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Trends and status in chip design and EDA

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I. INTRODUCTION

Russia (official: Russian Federation) is federal presidential republic, comprising 83 federal subjects. Russia is the largest country in the world, covering more than one-eighth of the Earth's inhabited land area. Russia spans nine time zones and incorporates a wide range of environments and landforms. Russia has the world's largest reserves of mineral and energy resources and is the largest producer of oil and natural gas globally. Russia has the world's largest forest reserves. Its lakes contain approximately one-quarter of the world's liquid fresh water, 20% in Lake Baikal alone.

More than 160 different ethnic groups and indigenous peoples live in Russia (80.9 % Russians, 5.3% Tatars; 1.9% Ukrainians; 1.5% Bashkirs; 1% Chuvashes; 9.4% others and unspecified). Traditionally there is high rate of educated peoples in Russia – 27.5 % high education, 5.4 % undergraduate education, 36.7 % secondary professional education, 21.5 % secondary basic education. According to a UNESCO report, more than half of the Russian adult population has attained a tertiary education. Literacy is more than 99.7 %. There are more 1000 universities and institutions in Russia (662 are State and 409 are Private).

Historically, science and technology in Russia are popular and active developed. In the 19th and 20th centuries the country produced a large number of notable scientists and inventors. Many achievements in aerospace technologies, TV and radio communication, nuclear energetics, medicine, etc. dealt with names of Russian scientists and engineers.

II. CHIP DESIGN AND EDA PRESENCE

Russian companies involved in microelectronics design and manufacturing could be categorized in two main groups. The first one includes companies having own capacity such as foundry or mini-fab. The second group includes fabless companies and design houses. All companies use both native

and foreign technologies.

The leaders of Russian microelectronics industry are JSC “Angstrom” and SITRONICS Microelectronics, which is headed by JSC “Micron”. The short list of companies and SMEs involved to a chip design and electronic design automation is represented in the database in [1].

The potential of Russian market is great therefore more and more design companies are required. In order to improve efficiency of new technologies introduction the realization of comprehensive program to study, training and retraining of staff is needed. In these circumstances, training and competence centers providing study and transfer of new technologies to customers on Russian market play important role.

III. ACADEMIA

Microelectronics training and competence center (MTCC) of Vladimir State University is one of three first such centers opened in Russia in the framework of European project Copernicus in 1997 based on the EUROPRACTICE program. The MTCC was opened at Computer Engineering department possessing high quality teachers and scientists and having well relations with microelectronics industrial enterprises as well SMEs. The main aim of the MTCC is dissemination of the state-of-the-art technologies and design methodologies, up-to-date EDA and CAD tools among Educational Institutions and SMEs, and also studying and retraining of specialists to use these tools. The MTCC specialists carry out research works in the area of design automation and design-for-testability of digital, analog and mixed-signal ICs using different FPGA and ASIC technologies. Language barrier is one of essential problems for Russian specialist to start using modern foreign tools and technologies. Therefore the MTCC made adaptation of materials in English and provided workshops and master-classes at using CAD tools for representatives of Russian design and manufacturing enterprises.



Capital
Largest city
Language
Area Total
Population (2012 estimate)
Currency
Time zone
Internet TLD

Moscow
Moscow
Russian
17,075,40 km²
143,300,000
Russian ruble (RUB)
(UTC +3 to +12)
[.ru](#) [.su](#) [.ph](#)

The center has very attractive geographical position. Vladimir city is the administrative center of Vladimir region, which borders with Moscow, Yaroslavl, Ivanovo, Ryazan, and Nizhny Novgorod regions. Vladimir is situated 180 km east of Moscow. Vladimir was one of the medieval capitals of Russia. Modern Vladimir is a part of the Golden ring of the ancient Russian cities and a significant tourist center. Its chief monuments and cathedrals inscribed by UNESCO on the World Heritage List. There is a railway connection between Vladimir and Moscow. Vladimir State University is the major regional cultural and scientific centre. About 27 000 students are studied at the university, which consists of 8 institutions and 93 departments. There are several R&D centers involved in hi-tech areas such as nanotechnologies, photonics, microelectronics, mechanical engineering, IT, robotics, etc. The MTCC is one of the most efficient at the university.

