

Contract #XXX

REPORT OF THE CONTRACTOR

Phase #2:

Draft Plan to Create a Nanotechnology Proof of Concept Grant Program with US Universities in Technology Transfer, Investment & Skill Development

Contractor: Thomas D. Nastas

**Founder & President
Innovative Ventures Inc.
Haslett, MI USA**

**Presented to:
Evgeny Evdokimov & Anatoly Zaikin
Infrastructure Department
Russian Corporation of Nanotechnologies
Moscow, Russia**

21 December 2010

SUMMARY OF THE PROJECT	3
Introduction.....	3
Summary of Phase #1	3
Background to Phase #2.....	4
The Role of POC Funding in Technology Commercialization: Implication to Russia & Rusnano	4
The Strategy of Phase #2: Our Proposal to US Universities	5
Market Forces are the Catalyst Bringing the Parties Together	5
Reasons to Partner with US Universities	5
Goals in this Phase #2 Project.....	5
Objective #1: Lead Discussions to Create a Rusnano POC Initiative with CU & U-U, the Draft Plan ...	5
Objective #2: Negotiate a Memorandum of Understanding (MoU) to Establish the POC Initiative	5
Objective #3: Define the General Terms of the POC Initiative.....	5
PHASE 2 ACCOMPLISHMENTS	6
Project Objective #1: Lead Discussions for a POC Initiative, the Draft Plan	6
The Execution Plan for a Proof of Concept Initiative.....	6
Draft Plan from the University of Colorado	6
Draft Plan from the University of Utah	6
Project Objective #2: Conclude Memorandum of Understanding, Proof of Concept Initiative.....	6
Vision & Objectives of the Initiative	7
MoU: University of Colorado & Rusnano.....	7
MoU: University of Utah & Rusnano.....	7
Project Objective #3: General Business Terms of the POC Initiative	7
Education & Skill Transfer to Idea Kazan & Other Nanocenters.....	7
Technology Rights of Use	9
Velocity of Deal Flow & Investment.....	10
‘Self-Financing Fund’ to Replenish the POC	10
Co-financing to Leverage Rusnano \$	10
Operating Budget to Manage the University/Rusnano POC initiative	10
Budget Contributions of CU & U-U to the POC initiative.....	11
Forgiveness of University Overhead Costs Charged to the POC initiative	11
Joint R&D Program for Collaborations in Nanotechnology.....	12
NSF Nano Research Center	12
THE GOFORWARD PLAN FOR 2011	13
Next Steps to Consummate the POC Initiative: Phase #3	13
Tasks to Execute in Phase #3	13
Concluding Comments & Recommendations to Rusnano.....	14
Position the Initiative as a Platform to Leverage for Future Partnerships	14
Budget \$100MM for Investment to Fund Multiple POC Initiatives.....	15
Overinvest in Early Adopters to Build Reputation & Word of Mouth for Rusnano	15
Build the Rusnano Brand by Building a Community	15
Preparing for a Tender	16
Selling Risk Incrementally to Engage US Decision Makers for Approval of the Initiative.....	16
APPENDIX.....	18
(Relevant) E-mail correspondence, Contractor, CU, U-U & Rusnano.....	18
Draft POC Proposal from the University of Colorado.....	19
Draft POC Proposal from the University of Utah.....	27
Memorandum of Understandings, Universities of Colorado & Utah POC Proposal	38

SUMMARY OF THE PROJECT

Introduction

This report presents phase #2, the initiative of the Russian Corporation of Nanotechnologies (Rusnano) to partner with the technology transfer offices (TTOs) of US universities in technology transfer, investment and skill development. The execution team included Evgeny Evdokimov & Anatoly Zaikin (Rusnano) & Thomas Nastas, Innovative Ventures Inc (IVI).

Our objective in this phase #2 is a negotiated agreement that incorporates the following components:

1. A grant-making proof-of-concept (POC) initiative to finance US university nano innovations by Rusnano with an exclusive, royalty-free technology right-of-use by Rusnano or an infrastructure partner, e.g., Idea Kazan nanocenter (or others) in Russia.
2. Skill transfer and development to Russia in the US university business model of nanotechnology development, technology transfer, licensing, and formation of new SMEs to commercialize nano-products. We accomplish this transfer of knowledge through two interventions:
 - ‘Embed’ a Russian national (Rusnano or nanocenter employee) into the organization of university TTOs, to learn the techniques & knowledge in the day-to-day activities of technology commercialization from senior managers of TTOs and staff of their licensing officers & business formation teams
 - Hosting of scientists & post-graduate science students from Russian universities to the USA, to learn the details of nanotechnology development from the stage of applied science through laboratory prototyping, testing, technology improvements & final product development
3. Early ‘1st look’ and option for Rusnano (and/or Rusnano Capital or related funds) to invest capital in new US companies formed around the nanotechnologies financed from the POC initiative.

It is these strategies that this phase #2 advanced, to test them with management of the universities of Colorado, Michigan & Utah, generate reactions, issues and objections. We then collaborated to develop 1st thoughts and 1st details in the project plan for consummating the initiative and a contract in 2011.

Summary of Phase #1¹

In May 2010 the team met with senior management in the TTOs of Columbia University, the Universities of Colorado, Michigan, Utah and Washington. We researched and evaluated the strategies and lessons learned by these TTOs in creating new start-ups around university technology and ways to transfer them to Russia.

Business formation teams in these US universities work to two interrelated goals:

1. Commercialize university technology through licensing and selectively, creation of new start-ups.
2. Provide operational assistance in SME creation through three interventions:
 - Develop the business plan/model including early technology evaluation with 1st customers
 - Recruit talent to the venture, e.g., attract serial entrepreneurs and seasoned CEOs to new start-ups in the local community, encourage (and groom) 1st time unproven entrepreneurs for start-ups

¹ Author’s note: In this report, I reference information from the Phase #1 report & recommend that readers read it (Appendix, pages XX-XX).

- Assist in raising capital, i.e., proof-of-concept, prototyping and early product development as grant programs and secure 1st round 'series A' venture capital (VC) investment

These interventions are done to achieve financial and economic development objectives:

1. Increase financial returns on university investment in science, technology & innovation (STI) for the benefit of the university, its employees and the TTO, to increase \$ available for investment in more research & emerging STI creation, provide a steady stream of \$ for STI funding programs and advance student programs in entrepreneurship.
2. Make an economic development impact on the local community by creating more jobs, increasing and diversifying a region's industrial, employment and tax base.
3. Develop the infrastructure for more VC investment and more entrepreneurship in the local community, to reduce the uncertainty and risk of angel and seed investing in university start-ups.

California and Massachusetts have well developed ecosystems for STI & VC investment, and the private sector provides the services to create start-ups which the SME formation teams perform in some university TTOs. Moreover these two states have the largest amounts of VC in the USA, attract US/international investors and serial entrepreneurs that pull innovation from Stanford and MIT; consequently these two universities have little need for business formation strategies in their TTOs and meeting with them would not have advanced Rusnano's knowledge for skill transfer to Russia. Moreover Rusnano knows them well through past visits and is familiar with their successes and their limitations.

But states with a short history in entrepreneurship and difficult economic environments like Michigan, Utah and Colorado lack the ecosystem advantages of Silicon Valley & Boston/Route 128. They are forced to push STI into the market, to execute effectively and efficiently without being pushy or obnoxious to investors; they developed progressive commercialization strategies in business formation to overcome geographic/economic disadvantages and strengthen the private sector with university leadership and initiatives to create a better environment for start-up creation.

It is these strategies that Russia needs to learn, adopt and transfer to the country if it is to build the robust ecosystem needed for successful nanotechnology creation and economic diversification.

Background to Phase #2

The Role of POC Funding in Technology Commercialization: Implication to Russia & Rusnano

Commercialization of new technology starts with R&D and product development to demonstrate 'proof of concept' and the value of novel ideas. Developers are only able to approach potential customers when they clearly present a technology's performance and potential, conducted to a comprehensive analysis under different user conditions.

A POC initiative finances the costs of advancing a technology to the evaluation stage, benchmarking it to direct competitors, alternatives or substitute products to demonstrate its benefits, strengths, weaknesses: then productizing the technology to make it commercial.

Russia is talented in basic science, but lags in the skills to transform applied research into engineering bench models through 1st prototypes for customer testing and feedback; later into 1st sale through scale-up. Knowledge in POC business models is needed for Russia to overcome deficiencies in commercialization; learning from US partners is a solution to accelerate skill development.

The Strategy of Phase #2: Our Proposal to US Universities

The universities of Colorado, Michigan and Utah were most receptive to continue the conversation started by the team and we concentrated our attention on them in this phase #2. The idea proposed by us was the creation of a Rusnano financed POC initiative at CU, U-M and U-U, but it did not stop with investment; integral to our proposal is skill transfer, specifically to integrate an employee of Idea Kazan and other nanocenters into our partner TTOs, to work side-by-side with university licensing officers and business formation professions and learn the US model of technology commercialization from them.

Market Forces are the Catalyst Bringing the Parties Together

CU, U-M and U-U have funding shortfalls for technology POC programs due to state budget cuts as a result of the financial crisis. Russia has a technology & skill shortfall to invent, develop and commercialize innovative nanotechnologies that can compete in local and international markets. Additionally Rusnano nanocenters have an 'entrepreneurial shortfall' in technology commercialization and SME creation.

US universities are more flexible than they might have been in the past in considering relationships with partners in a POC initiative for US technology development and commercialization. Rusnano is ideally positioned to exploit the budget constraints of US universities for its gain to make a step change in achieving the Russian Government's mandate for it. While Rusnano is making investments in domestic companies and is doing all to attract foreign direct investment (FDI) in the nano-tech space, other initiatives are necessary to accelerate nano technology creation with trained professionals that can execute commercialization programs. Partnering with US universities at the very beginnings of nanotech creation through POC funding is a solution to achieve these aims.

Reasons to Partner with US Universities

By targeting nano initiatives in technologies where Russia is weak and US universities are strong, Rusnano can build new technical competencies in nanocenters (and Russia) and justify Russian taxpayer \$ invested abroad. Likewise by learning technology commercialization skills from American developers, talents missing in Russia, Rusnano creates new assets for the country as US trained Russian business development guys return to Idea Kazan and other nanocenters to execute their training in Russia, and mentor their colleagues in the skills and knowledge they acquired in the USA.

Goals in this Phase #2 Project

It was the contractor's role to marry the needs of US universities with the objectives of Rusnano, lead discussions among the parties, sell risk incrementally to create the comfort required for agreement to a project and consummate a memorandum of understanding.

Agreements concluded with CU and U-U is the subject of the remainder of this report. With U-M, discussions are still evolving with its director Ken Nisbet; he expressed his desire to move forward on a project plan with Rusnano after the Christmas holidays in the USA: in fact this meeting in Ann Arbor, MI, is confirmed for 10 January 2010 at 09:00 EST (17:00 Moscow time).

The Contractor project objectives included:

Objective #1: Lead Discussions to Create a Rusnano POC Initiative with CU & U-U, the Draft Plan

Objective #2: Negotiate a Memorandum of Understanding (MoU) to Establish the POC Initiative

Objective #3: Define the General Terms of the POC Initiative

PHASE 2 ACCOMPLISHMENTS

Project Objective #1: Lead Discussions for a POC Initiative, the Draft Plan

The contractor met independently and at his own initiative with CU in Boulder, CO, in July and again in August 2010, to test its reaction and receptivity to developing a long-term partnership with Rusnano. In late August the contractor conducted multiple telephone calls with U-U & U-M; later the contractor organized and led conference calls between the team and the universities.

The purposes of these meetings and calls was to not just test the feasibility of a long-term partnership between the parties, but build confidence on the US side to do business with Rusnano as US university administrators and decision makers have little knowledge of the strategic aims of Rusnano, the people behind Rusnano and solutions to synchronize the educational & research mission of US universities with the goals of Rusnano; the creation of a nanotechnology industry in Russia through investments in applied research, infrastructure development, education & skill development.

The financing of a POC initiative with foreign capital is 'foreign' to US universities as the traditional source is taxpayer \$ from state (Colorado, Michigan, Utah) legislatures and the US government, not a foreign, state-owned corporation that operates as an extension of a foreign government's economic development aims.

The strategy of Rusnano investing Russian taxpayer \$ to finance US university technology is likewise 'alien' to its current business model; yet an out-of-the box gutsy proposition is exactly what's need to drive new thinking and strategies in international partnering, infrastructure development and innovation into the minds and hearts of Rusnano senior and middle management. Investment to access new technology is a worthwhile business objective, but learning must also accompany it to advance economic development goals in Russia.

