



# PHLburg Technologies, Inc.

1275 Drummers Lane  
Suite 101  
Wayne, PA 19087

Telephone: 610-688-6800  
Fax: 610-975-5800  
Website: phlburg.com

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Security Device –  
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## MESSAGE FROM NEIL B. GODICK

The Kremlin is positioning itself to exert more control over major Russian based Internet companies. Yandex (Russia's largest) is in discussions with the Kremlin to give the state veto power over changes in its ownership.

Recently, Russian officials beginning with its President have highlighted the "strategic" nature of major Russian Internet companies. They are warning that foreign control over them could be a security concern. Current Russian laws limiting foreign investment don't cover the sector. Now, if the government wants to block a transaction it resorts to technicalities.

The Internet is now used by an estimated 50 million Russians. *We do not intend for these reports to solve any need our readers may have. We do intend to keep everyone current on technology developments in Russia. If you would like any additional information on any of the developments reported – send us a note.*

**St. Petersburg enterprise OAO NTTs RATEC** has started manufacturing a new generation of equipment that checks hand luggage for explosives and other hazardous materials. The device can detect explosives disguised as mobile phones, notebooks, filled drinking bottles, and other objects difficult to detect using other equipment and inspection techniques.

According to Andrey Vishnevkin, NTTs RATEC's Deputy Director, "using our equipment at airports will again make it possible for passengers to take drinks (once they have been checked) on planes without any restrictions".

The device uses neutron-radiation analysis. The checking procedure takes not more than 15 seconds. The checking procedure occurs at the second control stage after passing the X-ray machine. The equipment requires no operator; the device works automatically. The device detects the elevated nitrogen concentration contained in explosives.

The device is a further development of NTTs RATEC's earlier equipment that is already in operation at Pulkovo (St. Petersburg) and

Sheremetevo (Moscow) airports. The research funding was provided by the Federal Agency for Science and Innovations and by the Anti-Terror Program. OAO Gazprombank is the strategic investor financing the commercialization of this project.

The principal consumers for this equipment are airports and organizations that require stringent security measures. Recently OAO NTTs RATEC signed a contract to supply these devices to China. They will be used in facilities that have stringent security requirements. Company specialists are currently installing the equipment there.

Since 1991, NTTs RATEC has been developing and producing devices to detect radioactive and explosive substances. The company currently employs 35 people.

### Train Wheel – Energy Savings

**Scientists from Omsk invented a Flexible Wheel** which can increase railroad train speed, extends railroad wheel and groundwork service life, and reduces power consumption.

According to RIA OmskPress Agency, there are no world analogs to this invention. This invention will radically modernize the railroad wheel pair that has been in use for over 170 years. The inventor added a rubber-impregnated interlayer to the wheel and made the components independent from one another. The result is a softer running wheel with better cohesion properties and half the material resistance as the bogie runs on the rails. On a level rail section, a single electric locomotive can haul a train weighing up to 12, 000 tons.

The Flexible Wheel is just a part of the *High-speed flexible transport system* project. The project will reduce freight delivery costs. The project is costly. Europe and Japan have expressed their interest in this invention, and the scientists expect Russian federal funding.

### Health Care - Laser Surgery Device

**A new powerful laser, developed jointly by Russian physicists and physicians**, can be used as a bloodless scalpel and safely crush renal calculus.

According to Oleg Teodorovich, Head Chair for endoscopic urology at the Russian Medical Academy of Post-Diploma education, "a special feature laser operating in the scalpel mode has been developed". The laser allows a surgeon to perform an operation by using a radically different surgical technique. The technique enables bloodless elimination or evaporation of a tumor. It also makes it possible to weld or stop hemorrhaging in 1-2 mm blood vessels."

This unique laser also can crush renal and urethral calculi without contact. This results in adjoining tissues not being damaged.

## Health Care – Diagnostic Protein

**A unique luminescent protein was obtained by Russian scientists** from Krasnoyarsk. According to experts, this protein will provide a real breakthrough in diagnosing grave diseases.

Amylin is a unique agent that reacts to any pathogen in human blood. The protein sends a visible signal when it reacts with cancerous cells in tissue, HIV, or hepatitis virus. The new analysis method is much quicker and less expensive than existing methods.

