaper medical devices but the application of SSEMs are as yet unproven.

Young Scientists

Most students who graduate from MIFI leave because of the low pay; because of their backgrounds in electronics they have opportunities elsewhere. Some graduates, however, remained with the team.

Lessons Learned

We had the opportunity to meet several members of the research team, among them junior members with excellent English skills and international ambitions. One team member was particularly instrumental in developing and managing contacts with potential German partners. In this case the presence of younger scientists was not only an distal indicator of the sustainability of institutional training system but a proximate indicator of the research team's sustainability in terms of being networked with foreign collaborators and partners.

Project 636 Development and Investigation of Materials with Giant Magnetoresistance
as Basis for Sensors and Devices Controlled by a Magnetic Field

PM: Sergei Karabashev, interview conducted with Yakov Mukovskii
Lead Institute: MISIS, Moscow
Supporting Institutes: none
Foreign Collaborators: Universiteit Leiden, The Netherlands
Technical University of Vienna, Austria
University of Maryland at College Park, US
Naval Research Laboratory, US

Project flagged for networks and research excellence.

Introduction and Project Objective

Dr. Mukovskii has worked at MISIS in the field of high temperature superconductors and infrared sensors for missiles since 1978. Project 636 enabled the team to carry out research and development of new materials to be used as magnetic memory in static regimes for different electronic devices. The result of the project is a thin film single crystal with high magnetoresistance values, which only 3-4 research teams in the world can produce. Such crystals can be incorporated into sensors, recording, and registration device.

Economic Value

The research team has not been successful in acquiring subsequent funding for the project. The costs of producing a prototype are prohibitive. Mukovskii believes there are numerous commercial applications but his efforts to build productive partnerships with Russian institutions have not been successful. He has also approached several companies at US conferences and the response is the same, "Show us real applications. Make a model and then we will talk about joint venture." Some companies have initiated contact with Mukovskii after learning of his work though conferences and publications. As US companies curtail their own R&D efforts to control costs, Mukovskii hopes there will be opportunities for his team in the future.

Diverse Funding

Mukovskii is very positive about his experience with ISTC but the two years that have passed since he submitted his second application have been difficult. He claims his application has been delayed five or six times. The collaborators would like to move ahead and they help him attend conference in order to maintain ties.

The laboratory survives on grant money alone, approximately $5000 from the Russian Foundation for Basic Research and $5000 from foreign collaborators.

MISIS has money for education but no money for scientific research. It is located in the center of Moscow and can make a lot of money leasing space; he can ask no more than

that they allow him to keep his lab space. “They don't touch us and they allow us to live.”

International Cooperation and Networks

Mukovskii have very strong links to and support from several US research units. All of his contacts with foreign researchers resulted from participation in Project 636. Mukovskii’s method for recruiting collaborators was basic but fruitful: he knew some names based on publications in his field and his team too had and established reputation evinced by international publication. When he applied to the ISTC he contacted 10 groups--5 in US and 5 in Europe; some answered and after that he proposed they take part. His ties to the University of Maryland and the Naval Research Lab have lead to short-term research opportunities in Texas and Florida. The way to develop this project is to develop contacts with foreigners primarily in the US. Mukovskii also has developed contacts in India in a government lab that fulfills order for the Ministry of Defense; this opportunity looks promising insofar as they have asked him to apply for a grant.

Young Scientists

On the team there were two young researchers, with PhDs in physics and materials science, who carried out very good work but now they are in completely different fields; they are programmers in Moscow. There is a staff of 40 in his laboratory. Mukovskii is a group leader and has three researchers, two PhD students, and two engineers under him.

Lessons Learned

This case exemplifies the need to consider sustainability systemically instead of emphasizing the constituent elements. The PM’s excellent international contacts and experience are a necessary but insufficient; he is unable to bring all the elements together to support his team due to the realignment of institutional priorities and lack of funding.

Case 737 Optical Superradiance and Transient Processes in Extended Resonance and Optical Waveguide Media

PM: Suren Osipovich Mirumyants
Lead Institute: Science and Production Center "State Institute of Applied Optics", Kazan, Tatarstan, Russia
Supporting Institutes: Kazan Physical and Technical Institute, Kazan, Tatarstan,
Foreign Collaborators:Heinrich Heine Universität Düsseldorf / Institut für Physik der Kondensierten Materie, Düsseldorf, Germany;VITCON Projectconsult GmbH, Jena, Germany

Project flagged for research excellence

Introduction and Project Objective

Both project 737 and 2121 are in the area of quantum optics. The area if inquiry is optical transient image processes to aid in the development of a photon echo-processor. In project 737 the team was successful in developing a one channel echo-processor and plan to overcome the temperature requirements of the current procedure though laser cooling in lieu of helium in project 2121. The research team hopes that by the conclusion of project 2121, which at the time of the interview had been awarded funding by the EU but was not underway, they will have a demonstration prototype. These processors could have potential applications in medicine, agriculture, and a number of other fields.