The team's proposal of embedding a Russian national into the operation of a US university TTO as an intern/trainee under the supervision of the TTO has never been done before: yet it is a strategy that joins the education mandate of US universities & Rusnano needs in an unusual way to promote international sharing of knowledge, best practices and globalization. Add to this an exchange program of Russians working side-by-side with US colleagues in applied science, technology commercialization and new business start-up formation: Now we have a winning proposition that justifies Rusnano support for this POC initiative.

The Execution Plan for a Proof of Concept Initiative

CU, U-U and Rusnano intend to establish a five (5) year, proof of concept initiative with a capitalization of up to \$10 million by Rusnano in each university, invested as tranches, in promising University nanotechnology and/or Rusnano nanocenter technology with commercial potential. The objective of the joint initiative is to support world class researchers conquering interdisciplinary research & engineering challenges in the creation of nanoscience breakthroughs and technology commercialization to the market.

Draft Plan from the University of Colorado

See pages 19-26 to read the draft project plan with CU

Draft Plan from the University of Utah

See pages 27-37 to read the draft plan with the U-U.

Project Objective #2: Conclude Memorandum of Understanding, Proof of Concept Initiative

The contractor prepared the draft MoU, negotiated the final text with management and legal counsel of CU, U-U and Rusnano, with all parties (+ Rusnano's international department) approving the MoU. CU-Rusnano

consummated the MoU on 2 December 2010, and 3 December 2010, U-U-Rusnano consummated the MoU. See pages 38+ to view the two MoUs as PFD files.

Vision & Objectives of the Initiative

1. Develop and implement a comprehensive, world-wide vision to position the CU, U-U, Rusnano and Rusnano's nanocenters as a global leader in nanoscience and technology distinguished by interdisciplinary collaboration and entrepreneurial excellence.
2. Integrate and advance nanoscience and technology across the CU, U-U, Rusnano, its nanocenters and the world.
3. Drive research partnerships between University leaders in Colorado, Utah & Russian academia, the private sector and governmental agencies, forming an interdisciplinary research and educational environment poised to capitalize on emergent nanotechnology research opportunities.
4. Aggressively position the Initiative to competitively vie for nanotechnology research, development, and educational funding.
5. Drive the commercialization of new nanoscience discoveries through technology commercialization (licensing), identification and promotion of entrepreneurial opportunities, and the start-up of new high tech companies.

MoU: University of Colorado & Rusnano

Copy attached to this report in Appendix

MoU: University of Utah & Rusnano

Copy attached to this report in Appendix

Project Objective #3: General Business Terms of the POC Initiative

Education & Skill Transfer to Idea Kazan & Other Nanocenters

A key feature of the agreement is the commitment of CU & U-U to host a Russian national of Rusnano's nomination (meeting the technical, business & language qualifications of CU & U-U) into the TTO as a technology transfer officer.

The Russian 'transplant' (trainee) takes orders from the management of the TTO, are under their authority and control, with TTOs managing, developing, training and disciplining Russian interns, even though trainees' salary, cost of living, travel, etc., is paid by Rusnano and/or nanocenters. The project team believes an intern/trainee program is a win-win for all parties and a practical solution with long-term benefits accruing to everyone.

It's the responsibility of the Russian transplant to learn the business of technology commercialization and develop the ability to make independent decisions that optimize financial and economic development returns in licensing and business formation such as:

1. Distinguish the prospects & criteria for licensing a technology vs. new start-up creation.
2. Promote technology in the market as exclusive and non-exclusive licensees. TTOs proactively build relationships with companies to develop them into future licensees. Building these relationships means personnel interaction, picking up the phone to call acquaintances and making 'cold calls' to potential buyers of technology.

3. Execute license agreements and contracts including pricing, financial, non-financial, legal & license compliance terms & conditions + new investments made by licensees to advance technologies, ownership rights of the university in 2nd generation technologies and royalty rates paid to it.
4. Fund the technology to capitalize the new start-up. CU & U-U intend to cycle Idea Kazan and other nanocenter staff through the programs they use to raise the capital needed to advance university technology from one stage to the next in development through commercialization like;
 - Engineering technology development funds that provide funding for later-stage research activities, for technology refinement.² Size of grant up to \$10k.
 - Micro grant funds which supports researchers' needs to purchase components or hire programming services to demonstrate experimentation results. Size of grant, up to \$5k.
 - Mini grants to document business opportunities for proposed technologies. A mini-grant of \$3k-\$10k is not intended to fund an entire business plan, but a 3-4 page document detailing the technology's potential.
 - Revolving IP fund that pays the legal costs of filing domestic or international patents with costs reimbursed through revenues generated from licensing. Such repayments replenish the facility so it becomes a revolving fund with a one-time investment.
 - Raising seed & 1st round equity capital

Rotating staff from Idea Kazan and other nanocenters exposes them to the role and function of these funds in development and commercialization, the criteria to invest \$ to improve the technology and the sources of these \$; knowledge useful to transfer to the Russian ecosystem,

5. Activities to create a company including legal (corporate) structures, site location of the start-up, creation of scientific committee and business advisory board, recruiting members of the Board of Directors.
6. Creation of the business plan and its execution; specifically the attraction of a CEO or COO candidate to lead a start-up.

This subject merits discussion.

Some university business formation teams are challenged to start companies in communities since they work without the complement of start-up resources that exist around the ecosystem of Stanford & MIT, e.g., Michigan & Colorado. Consequently these US universities are forced to be creative, innovative and proactive in technology commercialization and their learning curve lessons are what Rusnano and its network of nanotechnology centers must learn.

Recruiting talent to start-ups is one example of the learning to be acquired, i.e., attracting and hiring CEOs to university technology start-ups in Michigan & Colorado from the Silicon Valley/MIT communities. U-M has a particular difficult time attracting CEOs from California, what with the State of Michigan's 15% unemployment, crime, decaying infrastructure and declining automotive industry. But they overcame these issues; U-M created 12 new start-ups in 2009 and consistently ranks in the top 10 of universities creating start-ups.

²Source: <http://techtransfer.umich.edu/assets/forms/etdfgap.pdf>

Russian trainees/interns will work under the direction of CU & U-U business developers to learn the strategies used to identify and recruit CEO to new ventures including:

- Network with investors and local VCs, to solicit suggestions on candidates for start-ups. If the candidate accepts the position, there's an excellent chance that the investor will finance the start-up since investors frequently invest in entrepreneurs they've worked with in the past. These TTOs offer small amounts of 'dating' or 'bait' \$ (consulting contracts) to several candidates for CEO positions, to have them perform analysis of the technology and see which ones get 'excited' about the project as a possible job for them. CU has a pool of over 800 potential CEO, COO and project managers for start-ups.
- Entrepreneurial-in-residence³ (EIR) programs, to build a talent pool of potential candidates to manage SMEs. EIRs are experienced entrepreneurs, employed by the TTO and 'embedded' within the team as part-time employees. These individuals expand the business formation capabilities by providing technology and marketing assessments, and function as extensions to business formation staff to mentor faculty and develop venture concepts into start-ups. The EIR performs one of three primary functions:
 - Launch a new venture
 - Assist in the evaluation of potential investments where the entrepreneur has a particular expertise
 - Provide operating expertise to assist with existing investments (SMEs)

For discussion with Rusnano & our university partners: The team's initial thought was to select three (3) nanocenter employees, one from Idea Kazan, one from Zelenograd and one from Tomsk/Novosibirsk, and embedded them into the TTO of CU, U-M and U-U. Skill acquisition in the business of commercialization will take approximately five (5) years, yet it's unpractical to have these three individuals away from their nanocenters for such a long time; nanocenters need this expertise now, not five years from now, with skill transfer needing to happen sooner vs. later.

Our solution to speed skill transfer to Russia is to select two employees from three locations (a total of six), and rotate them from a nanocenter to a university and back to Russia every six months, e.g., employees X & Y are Idea Kazan staff. For the 1st six months X works in Colorado, returns to Idea & Y works for six months in Colorado. Employee Y finishes his 6 month program, returns to Kazan and employee X re-locates to the States for another six months. This plan returns X to Kazan to execute his new skills immediately in the nanocenter & local infrastructure and the same for employee Y.

While this solution targets skill transfer and the needs of Russia, it may be too disruptive to the directors of the TTOs in managing the day-to-day operations of the operation since the responsibilities and job duties assigned to one Russian national may not be easily picked up by his replacement. Certainly this is a point for discussion with the directors of CU, U-U and later with U-M.

Technology Rights of Use

Projects are ready for financing consideration once the TTO receives a disclosure from the university inventor; disclosure under US university policy = ownership of the IP by the university. The team negotiated with CU and U-U that Rusnano or an infrastructure partner, e.g., nanocenter in Russia, receive an exclusive, royalty-free technology right-of-use in the territory of Russia. Potentially this agreement might be extended to the territories of states in the CIS.

³ See these sites to learn more about EIR programs: <http://www.startable.com/2009/04/08/venture-capital-entrepreneur-in-residence-part-1/>, <http://bostonvcblog.typepad.com/vc/2009/09/serving-as-an-entrepreneur-in-residence-at-hbs.html>, <http://www.rmit.org.au/browse;ID=vezl7jzcrkxq> & <http://www.foundationcapital.com/people/entrepreneurs-residence.php>

For discussion with Rusnano & our university partners: Further negotiation is required with each university on the inclusion of this term in a contract, freedoms to execute, restrictions and specifically what Rusnano seeks to achieve. An exclusive license for example is granted to one legal entity, not multiple organizations; an exclusive license granted to a contract signatory prohibits sub-licensing so Rusnano must decide in advance what legal entity it desires to have technology rights-of-use; itself, one nanocenter or another 3rd party.

Velocity of Deal Flow & Investment

CU and U-U will conduct two (2) rounds of technology solicitations/year from university faculty, developers and researchers. Each university expects to receive about 100 nanotech disclosures/year, 30-35 applications/year progressing to the stage for POC funding, of which 9-10 are financed; funding decided between by the TTO, Rusnano and outside advisors. Size of grant is \$50,000-\$200,000 with the average grant being \$50,000-\$100,000.

CU and U-U forecast their ability to invest \$1-\$1.25 million/year in each of the 1st three years with an increase in grant financing in years 4 & 5 as the program builds momentum in the academic community. Total program out-pocket-cost (five years) to Rusnano for each university is estimated at \$8-\$9 million (excluding its operating costs).

What happens next, once \$ are granted and the technologies are commercialized?

'Self-Financing Fund' to Replenish the POC

The team proposed that a small % of the royalties received from licenses in the POC be distributed to Rusnano. This created some objections as CU & U-U have strict guidelines on the use of proceeds as royalties finance the operating budget of their TTO and motivate the university's academic community to create new science. For CU, royalties are distributed equally; 25% to the university general fund, 25% to the TTO, 25% to the inventor and 25% to the inventor's lab (staff). For U-U, sharing is 33.3% to the investor, 33.3% to his/her lab (staff) and 33.3% to the university foundation that finances the TTO's budget.

U-U suggested the idea to structure a royalty sharing agreement whereby a small % of royalties received from nano-tech licensed from the Rusnano POC initiative is re-invested in a 'revolving' fund to create a self-financing initiative for future POC investment in the nanotech space.

For discussion with Rusnano & our university partners: At this time it is uncertain if such an idea is feasible, but certainly it's worth further discussion in Phase #3.

Co-financing to Leverage Rusnano \$

CU is able to co-invest with Rusnano if nano-projects are in the energy, biotechnology or medical device space as the TTO manages State of Colorado POC \$ for these applications; no co-invest \$ are available for nanotech outside these three industries.

U-U has several POC initiatives operating now, and monies may be available for co-invest in 2011 as Rusnano and U-U execute. Matching \$ range from \$35,000-\$50,000.

Operating Budget to Manage the University/Rusnano POC initiative

Initially CU and U-U proposed an operating budget of \$1.4 million and \$955,000 respectively, costs unacceptable for a program that invests only \$1-\$2 million/year and Rusnano's mandate to invest capital but not pay the costs of investing grants.

The team had multiple conversations with senior managers of CU & U-U, to agree that each party pay its own costs to manage the program; the logic of this approach being that a Rusnano financed POC enables the universities to do more of what they are already doing, with no increase in overhead; we learned that this logic is naive.

