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The Czech Republic

Trends and status in chip design and EDA

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I. INTRODUCTION

The Czech Republic is a parliamentary republic in the middle of the Europe. Its origin can be seen from medieval Czech Kingdom which became part of Austrian (or Austro-Hungarian) empire under the rule of Habsburg.

After the World War I and the split of the Austria-Hungary, former Czech Kingdom made a common state with Slovakia. The Czechoslovakia was one of the most democratic and most advanced countries in the middle of the Europe. World War II and the following decades under the Soviet control had negative impact on this trend and Czechoslovakia has been more oriented to the heavy industry and military production.

The *Velvet revolution* in 1989 signified a change and the Czechoslovakia and the Czech Republic (after the split of Czechoslovakia to the Czech Republic and Slovakia) became again the part of the Europe. The Czech Republic is an active member of OECD (1995), NATO (1999) and European Union (EU, 2004).

Population of the Czech Republic exceeds 10 million people living on 78 thousand km^2. The Czech Republic is known for its cultural heritage (Prague, Český Krumlov and other UNESCO places) and also for its industry (Škoda).

There are 73 universities, from which 28 are state or public.

II. CHIP DESIGN AND EDA PRESENCE

ON Semiconductor Corporation - a premier supplier of high performance silicon solutions for energy efficient electronics, has design center located on the company's Roznov campus. The center, is focused on the development of energy efficient power solutions for use in televisions, notebook computers, battery chargers, white goods, and LED lighting and wireless applications.

Brno Freescale EDA design center is developing the *Processor Expert* technology. Processor Expert is a development system to create, configure, optimize, migrate, and deliver software components for Freescale silicon. This technology is integrated into Freescale's CodeWarrior products supporting S08/RS08, S12(X), Coldfire, Coldfire+, Kinetis, DSC 56800/E, and some Power Architecture processors.

Codasip is a dynamic young company that provides an all-in-one development environment for application processors (ASIPs) based on open-source standards and ASIP design services. Codasip® Framework enables designers to create the most effective ASIPs for the target applications.

III. ACADEMIA

Brno is the capital of the South Moravian Region with population of almost 400.000 people. The city has very attractive strategic geographic position within Central Europe with excellent transport accessibility, including an international airport. It is the modern, dynamic and fast growing centre of industry, trade, science, information technology, research and innovation with business incubators and centres of excellence in science. It's called city of universities with more than 86,000 students at 14 universities. Brno supports infrastructure for the business in the field of science, research and innovation and is also important centre of international trade fairs and exhibitions. The city is known with high quality of life - a centre culture and sports, historical sights (Villa Tugendhat, a UNESCO site, functionalist architecture). [1]

On 19 September 1899 the Austrian Emperor Franz Joseph I signed a decree bringing into existence a Czech Technical University in Brno. This was the first Czech higher education institution in Moravia. Brno University of Technology (BUT) in the course of more than 110 years has matured into an internationally recognized institution offering a cutting-edge education based on the latest scientific and professional knowledge delivered at eight faculties covering a broad spectrum of fields ranging from technical and scientific

Capital	Prague
Largest city	Prague
Language	Czech
Area Total	78,866 km^2
Population (Sep 2012 estimate)	10,513,209
Currency	Czech koruna
Time zone	CET (UTC+1)
Internet TLD	.cz

disciplines through economics to the arts.

According to the Quacquarelli Symonds Limited (QS) prestigious world university rankings, BUT has been among the best universities of the world for several years in succession. For the period 2009–2013 the Brno University of Technology has been awarded the European Commission's prestigious ECTS and DS Label certificates, issued in recognition of quality higher education. [2]

The Faculty of Information Technology (FIT) at the Brno University of Technology was established on 1st January 2002, settled into former Cartesian monastery in Kralovo Pole, Brno. Activities of the faculty are divided into Department of Computer Systems (architecture of hardware and software of embedded systems, specification and design of computer-based systems, reconfigurable systems, adaptive systems, diagnostics and testing of digital systems and bioinspired computer systems), Department of Information Systems (database technology, implementation of information systems, management of software projects, theory of formal languages and compilers), Department of Intelligent Systems (Intelligent Systems, systems for specific applications, computer-based systems, interface design and the use of multilevel parallelism) and Department of Computer Graphics and Multimedia (general computer graphics algorithms, rendering, processing and recognition of speech signals, animation in three-dimensional space, modern methods of interaction in three-dimensional space, image processing, and applications). [3]

The Research Centre of Information Technology is part of IT4Innovations project which aims to build a national Centre of Excellence in the field of information technologies. FIT BUT takes active part in the project as a leader of two work packages Multimedia Information Recognition and Presentation and Secure and Safe Architectures, Networks, and Protocols. The aim of FIT BUT in the project is strengthening the co-operation with the industry. Part of the project is acquisition of a high-performance supercomputer that is planned to be put into operation in 2015, in which time it is supposed to rank among the top 100 most powerful supercomputers in the world. This supercomputer will be placed in Ostrava. [4]

IV. Government Programs

The complete change of the economic background after the Velvet revolution in 1989 affected also the research. More than half of research positions have been lost during the privatization period. [5] In the first years a lot of scientist left the Czech Republic. The new millennium brought a change and the number of researchers started to grow also due to the government research programs. Now we see a stable growth of scientist of more than 3 % per year. Public funding of research also steadily grows and exceeds 1 billion € per a year. [6] The most important grant institutions are the Grant Agency of Czech Republic, Technological Agency of Czech Republic and Ministry of Education.

The membership of Czech Republic in the EU in 2004 opened the way to the EU funding. The flagship of EU research is Seventh framework programme which will continue in Horizon 2020 (2014 – 2020). The proposed budget exceeds 80 billion €. There is also European Regional Development Fund which aims to build new capacities and research infrastructure in less developed regions (mostly in the new member states but also in less developed regions of the old member states).

The South Moravian Innovation Centre (JIC) is an agency that supports collaboration between industry, R&D institutions and public administration bodies in the region of South Moravia. JIC also offers an incubator for high innovative companies. The JIC Innovation Park has almost 60 innovative companies and startups from the fields of IT, software engineering, computer security, machining, biotechnologies, robotics and more. [7]

References

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[3] www.fit.vutbr.cz
[4] www.it4i.cz
[5] www.vyzkum.cz
[6] www.czso.cz
[7] www.jic.cz

Prof. Tomas Hruska graduated at the Brno University of Technology, Czech Republic. Since 1978, he's been working at the Department of Computer Science, Brno University of Technology. He founded the Faculty of Information Technology (FIT) in 2002 and served there as the first dean till 2008. Prof. Hruska is currently the vice-dean of FIT. Since 2006 he's been working on the design and implementation of the Codasip® project.
Prof. Hruska received his CSc. (Ph.D.) in Computer Science and Engineering from the Brno University of Technology, Czech Republic.