Economic Value

Over the course of project 737 the project team underwent a sea change with regard to their orientation and interest in commercialization of the technology under development. “In the beginning we didn't expect that we would get any applied device. However, during experiments we understood that our technology could be applied in a commercial context. By the end of this project we even had negotiations with several companies about real commercialization.” All of these negotiations were with Russian companies, in Kazan and elsewhere. The project team claims there was genuine interest in technology deployment on the part of some companies but the process faltered when the companies could not raise the necessary funds.

Once they realized the promise of their research the team was intent on developing a full-scale prototype with complete documentation but limited resources dictated that they only lab prototype without all the appropriate documentation. The shortage of funds had in part to due with the decline of the euro during the project period.

The project team has made some effort to introduce the technology to a foreign audience. The results of the project were presented in Japan and the team was told there was great interest. However, none of the team members attended the workshop; ISTC SPM presented results and there was no significant follow-up. The project team intends to expand their commercial contacts to foreign companies in project 2121. The team

already produces a device, unrelated to the one developed in 737, for several foreign research organizations. These contacts were made with the help of one of the foreign collaborators of project 737. One collaboration with a German scientist has been particularly productive.

As yet there is no patent but the team intends to follow through with intellectual property rights registration during project 2121.

Diverse Funding

The project team was very direct in saying that ISTC support is the only way for the team to survive and the only opportunity to find other funding sources. In addition to the ISTC funding the team has been awarded some funds from the Russian Foundation for Basic Research and these funds will be used to help buy equipment needed in project 2121. However, these funds were made available only to the co-PM from the Kazan Physical and Technical Institute; the co-PM from the State Institute for Applied Optics was told he was ineligible for these funds due to his status as a former weapons scientist.

International Cooperation and Networks

ISTC was instrumental in recruiting foreign collaborators for project 737. Most of the team had worked in a closed institute and did not have the means to make their own connections. Of the half-dozen collaborators two engaged in significant intellectual exchange and assisted in the publication and presentation of the research. One of the co-PMs is particularly active in terms of publications in foreign journals and has developed an extensive network over the last several years.

The team hopes to make project 2121 more productive and will use it as a means to maintain and expand substantive contact with foreign colleagues who they hope will be useful in funding later applied research and in later joint research.

As a condition of participating in the ISTC science program technical reports were required every quarter; both PMs said this provided the basis for twice as many publications than they would have produced otherwise. In all there were 45 published papers and 34 presentations resulted from this research project.

Young Scientists

The only mechanism the State Institute of Applied Optics has to recruit young scientists is by developing financial resources through contracts with academic institutes. Every year 20-25 students participate in a practicum in the institute but after graduation the few stay and most pursue careers in the commercial sector. Project 2121 could be key in having a longer-term impact; the team as successfully recruited five young but experienced professionals from each institute to participate.

Institutional Change

As one of the PMs said, “The institute is like ice melting.” The Institute has shrunk from 5000 scientists to 1300 or less and “Even with all this equipment there is no opportunity.” In the time separating the conclusion of project 737 and the anticipated start of project

2121 the financial circumstance of the team, particularly those located at the State Institute for Applied Optics, has been grim. Two key team members took up construction work and several cultivated their own food. Even so, the PMs say that without the beneficial partnership with the Kazan Physical and Technical Institute conditions would be more serious.

The project managers had both participated in workshops and in business training courses.

Lessons Learned

The experience of this research team appears to support the thesis that Russian business has not reached a point where it can support R&D. The PMs have not had the opportunity to present their technology themselves in an international forum but it seems likely, in light of their second project, that this is a possibility for the future.

Project 781 Development of the Technical Project of a Device for Fine Purification of Gas Flows from Particles

PM: Dmitry Gorbenko
Lead Institute: VNIIEF, Sarov
Supporting Institutes: Konstruksionnye Pokrytiya Ltd., Moscow
Foreign Collaborators: Los Alamos National Laboratory, USA; MSE Technology Applications, Inc., USA

Project flagged for diverse funding

Introduction and Project Objective

The aim of this project was to develop and construct a prototype of a device to purify gas flows of submicron liquid and particle contaminants at high flow rates. In addition to developing a solution to a vexing scientific problem the project team believes there is market opportunity for such a device in a variety of commercial sectors.