New capital triggers new expenses. The team negotiated a reduced budget to approximately \$250,000-\$300,000/year. These expenses represent each university's new costs to manage a new program with a new industrial partner. Line item expenses include:

1. Hire a program manager to work day-to-day with staff embedded from Idea Kazan and other nanocenters, mentor and train this individual.
2. Program administration like additional accounting, financial and other expenses related to management of a program with foreign \$ and the reporting to multiple legal jurisdictions.
3. Expenses related to managing IP that may fall under US Government export control legislation.
4. Hosting Russian visiting scientists/students in the exchange program, meeting and travel expenses to Russia by CU & U-U including knowledge transfer/training at Rusnano conferences and hosted events to execute and manage the relationship.

Budget Contributions of CU & U-U to the POC initiative

Each university agreed to invest a package of in-kind services (costs) including:

1. Management oversight, including direct, hands-on training and mentoring of Idea Kazan nationals and other nanocenter personnel working in the TTO by its senior managers.
2. Raise additional grant financing to further commercialization (& leverage Rusnano \$), e.g., raise SBIR/STTR \$ & micro grants to finance development, raise venture capital to capitalize a new start-up around technologies funded.
3. Company start-up services, preparation of corporate documents & corporate governance documents, policies & procedures, recruiting CEOs & senior management to the venture, market assessment, office, research and laboratory facilities, business plan development, logo/brand creation, web hosting & development to name a few.
4. Management of faculty relations, secure, assess & protect inventions, manage patent prosecution, negotiation of licenses/contract process & license compliance, manage the Rusnano contract, update meetings, conferences, writing progress and final reports.

Forgiveness of University Overhead Costs Charged to the POC initiative

US universities negotiate an overhead charge to indirect costs on all contracts from the US government and private sector companies; the rate ranges from a low 37% for US universities with small research budgets, e.g., University of Vermont, up to 75% for those with large research budgets like Stanford. The overhead rate for CU is 52% and 42% for U-U.

In addition to the in-kind contribution that CU TTO makes to the Rusnano program, it is contemplating a significant reduction of some university overhead (facilities & administration fees, F&A). Depending on the budget levels for specific projects, CU TTO will seek permission from its administration to reduce F&A rates from 52% to a sliding rate from 15% to 0%, a contribution of 72% to 100% reduction from the standard F&A rate on selected indirect project costs.

It is estimated that CU contributions for POC program of the size being contemplated by Rusnano, i.e., \$1.00 million-\$2 million annualized, ranges from \$370,000-\$740,000 by CU, a sizable reduction in cost for Rusnano to access US technology. This contribution does not include financial aspects related to the investments that CU has made in research faculty, facilities, equipment and administration over the past decades.

This scheme, forgiveness of F&C, was proposed to management of U-U; decision pending further negotiation.

Joint R&D Program for Collaborations in Nanotechnology

A project goal is translational research leads to high value commercialization opportunities in the shortest period of time. It is implemented through the hosting of Russian scientists and post-graduate students at the CU & U-U.

NSF Nano Research Center

CU, U-U and Rusnano will seek opportunities to develop a joint submission to the National Science Foundation (NSF) to translate nanotechnology opportunities to market. NSF-sponsored Engineering Research Centers⁴ (ERCs) are located at universities across the USA, working with industrial partners to stimulate STI creation and commercialization. With funding from the NSF, universities and industrial partners, the Center develops R&D to the needs of industry in a specific technology fields like nano for biotech, clean energy, etc.⁵

For execution with nanocenters and US partners (CU, U-M, U-U & the NSF), Rusnano has two alternatives: join an existing NSF nano research center or establish a new one. To create a new one, Rusnano would need a US subsidiary of a large Russian enterprise like Gazprom, Lukoil, Rosneft, etc., as its industrial partner to comply with NSF guidelines. The advantage of creating new center is the indirect influence that Rusnano can exert on the Russian partner.

⁴ Source: <http://commercialization-handbook.wikispaces.com/Public+Research+Organizations.com>

⁵Ibid

THE GOFORWARD PLAN FOR 2011

Next Steps to Consummate the POC Initiative: Phase #3

Multiple tasks are required over the next few months (February 2010-May 2010) to conclude a contract with CU, U-M and U-U, and accomplishing them requires a number of actions and decisions from Rusnano management. Generally speaking the tasks will vary from one university to the next as their strategy for execution differs from one another as a function of the ecosystem they operate in, staffing and programs, policies and procedures, etc., yet we can group them into categories.

Tasks to Execute in Phase #3

1. **Plan & budget:** the initiative's 5 year plan including metrics, a detailed 1st year plan & operating budget, decisions required for execution, staffing and reporting processes within the university TTO to the administration & Rusnano, quarterly objectives & evaluation criteria.
2. **Integrate nanocenters into the Initiative:** detail the strategy, ways and means to phase nanocenters into the plan.
3. **Export Russian technology to the office of the US partner:** detail the strategy, methodology, policies and procedures for exporting Russian technology to the US TTO, define ownership of the IP when both parties contribute to its development, cost sharing, ways and means of commercialization in the US, Europe, Asian and CIS markets.
4. **Grant financing:** technologies sought for grant financing, the methodology & decision points for marketing the initiative to the university research community, the application and evaluation process, screening, selecting & approving grant applications including the policies and procedures for vetoing grants, monitoring tech development, decisions points, performance, shortcoming, etc. Resolve unknowns like the recipient of the exclusive licenses granted in the contract, how licenses will be executed in the markets of the USA, Europe, Asia, Russia, etc.
5. **Technology rights of use:** Negotiate the finer details of use of technology in Russia by Rusnano or a 3rd party of Rusnano's choice, restrictions on re-exporting the technology to markets outside the borders of Russia (or CIS), advancements of technology by Russian sources, etc.
6. **Contingencies:** actions to take for shortfalls in execution, in performance and/or cost overruns.
7. **Management of the relationship:** ways & means to manage the relationship with signatories 4,000 kilometers from each other, reporting policies and procedures including frequency & method of communication, correspondence and face-to-face meetings and events.
8. **Funding terms & conditions:** TTOs require \$ on a six month rolling advance. Methods & agreements for Rusnano to fund advances & reimbursements, including shortfalls and/or cost overruns.
9. **Information sharing & meeting schedule:** ways and means to transfer knowledge and learning lessons in tech development, licensing, commercialization & SME creation. Frequency, duration, location & participants from the US & Russia sides.

10. **Advisory committee:** roles, responsibilities, power & authority of the committee to oversee the initiative & the relationship, composition, selection criteria and mix by knowledge, experience, nationality & contributions sought.
11. **Liabilities & exclusions:** legal risks and liabilities to all parties arising from litigation brought in the US courts.
12. **Training & development:** criteria for a Russian national to be embedded in TTOs, mechanisms for selection, duties, role & responsibilities in the TTO, management of, training & development to be received, reporting responsibilities, freedom & 'firewalls' to be erected to prevent access to confidential university IP and/or classified research and/or records, definition & criteria of confidential university IP, classified research and/or information.
13. **Joint research projects:** methodologies to select joint research projects, university college/department to host the Russian scientists/post-graduate students, criteria for Russian selection, procedures and mechanisms for hosting, ownership of the IP resulting from joint research, co-sharing of research costs, laboratory use, mechanism for training & dissemination of research results to multiple legal jurisdictions.
14. **Options & Co-investment rights:** 1st rights and/or options for Rusnano and/or Rusnano affiliated 3rd parties to invest in start-ups and spin-offs created from technologies (core & secondary) developed in the initiative, co-investment rights with the university to invest at the same valuation, terms & conditions.
15. **Sharing of royalties/self-financing POC fund:** explore the feasibility of sharing royalties received from licensed technologies financed from the initiative, their distribution or better, re-investment into a revolving fund for investment into new POC initiative with Rusnano rights in downstream projects.
16. **Creation & funding of a NSF initiative:** Define how to establish a NSF engineering research center between the three parties, NST, a US university and Rusnano or the US subsidiary of a Russian corporation.

Concluding Comments & Recommendations to Rusnano

Initiatives to create a nano tech industry require experimentation & failure as Rusnano knows well. Success in industry creation mandates new approaches and business models just when Rusnano is getting comfortable with the strategies that management has worked so hard to implement.

The notion of a Rusnano financed POC initiative to finance US university technology is a new model that disrupts current thinking of both Rusnano managers and US university administrators. Successful execution requires not only a clear and well defined plan/strategy, but also the foresight to position the initiative as a strategic imperative to generate multiple sources of opportunities in the years to come. Certainly it will create challenges within the organizations and this is the way it should be; seek out controversy.

Position the Initiative as a Platform to Leverage for Future Partnerships

While POC programs are financed as grants from the funding party, for Rusnano it's really an investment to sit at the table of US university technology development; define it as it is and debate it as it is, not what you want it to be.

Structure the relationship & contract as a long-term partnership, with the maturity to control less yet finance more with less immediate benefits; approach with this frame of mind to optimize outcomes vs. execute as a

contract and one-time event to maximize gain at the expense of others. You are in the vortex of a major event in US-Russia relations in tech creation & commercialization, new thinking and ways for the US university community to engage with Russia, with Rusnano: I encourage Rusnano management to leverage this entry point into a platform that others will gladly join in the years to come.

Success in this venture gives Rusnano management and its investment directors a new currency other than cash to enter global markets.

Budget \$100MM for Investment to Fund Multiple POC Initiatives

CU, U-M and U-U are early adopters to do business with, but once your idea virus spreads in the academic community, Rusnano will find itself in the position of being the one sought after vs. being the suitor. Rather than having to return to the Rusnano Supervisory Board for additional funding requests on a transaction-by-transaction basis, capitalize the program with \$100 million, sufficient capital to partner with multiple universities as opportunities arise.

Overinvest in Early Adopters to Build Reputation & Word of Mouth for Rusnano

Why did CU and U-U respond so favorably to the team's initiatives, to be part of something new and innovative? Perhaps they liked to be seen as a leader, to go first, to do an experiment. After they adopted the idea and the notion of doing business with you, they started to spread the idea to others in the academic community, to connect and share new ideas about an outsider entering into the university community.

Their interest and commitment to you is not just about the money.

One day, months or years from now, the relationship will be seen as obvious, trusted and a safe decision. But it won't happen as fast as Rusnano would like. The imperative is simple: over-invest in the early adopters like CU and U-U, embrace them, adore them, support them, don't go away, don't let them down, be patient yet persistent. Mass market acceptance is rare. Viral connections based on experience are the only reliable way to spread new ideas in communities that aren't traditionally focused on the cult of the new.

Success requires that we raise the bar for your flexibility in doing business; your engagement with universities requires exceptional execution. It means that the only way to successfully engage this market is with relentless focus on the conversations that leaders and early adopters choose to have with their peers on the initiative and you; this conversation is what spreads the Rusnano brand in the USA. All the tools of the Western mass market are useless here.

There are big opportunities here, for all parties. It's going to take some time to capture and realize, but it's worth it.

Build the Rusnano Brand by Building a Community

To optimize the position and the outcome this project presents, build a community, a tribe within these three universities to spread your idea virus by looking for any and all ways to connect them with one another, to collaborate, to partner, to share ideas (and spread them). It lies in direct engagement and experimenting with individuals, not getting distribution in front of markets. Figure out how to use success in just one university TTO, and then do it in another, and then another, and then in ten. Build the tools to spread the data and the word that a community needs to connect. Building this asset is a choice, not an accident.

The magic of the community is that we can build it incrementally; day-by-day you earn the asset that will allow you to bring Rusnano to people who want it, making the transition from market push to market pull; a wonderful and enjoyable position to be in. As the connection gets tighter and tighter, expect pricing, financial terms and conditions to tilt in your favor.

Let's seize the opportunity to choose and deliver ideas that are optimized for the TTO community, for the small group that wants to grab them, inhale them and spread them. The good ones will spread the idea and the results, first from person to person, then from one circle to another, and eventually to large groups.

Preparing for a Tender

The team alerted CU and U-U that Rusnano may do a tender to select university partners to manage a POC initiative. A point of debate to a tender procedure within Rusnano is the reasons why the team preselected CU, U-M and U-U to partner with, not Stanford, MIT or others in the USA.

Our intent was to pick business formation by TTOs in states with economic environments that have analogs in and with Russia, e.g., Michigan and Russia have much in common since the majority of tax revenues come from one industrial source, i.e., automotive in Michigan, oil/gas in Russia. When these industries/prices are depressed, their effects ripple exponentially through the economy in terms of high unemployment, large budget deficits, growing social unrest, etc. There is no commonality between the economic environments of California, Massachusetts and Russia; no commonality between the ecosystem at Stanford, MIT and Skolkovo.

