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Armenia

Building a New Heritage in Electronic Design

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I. INTRODUCTION

During its 4000 years old history, Armenia was situated at a cultural, historical, and religious intersection and located at the crossroads between Europe and Asia. Today, it is located in the southern Caucasus between the Black and Caspian Seas, bordered on the north and east by Georgia and Azerbaijan, and on the south and west by Iran and Turkey. Armenia has a strong cultural and scientific heritage for thousands of years. It was the first state to adopt Christianity as a state religion, in 301 AD. The Ararat Valley of Armenia is believed to be inhabited since the Stone Age, making it is one of the oldest settled regions in the world.

The modern Armenia declared its independence from the former USSR in 1991, and held its first free presidential election shortly thereafter. Since then, the country's economy has switched from the large agro-industrial complexes of the Soviet era to small-scale agriculture. The government has pursued an aggressive economic reform program, slashed inflation, and privatized most small- and medium- size businesses. Armenia's public institutions of higher learning include Yerevan State University (YSU), founded in 1919, and the State Engineering University of Armenia (SEUA), founded in 1933. The American University of Armenia (AUA), a private, nonprofit institution affiliated with the University of California, opened on September 23, 1991, the same day Armenia declared independence. The idea of an American-style technical school originated during the influx of humanitarian and technical support from around the world after the 1988 Armenian earthquake, which killed 25,000 people. The National Academy of Sciences (NAS) of the Republic of Armenia was founded on 10 November 1943 on the basis of the USSR Academy of Sciences' Armenian Branch, organized in 1935. NAS RA is a highest scientific self-governing organization which unites NAS Members and scientific staff of affiliated scientific and research institutions. The Academy promotes and carries out fundamental and applied research in different scientific fields, as well as coordinates research carried out throughout Armenia. NAS RA is an official scientific consultant to the highest Governing Bodies of Armenia.

Armenia is a member of more than 40 different international organizations, including the United Nations, Council of Europe, World Trade Organization, etc. Capital of modern Armenia Yerevan was founded nearly 2800 years ago and today, forms one of the oldest cities in the world.

Era of computers and software development began in 1956 with the launch of Yerevan Scientific&Research Institute of Mathematical Machines (YerSRIMM). The institute was specifically created by the decision of the Soviet Government to design and build computers and related equipment. Already in 1959, YerSRIMM designed the first generation computer "Aragats" running on vacuum tubes; in 1961, the second generation computer "Hrazdan" on semiconductor elements was ready. Starting from early 60s, the Institute designed mainframes, automated control systems, as well as operating systems, networking and application software. In 80s, it alone employed around 10,000 people. Methodology and software for chip design and EDA were being developed jointly by YerSRIMM and Institute for Informatics and Automation Problems of NAS (established also in 1956). The corresponding directions of higher education were initiated by this launch in SEUA and YSU.

II. CHIP DESIGN AND TEST PRESENCE

In 1990s and 2000s, a new age in the industry development started when several US-based chip design and EDA businesses opened branches in Yerevan including Credence Systems (semiconductor design-to-test solutions), HPL Technologies (yield management software and test chip solutions), Virage Logic (advanced embedded memory IP), National Instruments, Singapore Technologies Kinetics Ltd (ST Kinetics), Synopsys, Mentor Graphics, and others. Diaspora played a key role in the formation of Armenia's fledgling software industry and was the primary factor behind the early establishments of many foreign companies in Armenia. Currently the number of companies which are specialized in EDA and chip design and test is close to 20, the number of employees there is over 1,000. The modern research in electronic design and test started in Armenia after establishment of the System Test and Reliability (STAR) Laboratory in 1996. It was created as a joint body of the NAS,

Capital	Yerevan
Largest city	Yerevan
Language	Armenian
Area Total	29,743 km^2
Population (2010 estimate)	3,262,200
Currency	Armenian Dram (֏)
Time zone	GMT+4
Internet TLD	.am

YSU, SEUA, AUA and YerSRIMM. The first project developed by the laboratory was sponsored by AT&T Bell Labs, after that other international projects followed

III. Academia

Armenia has 15 (21 with branches) state higher educational institutions and close to 75 private universities. Higher educational institutions in Armenia have three-level structure: baccalaureate, magistracy, post-graduate studentship. SEUA and YSU are the oldest and largest institutions developing engineering professionals for the IT industry. Other institutions active in the IT education include AUA, European Regional Educational Academy (ERA), and Russian-Armenian (Slavonic) University (RAU). In 2010-2011, nearly 6,900 students were enrolled at the Armenian universities offering IT related professions, of which about 6,000 students study at the above stated 5 main universities. Around 75% of all these students study at SEUA and YSU. Cooperation between the industry and the educational institutions was evolving during the post-Soviet years. Recently this trend has accelerated drastically. The cooperation includes:

