

Ferrobot SP CJSC

Volume of investments required: **\$ 2 100 thousand**

Intended use of investments required:

R&D (Ferromagnetic chip)	50%
Fixed assets acquisition (MBE equipment)	48%
Marketing	1%
Other (intellectual property rights protection)	1%

Company profile:

1. Date of establishment - November 2004
2. Stage of development - Seed
3. Size and source of investment to date - \$ 27 th., FASIE; Administration of St Petersburg
4. Industry - Hi-Tech, ferromagnetic memory on silicon
5. Target market - Information technology, including computer and audio-video products, mobile communication, medical engineering
6. Description and value of assets - \$ 200 th., technological apparatus and devices
7. Intellectual property rights - Patent on ferromagnetic material: Japanese patent #2000-261367, July 7, 2000; World patent (USA, 20 European countries) #PCT/JP01/07408, August 29, 2001. Inventors - scientists from Ioffe Physico-Technical Institute and Tokyo University A&T, registered proprietor - Japan Science and Technology Corporation. Patent novelty in Russia has been verified.
8. Signs of public recognition - Winner of the "Start" program, diploma for participation in the exhibition-congress (St Petersburg, June 2004), Medal for participation in the week of "High technologies in St Petersburg"; Semi-finalist in the BIT2003 contest, the prize of audience recognition. Discovery of the new ferromagnetic material - Award from the Magnetics Society of Japan in 2001; Outstanding Poster Award from the Materials Research Society of the USA in Fall 2000.

Owners:

- | | |
|--------------------------------------|------------|
| 1. Ioffe Physico-Technical Institute | 25% |
| 1 natural person | 75% |

Management and key personnel:

Medvedkin, Gennadiy Aleksandrovich - Project leader, senior scientist at the Ioffe Institute, Russian academy of sciences, 49, Doctor of Sciences in Physics. Has two-year experience at a video company as a manager and director for export-import of video and audio commodity (import of copyright on movies from the USA, export of products to Germany and Lithuania). Author of a series of inventions in semiconductor devices and materials, Mr. Medvedkin is experienced in commercialization of scientific results - applied introduction of several invented optical devices as solitary examples. Recipient of research grants from the Committee of Science and Higher Education of St Petersburg (2002, 2003), Foundation for Assistance to Small Innovation Enterprises (2004), JSPS foundation of the government of Japan (1999 to 2001), Germany Science Foundation DFG (2002, 2003), etc.

Nikitin, Sergey Eugenievich - Chemist, technologist, senior researcher, 46, works at the Ioffe Institute, Ph.D. in Chemistry, has two inventions in production of oxide films with transition metals, an expert in high vacuum processes for thin film deposition.

Smirnov, Valery Mikhailovich - Technologist, researcher, 34, works at the Ioffe Institute, Ph.D. in Technology. A high skilled specialist in epitaxial growth of multi component semiconductor compounds. He worked as a postdoc researcher in MBE technology of ferromagnetic films in Japan (2003-2004).

Products characteristics:

The essence of innovation is in a final adjustment of plan targets by commercialization of the memory cells on silicon. The ferromagnetic substance layers will be employed for development of spin injectors on magnetic memory devices based on silicon technology. Ferromagnetic chips (FM chips) will have a capacity of some hundreds Giga Bytes with a processing speed exceeding the present types of magnetic memory as a flash memory. The size and energy consumption is many times as low as in existent hard drives, so they can displace the drives in computers.

Comparative analysis with existing alternatives:

Characteristics	Spin injector layers of silicon operating at room temperature - 2006. FM chip on silicon - 2008.	Alternative 1 Magnetic flash memory (Intel, Samsung, Toshiba, AMD, Fujitsu - 2001-2003)	Alternative 2 Magnetic resistive cells MRAM (Motorola -2003; NEC, Toshiba, IBM- Infineon - 2004-2005)
Size, sq. mkm/cell	< 1	150	1,4
Memory, MByte	up to 100,000	64~512 - year 2002	4 - year 2004
Processing speed	nanosec	microsec	nanosec
Principle of operation	Spin injection	Electric potential	Spin tunnel

According to an expert opinion, the world market of flash memory will grow in 2004 by 36% and is estimated at the level of \$10.6 billion. Supply of the flash memory chips should rise by 21% up to \$ 1.8 billion chips. The average price of the flash memory chips will grow by 12% up to \$ 4.81. The spin injector FM chip belongs to the next generation of magnetic memory. Quantum processes for manipulation with spin state allow the sharp reduction of the energy consumption and the increase of processing operation.

Markets/Competition:

	Characteristics	Spin injector FM chip	Alternative 1	Alternative 2
2004	Geographical Region - USA, Japan. Market size \$ 10.6 billion.			
	Company market share, \$ /%	0/0	7.53 bil. / 71% (5 leading companies)	3.07 bil. / 29%
2008	Geographical Region - USA, Europe, Japan. Market size \$ 25 billion.			
	Company market share, \$ /%	65 mln. / 0.25%	17.75 bil. / 71% (5 leading companies)	7.25 bil. / 29%