The amount and nature of intervention in the market by TTOs is a direct reflection of the presence or lack of start-up services and financing programs available in the private sector, i.e., little is required in the Stanford ecosystem, more needed in Michigan, less needed in Colorado, more in Utah. As a general rule, the more that a TTO has to do itself, the more progressive and liberal it is in the creation of products, services and funding programs for start-up creation, including flexibility in governance & conflict-of-interest with faculty, i.e., allowing its developers to own substantial amounts of equity in start-ups. These TTOs are also more active in engaging university resources, e.g., engineering and MBA graduate students (schools) for interns in start-up ventures, prodding government and private sector resources for start-up assistance.

Selling Risk Incrementally to Engage US Decision Makers for Approval of the Initiative

There are very few people who have the capacity to see the feasibility of a foreign financed POC initiative at US universities, and what the future might hold for them with it. Over the past few months the team collected and organized human energy around this idea to consummate the MoU with decision makers in TTOs and Rusnano. Now as we transition from the MoU to a legal contract in 2011, the need exists to engage a variety of stakeholders in and around the university community and lead them along the path that we walk, to make them feel confident in the plan and the risks associated with it; these stakeholders certainly include the VP of Research (the department which TTOs report to), but also key university facility, & members of the local community, selected representatives in State government and perhaps the university presidents at CU, U-M and U-U. These groups look for the confidence points that we can deliver as promised, just as the team incrementally sold risk to the heads of the TTOs at CU, U-M and U-U. Stakeholders must be engaged since they have a fiduciary responsibility to manage state and US federal government assets for the benefit of taxpayers and citizens in and around the university. This responsibility naturally makes them risk-adverse to new initiatives.

How does this work, selling risk incrementally & engaging stakeholders, many whom are unobvious? Let me give an example.

The team met with Marvin Parnes, director of translational research, U-M, when the team met with Ken Nisbet, director of U-M's TTO. While Marvin is not involved in the TTO, Ken wanted him to participate in the discussion since he and Marvin report to U-M's VP of Research Steve Forrest: Ken had the wisdom to include Marvin since he can help 'sell' the initiative to Steve + help navigate approval through U-M's bureaucracy, which includes decision makers and members of the university infrastructure that Ken and the team are unaware of; we need to address their issues and concerns early in the decision process.

The contractor recommends that the team engage multiple stakeholders, a few are mentioned below, with many more to be identified, sooner rather than later:

1. Nick Kotov, the head of U-M's nanotechnology center, graduate, Ph.D., Moscow State University.
2. Ned Staebler, VP, the Michigan Economic Development Corporation, a potential co-financer of State of Michigan assets to a POC initiative, and Brian Calley, Lt. Governor, the #2 decision maker to Rick Snyder, the newly elected Governor, State of Michigan (and a former VC in Michigan, Ann Arbor).
3. Steve Forrest, VP, Research, U-M.
4. Tom Washing, VC based in Boulder, CO, and a head of U-M's TTO advisory committee + prominent leader in the tech transfer and entrepreneurial community in Boulder, CO and CU's TTO.
5. Paul Jerde, Executive Director, Deming Center of Entrepreneurship, Leeds School of Business, CU. Paul is member, Advisory Board, CU TTO.
6. Brad Bernthal, Director of Silicon Flatirons Center's Entrepreneurship Initiative, CU.
7. Steve Grizzell, President, Innoventures Capital Partners, Salt Lake City, the manager of the Utah Technology Finance Corporation. Steve is Chairman of the National Association of Seed and Venture Funds (NASVF) and serves on the boards of the Wasatch Venture Fund, MountainWest Venture Group and Utah Valley Entrepreneur Forum.
8. Jared Polis, US Congressman, member of the US House of Representatives from the State of Colorado. Jared is a former entrepreneur of two start-ups with market capitalization in excess of \$2 billion and keen to help access US federal \$ to co-finance/support the POC initiative.

How does Rusnano sell risk incrementally to university decisions makers and stakeholders to drive the initiative to a positive conclusion? Let me give you three examples how to do:

1. Engage opinion leaders early and often, met with them face-to-face each month to explain the initiative and what Rusnano is trying to achieve. Let them see who you are as individuals and as company representatives. Build coalitions among the stakeholders to your strategy.
2. Engage allies that stakeholders respect, with the experience for doing business in Russia and the USA, whom can connect you to the stakeholders and stakeholders to you. These individuals are reputation builders for you, willing to put their reputation on the line and at risk if you should fail or disappoint since their involvement in the project generates credibility and believability in the eyes of university stakeholders.
3. Sell the success of your international projects, to demonstrate your ability to consummate investments and relationships that bridge country cultures and legal jurisdictions, to demonstrate your results in attracting and securing international partners to projects that advance their interests and yours.

Good luck, be well and be lucky

Thomas Nastas

APPENDIX

(Relevant) E-mail correspondence, Contractor, CU, U-U & Rusnano

From: Thomas D. Nastas [mailto:tom@ivipe.com]
To: 'David Allen'
Cc: 'Tom Smerdon'
Subject: Your Message to me: Your 2 reactions to Rusnano response to CU proposal

Dave:

I hear you on all of this; no disagreement nor objection from my side to what you wrote. There will be no shortcuts, cutting corners, skimping on due diligence, 100% transparency, etc., this I will make sure of, and it's what Rusnano requires as a state corporation too, so all interests are aligned.

Part of what we need/have to do, is communicate your message (w/o the emotion) to Zhenya/Anatoly; we can do this in the call and also I'll do in individual conversations, both on the phone and in person (I hope to be in Russia, end of September). And I'll continue to communicate Russian needs/objections to you.

Russians are still a bit naïve to university practices (US & Europe) and they need to learn to do deals with the university community. But I have to say, when spending of Russian taxpayer \$, these guys are under the microscope and constant criticism, so they try to work to do deals that look like 'good deals,' and that partners fund 50% of a project cost, when partners share in the benefits. And this is what we have to work on, be creative, since a deal will benefit CU and Russia, so we need to look at the entire cost structure and be able to document where the cost sharing comes in (even if the cost sharing is in terms of CU sunk costs, which I think are legitimate expenses, your analogy, 'frames of a roll of film.').

That being said, as they grow horizontally leading to lateral growth, the culture and decision making will evolve as time marches on, and my major objective/contribution is to help balance interests and conflicts of culture and business practices. Zhenya has deep knowledge on US practices as he lived here for 7+ years, but that is not enough; he and I have to work to educate his superiors to the realities of the practices that are at the heart of the objections and work through them. Rusnano is a bureaucracy just like CU, and his superiors have the same mind-set as the one you articulated in your email to me, so we certainly have a challenge to get us and them on the same page.

From my viewpoint, 100% we will come to a deal, but it will take more time than you and they can imagine; I envision it will take 3 months, several trips to the USA, to hammer out the issues, convince decision makers, etc., to get to a proposal; even the guys at Rusnano don't fully understand the time commitment to do a deal and the time that they & I will spend to drive to conclusion.

I know that you'd like to make this as simple as possible, me too, as I am volunteering myself in this interim step to assist both parties, and I have a lot to do myself.

I suggested to the guys that we do the call on Thursday, 09:00 Colorado time. I've not heard from them either, so they may have had urgent priorities today, Friday. If I get a confirmation from them this weekend, I'll call to your mobile to alert you as you may not be on e-mail the next couple of days.

Questions, comments, issues? Call or write. Good to hear your concerns and feelings.
Be well and be lucky
Tom Nastas

Draft POC Proposal from the University of Colorado

Memo

TO: Evdokimov Evgeny & Zaikin Anatoly
TEL:
FAX:
FROM: Tom Nastas
PAGES: Nine (9)+ (2) = Attachments from David Allen,
University of Colorado
RE: **The GoForward Plan from Nastas, Rusnano &
US Universities + Dave Allen Proposal to
Rusnano**

Zhenya/Anatoly:

Attached are draft docs from Dave Allen of CU, proposal, budget & timeline. The main document for review is the proposal itself, since the time and budget flow from the project.

The docs are drafts and many unanswered questions exist on execution of this partnership: who will do what, when & how; how to integrate nanocenters into CU, how decide what University gets what tech from what nanocenter, how manage, etc., how deploy tech in geographic territories of interest to all parties, etc. There are also a number of financial issues for discussion too. Certainly we have some frank negotiations and discussions in front of us.

Nonetheless, we have a good foundation to move forward on with Utah, Michigan & Colorado. Thinking forward, there are other issues to discuss and resolve:

1. Embed a Russian into the tech transfer office. To gain senior management support and create the conditions for long-term success, we must embed a Russian into each TTO, to develop them so they become proficient in technology transfer, and be the liaison for taking US tech to Russia, Russia tech to the US, etc.
2. Build the political capital for success. While the project and the relationship makes sense, we have to be sensitive to political realities of cross-border deals, especially when University resources/facilities, US & Russian taxpayer \$ is used since the media and opponents can make anything into something.

One idea discussed with Dave and others is to enlist the Russian diaspora from the local community into the program, use Russian entrepreneurs in the local community (some who also teach at Universities) to support and 'sell' the program to constituents to prevent/minimize the impact that outsiders and naysayers may have.

3. Co-finance. Let's also look to get some money leverage. I've spoken to Ned Staebler, VP, Michigan Economic Development Corporation, Colorado Congressman Jared Polis (a tech oligarch), and many others in state/local governments, World Bank, US Sec'r of State office, etc., on the project and our current thinking. They are very supportive, and indicated the willingness to help co-finance projects with UM, CU, etc., in nano. While their words are not promises, they are encouraging, and I'm sure with time and effort, co-financing can be raised.
4. Aggregate deal flow to create more leverage effects. Colorado, Utah and Michigan are only three sources of nanotech in the USA. I've encouraged Dave on his network scheme of three Colorado universities (CU, Colorado State & Colorado School of Mines) to aggregate deals & increase the

number of projects for consideration. I'm confident that we can do the same in Utah (Brigham Young), in Michigan (Michigan State and Wayne State). I'd suggest that we have UM, CU and Utah as the coordinator in each state, controlling this process.

Let's think strategically and laterally. Michigan, Utah and Colorado have deep alumni networks that I believe we could access too, to aggregate even more deals, improving the quality and quantity of nanotech for proof-of-concept investment, create more and different relationships with alumni of these universities that work in major corporations, SMEs in the USA., to create more and better results for all.

5. Timing. You are signing or have just signed contracts with the nanocenters, and there may be a desire to wait on this proposal from CU & others, to give the nanocenters six months or so to get organized and to more clearly formulate their plans, international partnering, etc.

I discourage this idea. I suggest that you move forward on discussions for several reasons: it takes 6 months to consummate a proposal, to work through all issues, get decisions from the bureaucracies of Rusnano, nanocenters, US universities, etc. Keep moving and you'll have an agreement in 6 months with the US universities **and** your nanocenters will be ready to exploit.

If you wait 6 months, you'll need to re-start discussions, get universities excited again, and work 2x as hard to convince them of your desire to move forward; then you'll spend 6 months consummating an agreement with work beginning sometime from September 2011 to January 2012.

Let me know your thoughts.
Tom Nastas

Draft Proposal from Dave Allen, University of Colorado (CU)

Research, Development & Commercialization Partnership: CU& Rusnano

Overall Objectives

- 1) Plan and execute a world-class technology R&D and commercialization (RDC) program building from the capabilities and resources of both organizations in the field of nanotechnology and from decades of learning and best practices in technology transfer
- 2) The purpose of the RDC program is to build technology transfer capacity and create economic value that can be shared by both institutions through the deployment of products and services to the private sector

RDC Program Elements

- 1) Research Collaboration – Compelling research ideas will be pursued from the perspective of early identification of commercial drivers for market applications of interest to the investigators and the institutional participants. Inventions resulting from the research projects will be protected via PCT patent applications.
- 2) Technology Development – Research that meets commercially oriented milestones will progress to a development stage where technical work will be conducted by research investigators but will be directed by a commercialization plan devised by a team of experts relevant for the specific domain of each project (e.g., market development, intellectual property, particular field of technology, regulatory/standard compliance etc.).
- 3) Commercialization - Commercialization will occur through either licensing to a motivated exiting company adaptor or a start-up company. In the case of the start-up company, seed and early-stage funding will be provided to launch the company. The licenses may be limited by geographic territory to enable licensing to separate companies in the US and Russia.