The project team had originally asked only for $200,000 to support investigations into the theoretical basis of such a device but in negotiating the project agreement with ISTC the project team was encouraged to prove the practicality of the technique and was awarded extra funds to do so.

Economic Value

The Technology Implementation Plan developed by the team is considered one of the strongest, and is used by ISTC staff as an example for other teams to follow. The team initially envisioned deploying the device in environmental safety but have since discovered opportunities in perfume and cement production. The PM cited a US tire manufacturer that was able to increase the life of a tire by 30% by purifying inputs to 15 microns: the fewer the contaminant particles, the higher the quality the product.

Even with market opportunity technology transfer has proved to be a daunting process. First, an operational device has proved to be more difficult to achieve than expected and there are several technological problems yet to be resolved. Russian tire and cement facilities have expressed an interest but in addition to the $150,000 price tag there are unresolved technical issues that undermine the devices market readiness. The device does not function well at high temperatures and there is a sound insulation issue; the machine operates at 95 decibels when the allowed maximum is 85.

Second, research team has an appreciation for how ill equipped they are to gain market access. The project manager said from an organizational standpoint participation in the science program was critical to helping him understand how better to organize his team and find new approaches. He said they had all undervalued the role of marketing. The PM said, “It had seemed to me that if an engineer tried to develop something and he succeeded, and there will be demand. Where it should be demanded is not my job. As I received marketing education in advance of the ISTC project I knew we had to find the segments for clients of the products, the audience, the proper words that would lead to

that audience and make that audience discover your project. Only then when a customer has purchased the product can you consider your work complete."

He has had colleagues conduct a market analysis and has tried to drum up support and interest among the project's foreign collaborators. The team continues to work as it looks for customers. They attend ISTC meetings and seminars and have web pages promoting the machine. "Everywhere we can we show our product. Life has not once told us where one can turn to find the customer. It can be that unexpected." The PM views patenting as a method of marketing. There is a Russian and an international patent "to interest potential customers. The expert who conducts the patent search will then apply to us for the technology. This is how to find your customer. Of course no poet will read those kinds of books; the interested person will find it."

Lastly, the team is just beginning to encounter production challenges. They are learning how to cope with unstable prices of inputs and the consequences for production.

Diverse Funding

As they continue to develop the purification device the team is diversifying their interests and expertise and have submitted to ISTC an application for an unrelated project concerning ion coating. In this way the PM is managing his team like a business, "Any organization needs to have its pocket of demands for work. When you complete one project you get another started and start to think about financing for a third. Proj. 2527 is completely different area. Our focus is either to start 2527 or continue with the original projects. If neither project goes far we will get a third project. If both projects go forward we will have to divide the team. If we succeed in finding financial sources then we would have to have more people."

The team has struggled without institutional support. So long as the team does not ask for financial support the institute does not intervene but they see the goals of the research team, insofar as they involve improved manufacturing of cement and perfume, as divorced from institute objectives.

International Cooperation and Networks

Due to easy access to email and frequent attendance of workshops and seminars the PM has been able to break into the informal networks that will help his team and his business become a success. The team participated in three US-Russia workshops in which they presented their findings. The PM quickly realized the real work of these workshops was occurring in the corridors. They started to talk about other projects and the need for collaborative support. He approached representatives from 10 different companies to serve in this collaborative role; "nine persons turned us down but the 10th said yes; they said it was interesting research." In these same corridor sessions the PM developed close ties with his collaborator from Los Alamos. Together they "discussed principle issues such as coagulation problem of small dispersed particles which are enlarged in certain cases, resistance of technique to ensure safety, use of power installations, etc. We thought we were on the right path but in the seminar we came to realize that we still needed to work on some issues. We then adjusted out scientific fields, invited new

experts, and worked with publication. In one year after we resolved the issues we reported to the US in Montana [to interested company]."

Young scientists:
"Everyone votes with two hands to be involved."

Lessons Learned
Project 781 is a good example of a project team cooperating with ISTC in developing a technology for commercial application, taking advantage of education and training opportunities to better understand their product's potential market, and the intellectual rejuvenation that can result from grappling with new ideas. As with so many other science projects the research team's success was built upon productive international relationships.