Krasnoyarsk Institute of Biophysics has been studying luminescent microorganisms for over 25 years. By using luminescent bacteria, the biophysicists detect toxic substances. Amylin is found in various polyp types found in the northern seas. The Krasnoyarsk scientists have learned how to obtain the protein under laboratory conditions and impart various properties to it.

Yevgeni Vysotsky, photobiology Laboratory Head at the Krasnoyarsk Institute of Biophysics gave the following statement: “Currently there are quite a variety of methods for analysis that are used as basic diagnostic tools. Typically used as markers for antibodies are radio isotopes or enzymes. We suggest replacing these markers with our luminescent protein. The sensitivity of this analysis will be comparable with that of the radio-isotope method, which is currently the most sensitive of the methods known. But, unlike radio isotopes, our protein is not toxic. It satisfies practically every requirement placed on these markers.”

The scientists think this biotechnology approach has great prospects. The potential ranges from water quality control to hormonal studies.

## Enhanced Fabrics

**Wonder fabrics have been invented in the Russian city of Ivanovo.** Their beauty has captivated the best European couturiers. The fabrics new properties also make them useful for medical applications

When this fabric was shown in Paris it produced a stunning impression and delighted Chez Nina Ricci. They sold out all the garments with titanium deposition and ordered more fabric.

Boris Gorberg, ion-plasma processes laboratory Head at the Ivanovo Chemical Technology University explains, “We see a cloud of plasma around a metal electrode. The fabric passes through the argon plasma. In the vacuum it is accelerated by an electromagnetic field, which knocks out atoms from a metal plate. The atoms” settle “on the fabric to produce an extremely thin (just a few nanometers) deposition layer. After this treatment even ordinary gauze acquires a space-age look and unique properties. Gorberg continues, Fabrics with silver deposition have excellent bactericidal properties and thus can be used in medicine.”

The group successfully applied a metal coat to a fabric to keep it light and allowing it to breath. The ion-plasma processes laboratory at the Ivanovo Chemical Technology University began its experiments in that field back in the Soviet days. Private investors helped the Ivanovo chemists scale up their nano-discoveries to production levels.

## Supercomputer

**Skif, a supercomputer, has been developed by specialists** of A.K. Aslamazian Institute of Program Systems (IPS), RAS and United Institute of Informatics Problems (OIPI) of the National Academy of Sciences of Belarus.

The work was reported by IPS Director Sergey Abramov, RAS corresponding member, during a presentation held at Pereyaslavl-Zalessky to demonstrate new supercomputer's potential.

Abramov claims, "For the first time in the last 25 years Russian science has made a tremendous breakthrough in information-and-communication technologies. In terms of technology, fourth generation Skif computers are the apex of the world supercomputer sector. Further, Abramov claims, in terms of a number of indicators and know-how our Skifs are superior to their international analogs,"

The fourth-generation Skif can perform several tens of trillions of operations per second. To supply energy for it, a small electric power station is needed. A small lake provides cooling. The supercomputer costs about US\$100 million.

The USSR started developing supercomputers during the Cold War in an effort to keep pace with the West. In 1984, a secret research institute was set up in Pereyaslavl-Zalessky. The goal was to develop a super-large electronic computing machine that could outperform the scientists and designers overseas in the hi-tech field. The scientists were told to prepare an "asymmetric response" to the US Star Wars program. However, when the Soviet Union collapsed the work was stopped.

This work was resumed in 2000 under a joint Russian-Belarusian program and it took scientists just five years to develop supercomputers. This work made the Russia-Belarus Union a leader in the producing supercomputer equipment. Over that time five Skif family supercomputers were developed. They were rated among the world's most powerful computation systems.

"As early as this coming fall we are planning to develop a supercomputer at N technology level. In accordance with the world classification, N means" beyond competition", – says Abramov. Its planned maximum capacity is 0.5 peta-flops. Today there are no more than 10 supercomputers in the world that can provide the N technology level.

The scientists do not intend to stop there. By the fall of 2010, they will be ready to present a supercomputer with a 5 Pflop capacity.

To implement the national supercomputer program development plans RSK Skif (a business entity) was established. The RSK abbreviation means *Russian supercomputer*.

There are 60 total Russian and Belarusian companies, organizations and research institutes taking part in *Skif* development and implementation.