Research Collaborations

- 1) Identification of individual research projects that are of common interest to CU and RUSNANO:

A) Project characteristics

- i) scope of nanotechnology
- ii) process for project creation, evaluation and selection
- iii) involvement of external experts
- iv) involvement by CU and RUSNANO
- v) sponsored research terms, including project milestones and deliverables

B) Project continuation or termination

C) Filing of patent applications based on invention disclosures

- D) transition of research project to technology development project
- 2) Participation of RUSNANO in CU Engineering Research centers.

Technology Development

- 1) Four types of projects
 - A) From the Research Collaborations – This category constitutes a continuation of research that has passed key predetermined research milestones and is ready for assessment for the commercialization program.
 - B) From CU IP portfolio – This category constitutes CU research programs where inventions have been disclosed to CU and due to the early stage of the technology, it is unlikely that a commercial partner will be secured without further market analysis and proof of concept development work.
 - C) From the RUSNANO IP portfolio – This is similar to B above, except the base invention has been created by a RUSNANO related institution.
 - D) From other Colorado research institutions such as the Colorado School of mines and the Colorado State University. (Author's note: Neither of these universities has been approached about participation, but will be, pending further discussion with Rusnano & Nastas).
- 2) **Nanotech Commercialization program** -Technology Project Selection, Assessment and Validation Process.

A) The Key Role and Capacity of the Boulder Innovation Center

In an April 22, 2010 article by Vivek Wadhwa, Business Week magazine, Boulder, Colorado is the top U.S. destination for new tech companies largely because of a bottom-up revolution led by entrepreneurs. There are multiple reasons for our world-class distinction and the University of Colorado is part of that explanation. While the existence of serial technology entrepreneurs and technology talent is one element of success, more important is accessing the right person for a given technology at the right time. Accessing the right talent and setting proper expectations for the engagement, all within a timely fashion, is the key role and capacity of the Boulder Innovation Center (BIC), a partner of CU.

The BIC will support the CU TTO / RUSNANO collaboration by adapting existing BIC CU commercialization processes to the specific milestones of the RUSNANO collaboration. The BIC provides access to program management resources, advisors and angel investors to projects brought forward by the CU researchers. BIC objectives are established for each of the collaboration milestones: Project Solicitation; First Level Review; Roadmap Development; POC (proof-of-Concept); POC Completion Reassessment; & Business Plan Preparation.

BIC has 850 volunteer advisors with expertise in bioscience, energy, engineering, optics, materials and information technology. The BIC has each advisor's resume and has the ability to match keywords from CU researchers (and their technology) to keywords on advisors' resumes to identify strong matches between parties. The advisors bring both the domain expertise specific to the research together with business experience related to the customer problems addressed via the commercialization of that research. The BIC facilitates the development of a commercialization

strategy based on the CU research. If the advisor's interested level is very high, the BIC facilitates the process leading to the formation of a new company aimed at commercializing CU research.

The BIC has a network of ≈ 150 angel investors with interest in investing in CU technology based startups. The BIC works with the startup helping the company develop its investor presentation. ION Engineering, a CU based carbon capture technology the BIC in November 2009 and announced a \$3million DOE grant.

If this program is executed, the BIC will increase its staffing as needed to support the increased activity with CU researchers and BIC advisors.

B) Project Solicitation and Mentorship

CU TTO receives about 50 invention disclosures/year related to nanotechnology, broadly construed. Of the 50, approximately 15 to 20 are likely to be research for sponsors or existing licensees. To increase to number of eligible projects CU TTO will pursue an active solicitation of proposals/technologies.

Our experience has shown that a University-wide solicitation that explains the process and resources available generates many more projects than what would come to TTO in its normal course of business. We will manage this process in a manner that builds upon the learning gained from nearly 150 technology projects conducted by CU TTO.

The process will start with an e-mail and newsletter announcement of an upcoming solicitation for the **Nanotech Commercialization Program**. The announcement will indicate that summary proposals will be accepted on a certain date (see Timeline). TTO staff will hold group meetings with investigators to explain the program and answer questions. Investigators are required to talk to TTO staff about proposed project ideas and TTO will assemble a roster of projects being considered.

The solicitation announcement specifies the three main elements for inclusion in a two page project opportunity summary: explanation of the technology, potential market applications and what is necessary for this technology to be validated as commercial ready. Furthermore, the announcement will state that for investigators who are so inclined, TTO matches the inventor with business mentors who help the inventor prepare a project opportunity summary.

This matching is strongly encouraged. From experience we learned that teaming mentors with faculty investigators is a productive way to infuse commercial perspectives into applications. Paid mentors will be nanotech domain experts that are part of the BIC network of advisors. Mentorship will not be a condition of submission of project opportunity summaries, but we expect about half the investigators will collaborate with mentors. If the IP of a proposed project has not been previously disclosed to TTO, an invention disclosure to TTO is necessary. Initially, we estimate about $\frac{2}{3}$ of the technologies will have been previously disclosed to TTO with that percentage slightly decreasing over time. If no patent application has been file on a technology under consideration, business mentors will sign confidential disclosure agreement to proceed.

TTO will initiate two program solicitations per year. [Note the concept of 'cycle' is fundamental to understanding the budget and timeline]. We estimate that we will receive approximately 35 project summaries per cycle, of which 24 will be viable projects. Our experience is that some projects are not deemed suitable at this preliminary stage for the following reasons:

- they fall outside of the parameters of the program, e.g., not nano related technology;

- the IP is not sufficiently enabled for a provisional filing;
- the IP is obligated and the investigator did not understand the obligation;
- the use of funds would be inappropriate;
- the faculty member is primarily looking for student or summer support; and/or
- the proposal is really to conduct basic research, and is not development oriented

Projects from the Rusnano Ecosystem. At this time, CU is uncertain when and in what quantities the TTO will receive Russian nanotech projects or proposals. For planning purposes and discussion in this document, we expect RUSNANO projects in year three of the program. However, if any projects are available for consideration earlier, they will be incorporated into the pool of CU projects.

C) First Level Project Review.

CU TTO Director of Licensing & New Business and a RUSANO representative will oversee the first level review of the approximately 24 projects per cycle in the pool. Each project will be assigned to a team comprised of a TTO staff member, a graduate student intern and a Boulder Innovation Center Program Manager. Essentially this team will conduct a high level, broad-aim evaluation of each proposal. Each project receives between six hours of staff time and four hours of intern time. Criteria used to assess projects at this stage (a score sheet is used) are as follows:

- Fit to common interests of TTO and RUSNANO;
- Potential for commercial success (size, competition and other characteristics of the market; potential strength of IP; development cost/timeframe; additional capital needed and ability to attract it); and
- Reputation of the Investigator and his or her commitment to commercial development.

Based on our experience and rate of success in the past, we expect that 12-15 projects will be selected as meriting further market analysis. At this stage, provision patent applications will be filed on technologies (if not already initiated). The IP attorney expenses are paid by RUSNANO (through the contract) and TTO from its own patent resources. All patent application filing work will be done by expert outside patent attorneys. Ownership of intellectual property will be conveyed under the laws of the country in which the IP is created. The TTO IP staff and Licensing Associates will manage the IP attorneys. For projects not selected, reasons for rejection are provided to inventors, to maintain good relationships with them since many employ our feedback to improve/revise their application for submission in the future.

D) Project Assessment, Roadmaps and POC Proposal.

Based on the selected projects, the Boulder Innovation Center will work with TTO to engage teams to assess projects and formulate a development plan for each technology (also called a Roadmap or RdMap). This work will be conducted by teams composed of paid Denver/Boulder metropolitan area industry experts from specific nano related domains, local nano specific patent attorneys, TTO and BIC staff, inventors and/or post-docs and grad students from the inventor's lab, and student interns hired by TTO. RUSNANO representatives can engage in the process at its discretion.

The panel, led by the paid industry expert, will examine three aspects of the technology/opportunity:

- 1) IP assessment and patent development
- 2) Technical assessment and development, and
- 3) Market assessment and development

As these three elements merge and the project appears commercially viable, a development Roadmap is formulated by the team as a roadmap report (PowerPoint format), addressing the commercial readiness of the technology; the technical steps are identified and a POC proposal prepared. Once all presentations are completed, representatives from RUSNANO and TTO (and possibly others as determined by RUSNANO and TTO), will determine which projects are to proceed to the POC stage. This process takes 8-10 weeks and it is expected that 6-8 of the 12 to 15 projects will be suitable for POC funding (modeled as 7).

E) *Validation - Proof of Concept and IP Development.*

Money is spent to conduct POC work and to advance the original Provisional Patent Application to the PCT stage (of which Russia and CIS countries are treaty signatories). The Proof of Concept work is conducted in two phases. The first related to projects in the range of \$25k-\$75k, with an average of \$50k (inclusive of Facilities and Administration, campus 'overhead' costs). The scope of work for the POC projects is based on the Roadmap. Some projects, such a bio, energy related and platform solutions that form the technology core of a new company will require additional investment of about double \$50k (inclusive of F&A or overhead costs). Consequently, 2 of the 7 projects are expected to run in two phases. When two-phase POC projects are proposed, we have a mid-term review and assessment relative to project continuation. Single phase POC projects are expected to run for 3-4 months and two-phase projects 6-8 months. TTO licensing and financial management teams will administer the POC process.

F) *POC Completion Reassessment.*

Upon completion of the POC projects that satisfied predetermined objectives, the Roadmap team is reconvened with technical results inputted into an updated Roadmap. New information on IP and market assessment is factored into the Roadmap. Further, based on the results of the POC, additional IP is filed on each of the projects.

For each project at this stage, the BIC will convene a larger review group who are presented with the revised development and commercialization plan, with the inclusion of the POC results. This group is composed of serial entrepreneurs, angel and venture capital investors, domain relevant business consultants and thought leaders from the particular technical field. The purpose of this review will be to assess the commercial viability of the project. It is expected that based on this evaluation, 5 of the 7 projects will be deemed to have strong commercial prospects and those 5 will advance to the business plan phase.

Commercialization

- 1) ***Business Plan Preparation.*** The development Roadmap, results of the POC work and review suggestions from the preceding group evaluation will be augmented by additional market assessment and business development culminating in a business plan created for each technology. The business planning process involves roughly the same group of professionals and interns who were engaged in the Roadmap exercise. The two exceptions would be lesser involvement of the IP attorney and inclusion of a serial entrepreneur 'business driver' (if possible to identify such a person at this stage).

These five groups meet weekly for two months to work on the business plan. At this stage the business driver is working for equity, while all others involved are paid program staff.

- 2) ***Business Formation.*** At the end of the business planning work, the team forms a new company (see www.cu.edu/techtransfer to read about the issues of business formation). These activities involve engaging an attorney to advise the team about ownership, IP, employment contract, financing, option negotiation and related issues, and to file relevant legal documents with relevant jurisdictions.
- 3) ***Start-up Team Formation and Seed Funding.*** For the five start-up companies, the team that pursues the business formation will receive a \$150,000 seed investment from RUSNANO in the form of a nonrecourse convertible note. Based on our experience and current practice, we recommend that the note carry an 8% annual interest and convert to preferred class stock upon any of three conditions being met:
 - a qualified investment of \$2M
 - an acquisition
 - conversion in 2 years at a predetermined company valuation.

We recommend that no additional terms should be considered in the note because doing so creates hurdles or obstacles for further financing.

Financial Resource Needs

Two documents accompanying this proposal explain the operational timing and costs associated with this program. The total cost to conduct four cycles is \$6.8M, divided roughly equally between commercialization and seed investment. Including research center participation costs, the total budget \approx \$7.2M. However, given the sequencing of activities (the four cycles run in a serial fashion over the 2 year period) the complete commercialization program will run for $2\frac{3}{4}$ years. For the commercialization program the first year cost is \approx \$1.4M, the second year cost is \approx \$3.2M and the third year cost is \approx \$1.9M. Two years of research center participation cost adds \$600,000 to bringing the 1st total to \$1.7 million and \$3.5 million in the 2nd year (no third year research cost is factored in).