- Synopsys Armenia Educational Department (SAED) established by Synopsys, Inc. in 2004. Department started the cooperation with higher education institutions with SEUA in 2004. The basic chair of the department - Interfaculty Chair of "Microelectronic Circuits and Systems" was established earlier in 2001 by LEDA Systems (acquired in 2004 by Synopsys Inc.). The cooperation was extended to YSU (2005), RAU (2007), ERA (2010). Further cooperation development covers also foreign countries: Russia (MIET, 2006), China (2007), Saudi Arabia (2009), Jordan (2010), India (2010);
- Sun educational laboratories formed by Sun Microsystems, EIF, and USAID at SEUA, YSU and RAU in 2008;
- Microsoft Innovation Center formed by Microsoft, EIF and USAID at SEUA;
- Regional Mobile Application Laboratory founded in 2011 for Eastern Europe, South Caucasus and Central Asia under the joint project of InfoDev, Government of Finland and Nokia.
- Laboratory of Electronic Design and Test established by Virage Logic Corporation (acquired in 2010 by Synopsys, Inc) and YSU.

IV. Government Programs

Currently in Armenia there are several important Government Programs dedicated to IT support and its prosperity. Examples of such programs are:

- The Union of Information Technology Enterprises (UITE) is the primary IT Association in Armenia.
- Enterprise Incubator Foundation or EIF is a business development and incubation agency operating in Yerevan, Armenia.
- The annual ArmTech Congress is the official global Armenian high tech industry and business conference and networking platform.
- EIF and USAID signed an Agreement on establishment of Armenian National Engineering Laboratory (ANEL) at the State Engineering University of Armenia (SEUA), jointly with the National Instruments Armenian Branch.
- U.S. Civilian Research & Development Foundation (CRDF Global) in partnership with EIF and in coordination with the Government of Armenia is implementing a series of projects to promote scientific and technological progress in the country by offering competitive merit-based grants.
- Annual Award of the President of Armenia to the Best IT Students.
- Annual International Microelectronics Olympiad of Armenia under the patronage of the Prime Minister of Armenia.

V. References

[1] www.gov.am
[2] www.ysu.am
[3] www.seua.am
[4] www.sci.am
[5] http://www.synopsys.com/Company/Locations/Armenia/Pages/defa

Samvel Shoukourian received the Doctor of Science degree in Physics and Mathematics in 1990 and the Academic Rank of Professor in Computer Science and Software Engineering in 1993 from the Supreme Certification Board (Moscow). In 1996, he was elected a Full Member of the National Academy of Sciences of Armenia. Currently he is the Scientific Leader of IT Educational and Research Center, Yerevan State University (YSU), Yerevan, Armenia. Since 1994, simultaneously with the work at YSU, he has been Chief Scientific Advisor and Development Director in different international companies. Since 2000, he is directing the Department of Embedded Test and Repair at Virage Logic Corporation (USA) and since 2010, the same department at Synopsys, Inc (USA). He has authored more than 80 papers, and holds Russian and U.S. patents. The main topics of his current research interests include testing of electronic devices and systems, formal models of distributed systems, information technologies and architectures for multimedia virtual environments.

Vazgen Melikyan is the Director of Synopsys Armenia Educational Department and the Head of Interfaculty Chair of "Microelectronic Devices and Systems" at State Engineering University of Armenia (SEUA) since its establishment in 2001. He earned his PhD from Moscow Engineering-Physics Institute (MIFI), Moscow in 1984. He received the Doctor of Science degree in Engineering in 2006 and the Academic Rank of Professor in Automated Systems from the Supreme Certification Board of Armenia in 2006. Vazgen is Honorable Scientist of the Republic of Armenia. He is a Laureate of "President of the Republic Prize" in "Technical Sciences and Information Technologies" area. He is a Full Member of the Academy of Engineering of Armenia, Academician of Academy of Sciences of Applied Radio Electronics of Russia, Ukraine and Belarus, Honorary Professor of National Research University MIET, and European Regional Academy of Armenia. He has authored >182 scientific publications and >100 methodical publications and manuals.

Gayane Markosyan is the PR Manager of Synopsys Armenia CJSC. She joined Synopsys in September 2006. Prior to Synopsys, in 2003-2006 Gayane was a Head of PR office at State Engineering University of Armenia - SEUA (Polytechnic). During the same period she was a Member of the SEUA Board. Gayane has a PhD from SEUA in the field of Automated Control Systems. She has 32 years of experience in teaching. She is an Associate Professor of Applied Mathematics & Informatics Department at SEUA. Gayane has >30 scientific and methodical works, she was a supervisor of >100 Diploma Works and Master Theses. Gayane is the Executive Director of the SEUA Alumni Association. She is a member of Union of Armenian Journalists and Yerevan Press Club. Gayane is also leading the SCR and Community Involvement programs at Synopsys Armenia. She is the Winner of the Community Champion Award 2008 of Synopsys and was nominated as a Community Superhero at DAC 2009.

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