Nowadays the microelectronics training and competence center of Vladimir State University has partner relations with many leading companies in EDA, microelectronics and IT such as Intel, Microsoft, Fraunhofer IIS, DLink, National Instruments, Agilent, Rohde & Schwarz, companies represented by EURO PRACTICE, etc. Such cooperation provides improving study curricula and including the state-of-the-art technologies and CAD tools in educational process of the Computer Engineering department in order to prepare high quality and well skilled design engineers among young generation, allows carrying out joint R&D programs and improves the competitiveness. The MTCC is ready to new collaboration. The partnership is mutually beneficial because it works on the transferring technologies, social and cultural exchanges to the direction of open international society.

There are two leading universities in Russia providing study of IC designers and technologists and having own Fabs – National Research University of Electronic Technology (MIET) situated in Zelenograd and Southern Federal University as Taganrog Institute of Technology situated in Taganrog.

IV. GOVERNMENT PROGRAMS

The crisis of 1990-s led to the drastic reduction of the state support for science and a brain drain migration from Russia.

In the 2000s, on the wave of a new economic boom, the situation in the Russian science and technology has improved, and the government launched a campaign aimed into modernization and innovation. Information technologies, micro- and nanoelectronics dealt with one of eight priorities for the country's technological development specified by the President.

The government provides financial support to realization of corresponding state programs with perspective to 2020, for

instance, 12 189.4 billion RUR in 2012, 12 943.2 billion RUR in 2013, 13 341.6 billion RUR in 2014 (short-term plan) [2].

There are several federal programs for supporting and development of electronics industry and IT market in Russia :

- “Development of science and technology” (146,29 billion RUR in 2012, 126.01 billion RUR in 2013 and 84.68 billion RUR in 2013);
- “Development of electronics and radioelectronics industry” (25,58 billion RUR in 2012, 19.42 billion RUR in 2013 and 16.54 billion RUR in 2014);
- “Information society 2011-2020” (131,51 billion RUR in 2012, 120.87 billion RUR in 2013 and 112.43 billion RUR in 2014).

There are special federal target programs (FTP) [3] for development science, high education and industry in critical technologies, for instance, FTP “Development of electronics component base and radioelectronics”, FTP “Research and development in priority directions of Russian science and technology complex evolution”, FTP “Support, development and application of GLONASS system on 2012-2020”, etc.

The open JSC “RUSNANO” (was founded during the reorganization of the Russian Corporation of Nanotechnologies) independently and in cooperation with foreign investors realizes several ambitious investment projects for SMEs in the area of micro- and nanoelectronics development [4].

One of state investment project in innovation is Skolkovo Innovation Centre (SIC). The strategic goal of the SIC is to concentrate international intellectual capital, thereby stimulating the development of break-through projects and technologies. In the course of implementation of the project, companies that are engaged in innovative development are discovered. After a selection process, some of these become project participants of the center. They are provided with all assistance necessary for development. The Skolkovo Foundation and its partners transform the infrastructure, resources and other possibilities of the center, into effective services for companies that are project participants. Project participants will be able to use benefits with regard to customs payments and tax benefits, and will also gain access to the infrastructure of the SIC [5].

REFERENCES

- [1] <http://www.semidec-ru.eu>
- [2] <http://info.minfin.ru>
- [3] <http://www.programs-gov.ru/>
- [4] <http://www.rusnano.com>
- [5] <http://www.sk.ru>



Sergey Mosin was born in USSR on September 21, 1976. He received the engineer diploma in computer engineering with honors and the Ph.D. degree from VSU in 1998 and 2000, respectively. Since 2001, he has been an Associate Professor with CE department. He was an acting head of CE department during 2005-2011 academic years. In 2011, he became the vice-rector for research of VSU. He is currently a senior scientist. Since 1997, he is a member of IEEE. The area of his R&D interests deals with design automation of analog and mixed-signal ICs, development of CAD tools for design-for-testability of analog and mixed-signal circuits. He is scientific adviser of PhD students. He has published a monograph, 3 textbooks and over 70 journal and conference papers.