Commercial Contract Terms

It is anticipated that the patent rights will be divided between 1) Russia and Commonwealth of Independent States (CIS) countries and 2) countries outside of Russia and the CIS. RUSNANO and CU will have the rights to license to companies operating within their respective jurisdictions. In order to acknowledge the contribution of the various parties to overall commercial success, CU shares 20% of all royalty, fees, payments, liquidation proceeds and related economic benefit (collectively “economic benefit”) with RUSANO for companies receiving a license to countries outside of Russia and the CIS. Conversely, RUSNANO shares 20% of economic benefit it receives from licensees operating in Russia and the CIS. RUSNANO captures 100% of the return on its seed capital investments

Draft POC Proposal from the University of Utah



November 25, 2010

Draft Proposal for a Collaborative Nanotechnology Center between the University of Utah and the Russian Nanotechnology Corporation (Rusnano)

The vision of the new Nanotechnology Development Center (NDC) will be to create a cross disciplinary environment in which world class researchers attain global recognition by conquering interdisciplinary challenges and commercializing their nanoscience breakthroughs.

The vision and the mission are to:

- Develop and implement a comprehensive international program to position the NDC as a global leader in nanoscience and technology distinguished by interdisciplinary collaboration and entrepreneurial excellence
- Integrate and advance nanoscience technology across the University, the world and specifically with our collaborative partners in Rusnano Centers in Russia
- Drive research partnerships with leaders in academia, the private sector and governmental agencies, forming an interdisciplinary research and educational environment poised to capitalize on emergent nanotechnology research opportunities
- Aggressively position the NDC to competitively vie for lead nanotechnology research, development, and educational funding
- Fund promising nanotechnology research to develop rapid prototypes and position them for new markets
- Create a novel nanotechnology entrepreneurship program by educating and training the best students in technology development and commercialization
- Drive commercialization of new nanoscience discoveries through technology commercialization, identification and promotion of entrepreneurial opportunities, and development of new high tech companies
- Train and educate our international partners in best practices for technology assessment, structure, start-up creation and licensing

BACKGROUND

The Technology Commercialization Office (TCO) at the University of Utah is currently ranked first (tying with MIT) in the United States at creating new companies from its research, as ranked by the National Association of University Technology Managers (AUTM) in its annual survey. The TCO has developed a unique model that integrates education and an aligned ecosystem to achieve superior results in technology development and new company formation. The model brings together some of the best: executive management talent, early stage funding vehicles, technology services, entrepreneurship training, student

involvement and corporate partnerships in a setting that encourages economic development and speed to market by aligning all the critical factors necessary for success. The Technology Commercialization Office is involved in outreach efforts across the country and the globe by engaging in partnerships in China, Korea, Mexico, Germany and India. It is also a founding member of the Western Innovation Network which brings together unique resources and technologies from the University of Washington, Oregon State, Portland State, the University of Oregon, University of Southern California, Arizona State and others. These efforts are important as the NDC will look to draw upon these unique assets in nanotechnology to establish itself as a leader in the United States.

The Nano Institute at the University of Utah has quickly become one of the premier research centers in the Western U.S. The Institute focuses on five important nanoscience areas: nanomaterials (thin films, coatings); interfacial sciences dealing with the behavior of fine particles and thin films that interact (molecular structuring, ion transport); nanobiosensors (diagnostics, chemical detection); nanomedicine (localized drug delivery, diagnostic imaging, scaffolds for tissue engineering); and micro and nano systems integration and reliability (building nano systems and devices). The Institute has also recently launched a newly formed Center for Nanomedicine which will be a critical part of the new Institute as researchers at the Center work toward developing methods to target therapeutics and diagnostics at the cellular level, revolutionizing imaging and drug delivery for treating cancer and neurological diseases.

OBJECTIVES

The overarching objective of the Nanotechnology Development Center will be to create a World Class Proof of Concept Center to fund promising nano technologies which in turn translate into high value companies and increased collaborations between Rusnano Centers and the University of Utah.

This will be accomplished by focusing on the following specific functions of the NDC:

1. **Setting up the Infrastructure and Processes to Identify Promising Nanotechnologies**

The NDC will have dedicated personnel to manage the operations and processes necessary for success. This will be comprised of a senior level manager and an administrative assistant to ensure that plans and objectives are accomplished. These individuals will report through the Technology Commercialization Office at the University of Utah and be approved by Rusnano, the Dean of Engineering or Nano Institute Director, and the TCO.

The process for commercializing nano-related technologies differs significantly from other technologies because of their unique understanding of the patent landscape and markets. Nanotechnologies require a unique model that is not readily available at most Universities. The path to commercial scale is also relatively long; the capital required is often very large; and the markets are ill-defined. Early stage nano companies looking to eventually raise private sector financing need to begin working with Venture Capital early in the process to specify their technical and product development roadmap and match development milestones with the size and type of required private investments. The Center will structure into its process the very early involvement of both potential industry partners and Venture Capital. The NDC will integrate and utilize the TCO's existing technology screening and assessment systems to identify promising technologies and companies. The Utah TCO has developed and continues to follow a seven-step process in commercializing/monetizing Intellectual Property.

- I. Educating researchers about defining IP and protecting it. While researchers are aware of the published literature as they compete for research funding, they are relatively unaware of the patent literature. The TCO routinely and regularly educates the research community on the definition of intellectual property, how to protect it and its vital importance.
- II. Identifying IP and soliciting Invention Disclosures. Our office has been successful in soliciting on an average about 200 invention disclosures a year. A formal process has been

set up to handle this volume effectively. Each invention is tracked using a commercially available database and deals are monitored for efficiency using several factors.

- a. Technologies are run through an initial triage process to as a first step to see if they meet the minimum patentability and marketability requirements
 - b. The second stage involves a more in-depth screening into:
 - i. Prior patent art
 - ii. Competitive landscape
 - iii. Market conditions
 - iv. Scalability
 - v. Investment potential
 - vi. Inventor involvement
- III. Pursuing a well-defined patent strategy. We strive to get the broadest claims coverage in each patent application. On an average there are over 200 patent applications in prosecution managed by our office, with an annual budget of \$3.5million. We work with over 30 law firms and have implemented best practices for cost management and tracking patent prosecution progress.
- IV. Using networked connections in an effective technology marketing strategy that has been developed and adopted over the last fifteen years.
- V. Executing research agreements, and creating milestone-based development plans. Many times corporate partners are needed to further the development of promising nanotechnologies. This requires a new more flexible approach to research contracts based on expectations and project management.
- VI. Creating and supporting new start-up companies. The University of Utah has been one of the best Universities in the US at creating new companies from its research and has created over 20 unique programs to support these efforts.
- VII. Using a formal process to monitor agreement compliance and collections. Compliance is a key part of any licensing and commercialization process and is poorly undervalued at most Universities.

The University TCO has also partnered with local venture capital to create a novel “Energy Well Invested” (EWI) process that matches University IP, labs, researchers and programs with potential industry partners early in the product development cycle, so that companies develop applications that are in demand and do not waste time or resources developing applications that are of less interest to industry. The EWI process significantly accelerates the process from idea, to bench-top proof of concept, to a partnership with industry and ultimately to access to large established markets and licensing revenues from the industry partner. The NDC will continue to enhance and deploy the EWI process for all participating universities and technologies.

2. **Attraction of high potential, promising Nanotechnologies**

The NDC will solicit the best nanotechnologies from several key areas to ensure the highest quality and potential return.

- I. The University of Utah (UU) – The UU receives invention disclosures in key nano areas such as materials, medicine, energy, manufacturing, sensors and systems. These will be screened for proof-of concept potential and funding.

- II. Rusnano Centers – Technologies from Russian Centers will be screened for collaboration with UU projects for further prototyping and commercialization
- III. Joint Rusnano – University of Utah research projects – these inventions will be the result of basic research collaborations as defined in step 6 below.
- IV. Western Innovation Network – The UU is a founder in a very unique network of major research universities including Oregon, Oregon State, the University of Washington, Portland, Arizona State, USC and others
- V. Western Energy Commercialization Center – This is specialized area of focus for the NDC to exploit the best in nano energy technologies. This is a UU DOE funded center to attract the best in clean and renewable technologies.

3. **Education and Outreach**

Paramount to establishing a world class NDC is to educate both students and professionals to better understand how to engage and participate with the NDC. Building a culture of engagement leads to the best of best stakeholders being involved with the NDC and ensures long-term growth and stability. The NDC will work with several key initiatives on campus to ensure this mission:

I. The Lassonde New Venture Development Center

The Lassonde New Venture Development Center's mission is to assist researchers with breakthrough technologies and determine the commercialization potential of those ideas while providing students a unique educational experience in new business development. The Lassonde Center is comprised of graduate students from engineering, science, and business. Acceptance into the Center is competitive. The Center is run by an accomplished local entrepreneur, with an advisory board made up of venture capitalists and inventor/entrepreneurs.

During a year-long process, students receive weekly mentoring and teaching from both the executive director and local professionals. Students are trained in the various disciplines involved with early stage business development, from intellectual property to market analysis and strategy to writing a business plan. While receiving this training, students currently work in team to evaluate and develop business opportunities based on real technologies coming out of the labs at the University of Utah. The result is an unparalleled real world education in technology entrepreneurship that will create future leaders in the high tech industry. The TCO will introduce at least two nano projects per semester for inclusion into their annual selection process.

II. Technology Tuesday

Tech Tuesday is a premier networking event that brings together the best minds in science, business and venture capitalism. Tech Tuesday occurs on Tuesday evenings four times per semester and features an innovative speaker. We will dedicate a Technology Tuesday to our NDC so we can promote its efforts and highlight the best in the field of nanotechnology.

III. Faculty Training and Instructional Seminars

The TCO will coordinate educational seminars for faculty, graduate students and external stakeholders interested in commercialization and intellectual property. It is very important that faculty and students understand, even during the research phase, what constitutes a

valuable invention disclosure and what stage of research is most appropriate for prototyping. These seminars will be from 15-60 minutes to accommodate faculty schedules and staff meetings.

IV. Business Plan Competitions

The ability to attract the best new nanotechnology companies will be a goal of the NDC and one that will be accomplished through the University's elite Utah Entrepreneurial Challenge. Each year, the Utah Entrepreneur Challenge (UEC) helps hundreds of students across the state of Utah make their business ideas realities. The UEC is a student-run entrepreneurial competition. Entries begin in January, and the winner is announced at an awards banquet in April. The winner receives \$40,000 to help start their business, and over \$80,000 of cash and in-kind prizes are awarded to the runners-up. As one of the largest student entrepreneur cash prize competitions in the United States, the UEC has enjoyed much success throughout its history; jump starting the careers of many students. The Challenge will include a special Nano Prize for best new start-up and/or business plan that will become a focal point for the new NDC.

The Western Energy Commercialization Center will serve as another venue to highlight the best in Nanotechnology across the western United States. This effort will focus on breakthrough developments in nanomaterials, nanocells and nanofabrication for clean and renewable energy. A cash and services prize for the nationwide competition will be rewarded by the NDC and highlighted in the national press.

4. Commercialization Training

The ability to translate best practices in commercialization and technology transfer across the globe is a key component of the mission of the NDC. The University of Utah acts as a global institute with a much larger mission than its immediate community. By replicating its unique model across all economies the University has developed key relationships in Mexico, Germany, Korea, China and now Russia. The world, now more than ever, must act on a smaller scale to ensure that the best inventions, discovery and research impact every corner of the earth in the shortest time possible. This is accomplished by sharing resources and expertise. The NDC will implement a minimum of a once a year training program for Rusnano Center Directors and professionals at the choosing of Rusnano designated personnel. The training will involve a 2-4 day session as coordinated by the TCO and include:

- I. Infrastructure
- II. Technology Assessment
- III. Patenting and IP protection
- IV. Collaboration discussion
- V. Joint Research efforts
- VI. Budgets and finance
- VII. Start-up best practices
- VIII. Stakeholder support services

5. **Marketing and Promotion of NDC**

The University of Utah will actively promote the NDC to establish it as a global leader. It will develop a marketing, web based and social media plan to enhance these efforts. This will include membership in Redspan, the Western Energy Center and the Western Innovation Network. Press releases will be submitted through University channels and nanotechnology grant and Challenge winners will be highlighted.

6. **Developing a Joint R & D program for collaborations in nanotechnology.** Through the execution of a Master collaboration agreement the parties would present key research projects and development ideas for joint collaboration. Scientists from key Russian Universities, Rusnano Centers and faculty from the University of Utah would meet at least once per year in a conference or summit setting to review current and future research projects. A pre-selected advisory group or Board would then select those projects with the most potential for joint funding and grant development. The parties would then outline resources and faculty that would be needed to achieve major milestones. Those milestones would be placed as a Task Order under the guidelines of the Master Research Agreement prior to the initiation of any project. The goal of the projects would be focused on translational research that could lead to high value commercialization opportunities in the shortest period of time.
7. **Creating a Proof-of-Concept grant funding program for high value projects.** This is the major goal of the NDC and culmination of all the above goals and objectives. The concept of an easily accessible proof of concept fund to further the development of applied and market-directed research has proven to be an invaluable success at many top tier research Universities including the University of Utah. The NDC will set up a structure and guidelines whereby the NDC will invest monies in the range of \$50,000 - \$200,000 through an independent selection committee into nano research projects that have a commercialization focus. The proof of concept program will be structured along the following guidelines: The program will fund novel nanotechnologies that are near-commercialization. This program will support research/development in the aforementioned areas of nanotechnology. The goal for each funded Proof of Concept Grant (PCG) is to have the technology ready for licensing to a new or existing company for commercialization by the end of the two year funding period.

Applicants must indicate clearly the economic potential of project technology. Additionally, companies that would be suitable partners to develop a resulting commercial product must be identified.

8. **The Application Process.**

Initial Application (new)

Because the primary intent of this program is to provide funding to enhance the commercial potential of existing nanotechnology or inventions, the NDC generally supports relatively high risk research projects that have the potential to be licensed to a company in the short term (i.e., within two years).

Funding is to be used for development activities such as building a working prototype; preparing samples suitable for commercial evaluation; and collecting additional data to demonstrate commercial potential. New areas of research will be considered only if there is strong evidence that commercial feasibility can be demonstrated within the two year period. The applicant must clearly describe and support the technical basis and the economic potential for the innovation to be developed.

Second Year Application (renewal)

Although the selected projects are funded for a two year period, a renewal application is necessary to obtain the second year funding. Approval of renewal applications is strongly dependent on successful completion of proposed first year milestones. Establishment of a relationship with a commercial development partner will also be a major factor in the renewal decision.

Applicant Eligibility

No more than two PCG proposals per applicant will be accepted in any application cycle.

If a previous PCG application has been turned down by the review panel, the Principal Investigator (PI) may submit a revised proposal, either new or renewal, on the same subject for reconsideration.

Proposal Submission

There will be two submissions per year for both new and renewal applications with a deadline at the close of business (5:00 p.m.) on **March 15 and September 15** of each year. If the 15th falls on a weekend or holiday, applications are due on the first work day following the 15th. See special Renewal instructions.

One original and 9 copies of the proposal should be submitted to the NCG. Proposals will not be returned.

Include one copy of the Official Document Summary Sheet. The Document Summary Sheet is found on the Campus Information Systems (Research Administration - eProposal). If human subjects or animal research is involved, provide one copy of the IRB or IACUC, as appropriate.

The application must include the following forms arranged in this order:

1. Cover Sheets (pages one and two)
2. Technical proposal
3. Budget
4. Current and Pending Support.
5. Biographical Sketch

If any information items requested are not included at the time of submission, the proposal will not be reviewed.

For Renewal applications provide only the following in original and 8 copies:

1. Cover Sheets (refer to instructions below)
2. Revised budget only if different from the original proposal budget.
3. Up to three pages addressing the following (use format described in technical proposal):
 - o Technical results from your first year including performance on milestones.
 - o Changes to you original proposal.
 - o Describe relevant commercial interactions, such as collaborations, in-kind contributions, sponsored research, testing of samples or prototypes, option or license agreements.

Instructions for Completing Applications

Cover Sheets

1. Check program to which you are applying. Indicate new or renewal.
2. List PI and co-PI contact information.
3. Project budget should be for two years and not exceed \$100,000 per year.
4. The project will begin December 1 and June 1.
5. Abstract: limit to one-half page in the space provided, using one inch margins, single-spacing, with a font size of 12 points. The abstract should be written in technical language comprehensible to persons in other technical disciplines.

Technical Proposal & Project Description

The project description must include, in this order:

- a) General background (no more than 1/2 page).
- b) Commercial Application of the Research (include patentability, market size, and comparisons with currently available products or similar application or use).
- c) Specific goals, objectives, project milestones and anticipated results.
- d) Description of project plan including anticipated barriers and technical difficulties.
 - o The project description must be concise, limited to three typed, single-spaced pages with a font size of 12 points (see below for instructions on Key References and Extramural Support). One-inch margins must be maintained. Extensive documentation is neither necessary nor acceptable. There is no form pages provided. A violation of this format will result in your proposal not being reviewed.
 - o Note: It is important that you consult the Technology Transfer Office before disclosing details of any research that may be patentable or require protection, other than the PCG proposal. PCG proposals will be reviewed by persons who have signed agreements to keep the proposals confidential. Nonetheless, proposals that contain potentially patentable material should be marked CONFIDENTIAL.

Key references (Limit one page)

Extramural Support

What companies have potential for commercializing the product based on the potential companies' research and development program and commercial product line? Limit one page.

Budgets

If two years of funding are requested, separate budgets should be submitted for each year. Second year funding is contingent on submission and approval of a renewal application.

Funding is available for salaries and fringe benefits of post-doctoral fellows, students, technicians, and other non-faculty project personnel, technical supplies, equipment (>\$5,000), and miscellaneous expenses. Project funds cannot be used for faculty salaries (summer or academic year); travel that is not directly related to project research (e.g., conferences cannot be supported by this project); entertainment; consultants; or office equipment, including computers unless specifically justified. For renewal proposals, submit a budget only if there is a change from the original proposal.

Current and Pending Support (initial proposal only)

Complete for each Principal Investigator and co-Investigator. Use additional page for each if necessary.

Biographical Sketch (initial proposal only)

- a. Complete for each Principal Investigator and co-Investigator. Include a list of previously submitted invention disclosures, patent applications and patents. List any licenses that have been made on your inventions. List the companies for which you consult or in which you have equity as the result of your participation. List any industrial experience. Do not exceed two pages for each.
- b. No information other than what is asked for above will be reviewed.

Proposal evaluation

Applications will be reviewed by an Advisory Panel appointed by the TCO, NCG, Vice President for Research and Rusnano. Panel members, experienced in the evaluation of technology for the purpose of commercialization, are drawn from the business community throughout the U.S. Generally, panel members will be corporate officers (e.g., CEO or Vice President for Research), consultants or venture capitalists.

Overall evaluation criteria are the potential for commercial success.

Applicants will be informed of the panel's recommendations on or about May 30 and November 30.

Reviewers have found that answers to the following questions are particularly useful in their evaluations.

Does the PI(s) clearly explain the technology innovation? Are the arguments that it could work convincing?

Does the PI(s) clearly explain the significance of the innovation to the potential market?

Does the PI(s) provide information necessary to determine the commercial potential?

Does the proposed product fit a real market need?

Is the potential commercial impact of the research stated and justified?

Are the goals, objectives and results stated clearly and are they reasonable, given the funds and time provided?

Are the methods outlined and do they reflect the goals and objectives stated in the proposal?

Have potential barriers, technical difficulties and potential commercial partners been identified?

Are key references provided?

Have extramural opportunities been identified and are they reasonable?

Does the PI (and co-PIs) have the experience necessary to carry out the project?

Are the resources available to carry out the project?

Project Administration

The Principal Investigator is responsible for the administration of project funds. In particular, he/she must be certain that over-expenditures do not occur. There will be automatic carry-forward of any unspent funds for the initial year to the second year of support.

No-cost extensions will not be approved for the PCG.

Reporting Requirements

At least one month prior to completion of the PCG period (one or two years), the PI(s) must meet with a Technology Commercialization Office (TCO) or NCG staff member or consultant to present results and to agree on what actions will be carried out to commercialize the technology. A final written report must be submitted by August 1 and January 1 of the final year of funding. Renewal proposals will act as final reports for the first year of funding whether or not a second year is approved.

Follow up and tracking mechanisms would be put in place to monitor the success of the program.

Matching Funds

The University of Utah will match NCG grants when appropriate and if available through its VIP and TCP grant proposals. Matching funds will be available in \$50,000 and \$35,000 tranches respectively

9. Rusnano Diligence for Venture Investment

Proofs of Concept Grants (PCG) that reach their outlined milestones and are fully vetted by the NCG and TCO have the potential to be commercialized through a new start-up company and license. Rusnano shall have the option to invest in any PCG start-up with a 60 diligence period. A formal option agreement will be attached to this proposal as an Exhibit A. Intellectual Property shall be shared jointly by both parties as outlined in the Master Collaboration Agreement and according to US Patent Law.

The University of Utah will further contribute Venture Bench Services to any NCG/Rusnano start-up company.

Venture Bench is a University of Utah accelerator created by the Technology Commercialization Office that provides a suite of services for its technology based companies. This path to success can be long and challenging and Venture Bench provides new companies the support and expertise to shorten this time frame. Venture Bench services include the following:

- Business set-up
- Grant Funding Assistance
- TCP Grants
- SBIR/STTR development
- VIP award competition
- Seek Out Management Expertise
- Entrepreneur-in-Residence Program
- Establishment of Corporate Structure
- Market Assessment

- Micro-grants
- State Centers of Excellence Program
- Investment Funding
- Corporate Governance
- Venture Capital - National & Local
- Business Plan Development
- Logo/Brand Creation
- Web Hosting & Development
- Accounting Services
- Access to Research Facilities & Labs
- Office & Wet Lab Space

**Nanotechnology Development Center
Budget (per year)**

Proof of Concept funds	\$1,250,000
Nano Development Center – Personnel-Operations	\$275,000
Nano Utah Sponsorship	\$50,000
Technology Commercialization Services	\$50,000
Nano Business plan Challenge	\$50,000
Western Innovation Network	\$25,000
Commercialization Training	\$200,000
Venture Bench Services	\$50,000
Western Energy Center Prize	\$30,000
Joint Research Development	\$100,000
Redspan membership and Rusnano Center Tech Assessments	\$50,000
NDC Marketing	\$75,000

Memorandum of Understandings, Universities of Colorado & Utah POC Proposal

Attached on the next pages are the signed, PDF copies of the Memorandum of Understanding, POC, agreed to and signed between the Universities of Colorado & Utah with Rusnano.



RUSNANO
Russian Corporation of Nanotechnologies



University of Colorado

Boulder • Colorado Springs • Denver • Anschutz Medical Campus

MEMORANDUM OF UNDERSTANDING:

Between the University of Colorado & the Russian Corporation of Nanotechnologies

This Memorandum of Understanding ('MOU') is entered into on this day, the 2nd of December, 2010 ('Effective Day') between the Russian Corporation of Nanotechnologies ('Rusnano') and the University of Colorado ('University').

The purpose of this memo is to establish a joint initiative for the funding and commercialization of nanotechnology between Rusnano and the University of Colorado.

Whereas Rusnano brings expertise, resources and capital to the partnership and the University of Colorado brings expertise in the commercialization of early stage technologies, a first class nanotechnology activity at the University of Colorado and the expertise to attract grant financing and equity capital to commercialize technology to the market.

Now, therefore, in consideration of the foregoing premises and the mutual consideration set forth herein, the parties agree to the following objectives.

The Parties intend to establish a proof of concept initiative ('Initiative') with a capitalization of up to \$10 million by Rusnano invested as tranches, in promising University nanotechnology and/or Rusnano nanocenter technology with commercial potential. The objective of the joint initiative is to support world class researchers conquering interdisciplinary research & engineering challenges in the creation of nanoscience breakthroughs and technology commercialization to the market.

The vision and the objectives of the University & Rusnano in this initiative are to accomplish the following:

1. Develop and implement a comprehensive, world-wide vision to position the University, Rusnano and Rusnano's nanocenters as a global leader in nanoscience and technology distinguished by interdisciplinary collaboration and entrepreneurial excellence.
2. Integrate and advance nanoscience and technology across the University, Rusnano, its nanocenters and the world.
3. Drive research partnerships between University leaders in Colorado & Russian academia, the private sector and governmental agencies, forming an interdisciplinary research and educational environment poised to capitalize on emergent nanotechnology research opportunities.

4. Aggressively position the Initiative to competitively vie for nanotechnology research, development, and educational funding.
5. Drive the commercialization of new nanoscience discoveries through technology commercialization (licensing), identification and promotion of entrepreneurial opportunities, and the start-up of new high tech companies.

Section 1. Business Intent

To achieve these objectives, The Parties will work toward establishing a plan that incorporates the following components:

Development of a Joint R & D Program for Collaborations in Nanotechnology. The goal of the project is focused on translational research that could lead to high value commercialization opportunities in the shortest period of time.

Create a Rusnano Grant Funding Program for High Value Nano Projects. The concept of an easily accessible proof of concept fund to further the development of applied and market-directed research has proven to be an invaluable success at many top tier research American universities including the University of Colorado. Rusnano will fund nanotechnology research & development grants for two years in the amounts from \$50,000 – \$200,000 (with average grant financing from \$50,000-\$100,000). On a case-by-case basis and given the availability of funding, the University may contribute equal or lesser amounts of grant financing to University nanotechnology with Rusnano capital.

Creation of an NSF Nano Research Center. The parties will seek opportunities to develop a joint submission to the National Science Foundation per their established guidelines to translate nanotechnology opportunities to market.

Commercialization Center. The University of Colorado will educate and train Rusnano nanocenter specialists in best practices in its unique model to commercialize nanotechnology research. Year after year the Technology Transfer Office (TTO) at the University of Colorado has consistently created new start-ups around University technology as ranked by the AUTM annual survey.

The TTO has developed a unique model that combines the best: executive management talent, early stage funding vehicles, technology services, entrepreneurship training, student involvement and corporate partnerships in a setting that encourages economic development and alignment for all the critical factors necessary for success.

Educational & Skill Transfer in the Business of Technology Transfer. To help in the skill transfer of the University's TTO business model in technology commercialization to the Russian counterparts in this agreement, the TTO will host a Russian national of Rusnano's nomination (meeting the technical, business & language qualifications of the University's TCO) as a

technology transfer officer, all costs of this individual paid by Rusnano and/or one of its nanocenters. This individual is the interface and the liaison between the University TCO, Rusnano and/or its nanocenters in this initiative.

Section 2. Limitation of Liability. None of the parties shall make a claim against, or be liable to, the other party or its affiliates or agents for any special, incidental, or consequential damages, including (without limitation) lost profits, based on any breach, default or negligence of such other party, its affiliates or agents resulting from the continuation or abandonment of negotiations. The foregoing limitations shall not apply to either party's infringement of the other party's intellectual property rights.

The University understands and acknowledges that the execution and funding of this Initiative requires the approval of Rusnano's Supervisory Board, the decision making body of Rusnano as mandated by Russian legislation. The University understands and acknowledges that it has been preselected to manage this Initiative, yet Rusnano may conduct a competitive tender to select American university partners to host and execute this Initiative.

Rusnano understands and acknowledges that the transfer of certain types of specified technologies may be subject to US export control restrictions, as provided in U.S. export control legislation, which may limit the University's ability to transfer such technologies to Rusnano.

Section 3. Advertising and Publicity. Neither party shall use the name or any trademark of the other party in any advertising, sales promotion or other publicity matter without the prior written approval of the other party.

Section 4. General. Except as otherwise provided in the Definitive Agreement, the parties shall each pay their own costs and expenses necessary to effect the discussions contemplated by this MOU, including the expenses of preparing the Definitive Agreement. The terms of this MOU may be amended only by a writing executed by both parties.

Section 5. Non-Binding Agreement. Except for the provisions of Sections 2, 3, 4 and 6 of this MOU, each of which will be legally binding and survive any discontinuance of negotiations or termination of this MOU, this MOU reflects only how the Initiative will be conducted between the parties. This MOU does not constitute a binding agreement or obligation in any respect nor does it constitute an agreement to enter into an agreement or an agreement to negotiate, and this MOU may not be relied upon as the basis of a contract by estoppel. Such a binding agreement will arise only when all material terms have been set forth in a definitive written agreement (or sets of agreements) executed by all parties (hereinafter referred to as the 'Definitive Agreement'). Neither the expenditure of funds nor the undertaking of actions consistent with this MOU shall be regarded as the partial performance of a binding agreement or entitle the party expending funds or taking action to assert claims for reimbursement or damages (whether direct, indirect, consequential, incidental, punitive, special, or reliance damages, at law or at equity, however caused, whether for breach of contract, negligence or under any other legal theory) against the other party relating to such expenditure of funds or actions, except for claims for reimbursement or damages arising from the breach of Sections 2, 3, 4 and 6 of this MOU.

Section 6. Term. This term of this MOU shall be for the period commencing on the Effective Date and ending one hundred & eighty (180) days from the commencement of the Effective Date, unless extended or earlier terminated by mutual agreement of the parties. The parties agree that, during the term of this MOU, they will deal exclusively with each other with regard to the subject matter hereof.

Section 7. Execution. To facilitate the execution of this MOU, the same may be executed in two or more counterparts, each of which shall be deemed an original and all of which together shall constitute but one and the same instrument and a facsimile transmission copy shall have the same force and effect as the original.

By executing below, the parties agree to be bound by the foregoing terms and conditions.

ACKNOWLEDGED AND AGREED:

Russian Corporation of Nanotechnologies

University of Colorado

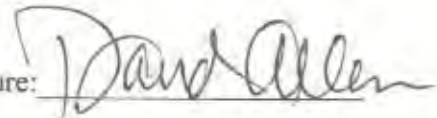
By: Evgeny Evdokimov

By: David Allen

Signature:



Signature:



Title: Managing Director

Title: Associate Vice President for
Technology Transfer

Date: 2 December 2010

Date: 2 December 2010

MEMORANDUM OF UNDERSTANDING:

Between the University of Utah & the Russian Corporation of Nanotechnologies

This Memorandum of Understanding ('MOU') is entered into on this day, the 3rd of December, 2010 ('Effective Day') between the Russian Corporation of Nanotechnologies ('Rusnano') and the University of Utah ('University').

The purpose of this memo is to establish a joint initiative for the funding and commercialization of nanotechnology between Rusnano and the University of Utah.

Whereas Rusnano brings expertise, resources and capital to the partnership and the University of Utah brings expertise in the commercialization of early stage technologies, a first class Nano-Institute embedded in the College of Engineering at the University of Utah and the expertise to attract grant financing and equity capital to commercialize technology to the market.

Now, therefore, in consideration of the foregoing premises and the mutual consideration set forth herein, the parties agree to the following objectives.

The Parties intend to establish a proof of concept initiative ('Initiative') with a capitalization of up to \$10 million by Rusnano, invested as tranches, in promising University nanotechnology and/or Rusnano nanocenter technology with commercial potential. The objective of the joint initiative is to support world class researchers conquering interdisciplinary research & engineering challenges in the creation of nanoscience breakthroughs and technology commercialization to the market.

The vision and the objectives of the University & Rusnano in this initiative are to accomplish the following:

1. Develop and implement a comprehensive, world-wide vision to position the University, Rusnano and Rusnano's nanocenters as a global leader in nanoscience and technology distinguished by interdisciplinary collaboration and entrepreneurial excellence.
2. Integrate and advance nanoscience and technology across the University, Rusnano, its nanocenters and the world.
3. Drive research partnerships between University leaders in Utah & Russian academia, the private sector and governmental agencies, forming an interdisciplinary research and educational environment poised to capitalize on emergent nanotechnology research opportunities.
4. Aggressively position the Initiative to competitively vie for nanotechnology research, development, and educational funding.

5. Drive the commercialization of new nanoscience discoveries through technology commercialization (licensing), identification and promotion of entrepreneurial opportunities, and the start-up of new high tech companies.

Section 1. Business Intent

To achieve these objectives, The Parties will work toward establishing a plan that incorporates the following components:

Development of a Joint R & D Program for Collaborations in Nanotechnology. The goal of the projects is focused on translational research that could lead to high value commercialization opportunities in the shortest period of time.

Create a Rusnano Grant Funding Program for High Value Nano Projects. The concept of an easily accessible proof of concept fund to further the development of applied and market-directed research has proven to be an invaluable success at many top tier research American universities including the University of Utah. Rusnano will fund nanotechnology research & development grants for two years in the amounts from \$50,000 – \$200,000 (average grant financing from \$50,000-\$100,000). On a case-by-case basis and given the availability of funding, the University may invest equal or lesser amounts of grant financing to University nanotechnology with Rusnano capital.

Creation of an NSF Nano Research Center. The parties will seek opportunities to develop a joint submission to the National Science Foundation per their established guidelines to translate nanotechnology opportunities to market.

Commercialization Center. The University of Utah will educate and train Rusnano nanocenter specialists in best practices in its unique model to commercialize nanotechnology research. The Technology Commercialization Office (TCO) at the University of Utah is currently ranked 1st in the United States, tying with MIT, as ranked by the AUTM annual survey of 2009.

The TCO has developed a unique model that combines the best: executive management talent, early stage funding vehicles, technology services, entrepreneurship training, student involvement and corporate partnerships in a setting that encourages economic development and alignment for all the critical factors necessary for success.

Educational & Skill Transfer in the Business of Technology Transfer. To help in the skill transfer of the University's TTO business model in technology commercialization to the Russian counterparties in this agreement, the TTO will host a Russian national of Rusnano's nomination (meeting the technical, business & language qualifications of the University's TCO) as a technology transfer officer, all costs of this individual paid by Rusnano and/or one of its nanocenters. This individual is the interface and the liaison between the University TCO, Rusnano and/or its nanocenters in this initiative.

Section 2. Limitation of Liability. None of the parties shall make a claim against, or be liable to, the other party or its affiliates or agents for any special, incidental, or consequential damages, including (without limitation) lost profits, based on any breach, default or negligence of such other party, its affiliates or agents resulting from the continuation or abandonment of negotiations. The foregoing limitations shall not apply to either party's infringement of the other party's intellectual property rights.

The University understands and acknowledges that the execution and funding of this Initiative requires the approval of Rusnano's Supervisory Board, the decision making body of Rusnano as mandated by Russian legislation. The University understands and acknowledges that it has been preselected to manage this Initiative, yet Rusnano may conduct a competitive tender to select American university partners to host and execute this Initiative.

Rusnano understands and acknowledges that the transfer of certain types of specified technologies may be subject to US export control restrictions, as provided in U.S. export control legislation, which may limit the University's ability to transfer such technologies to Rusnano.

Section 3. Advertising and Publicity. Neither party shall use the name or any trademark of the other party in any advertising, sales promotion or other publicity matter without the prior written approval of the other party.

Section 4. General. Except as otherwise provided in the Definitive Agreement, the parties shall each pay their own costs and expenses necessary to effect the discussions contemplated by this MOU, including the expenses of preparing the Definitive Agreement. The terms of this MOU may be amended only by a writing executed by both parties.

Section 5. Non-Binding Agreement. Except for the provisions of Sections 2, 3, 4 and 6 of this MOU, each of which will be legally binding and survive any discontinuance of negotiations or termination of this MOU, this MOU reflects only how the Initiative will be conducted between the parties. This MOU does not constitute a binding agreement or obligation in any respect nor does it constitute an agreement to enter into an agreement or an agreement to negotiate, and this MOU may not be relied upon as the basis of a contract by estoppel. Such a binding agreement will arise only when all material terms have been set forth in a definitive written agreement (or sets of agreements) executed by all parties (hereinafter referred to as the 'Definitive Agreement'). Neither the expenditure of funds nor the undertaking of actions consistent with this MOU shall be regarded as the partial performance of a binding agreement or entitle the party expending funds or taking action to assert claims for reimbursement or damages (whether direct, indirect, consequential, incidental, punitive, special, or reliance damages, at law or at equity, however caused, whether for breach of contract, negligence or under any other legal theory) against the other party relating to such expenditure of funds or actions, except for claims for reimbursement or damages arising from the breach of Sections 2, 3, 4 and 6 of this MOU.

Section 6. Term. This term of this MOU shall be for the period commencing on the Effective Date and ending one hundred & eighty (180) days from the commencement of the Effective Date, unless extended or earlier terminated by mutual agreement of the parties. The parties agree

that, during the term of this MOU, they will deal exclusively with each other with regard to the subject matter hereof.

Section 7. Execution. To facilitate the execution of this MOU, the same may be executed in two or more counterparts, each of which shall be deemed an original and all of which together shall constitute but one and the same instrument and a facsimile transmission copy shall have the same force and effect as the original.

By executing below, the parties agree to be bound by the foregoing terms and conditions.

ACKNOWLEDGED AND AGREED:

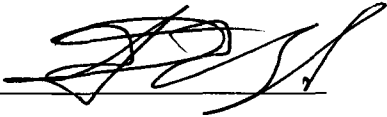
Russian Corporation of Nanotechnologies

University of Utah

By: Evgeny Evdokimov

By: Brian Cummings

Signature: _____



Signature: _____



Title: Managing Director

Title: Director
Technology Commercialization Office

Date: 3 December 2010

Date: 3 December 2010