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Italian Republic*

Fashion and chip design: the state of the art of EDA in Italy

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I. ITALY IN GLOBAL PERSPECTIVE

Italy is a unitary parliamentary republic in Southern Europe. To the north, it borders France, Switzerland, Austria, and Slovenia along the Alps. To the south, it consists of the entirety of the Italian Peninsula, Sicily, Sardinia – the two largest islands in the Mediterranean Sea – and many other smaller islands. The independent states of San Marino and the Vatican City are enclaves within Italy, while Campione d'Italia is an Italian exclave in Switzerland. The territory of Italy covers some 301,338 km^2 (116,347 sq mi) and is influenced by a temperate seasonal climate. With 60.8 million inhabitants, it is the fifth most populated country in Europe, and the 23rd most populed in the world. Modern Italy is a democratic republic. It has been ranked as the world's 25th most-developed country and its Quality-of-life Index was ranked in the world's top ten in 2005 [1]. Italy enjoys a very high standard of living partially because of a high GDP per capita [2, 3] and has a high public education level. Italy is also one of the world's most globalised nations. [4]. It is a founding member of what is now the European Union and part of the so-called Eurozone. Italy is also a member of the G7, G8, G20, NATO and adheres to the UN. It has the world's third-largest gold reserves, ninth-largest nominal GDP, tenth highest GDP (PPP) and the sixth highest government budget in the world.[5] It is also a member state of the Organisation for Economic Co-operation and Development, the World Trade Organization, the Council of Europe and the United Nations. Italy currently maintains the world's eleventh-largest nominal defense budget and is a participant in the NATO nuclear sharing policy.

II. ITALIAN ELECTRONIC COMPANIES

Italian companies involved in microelectronics design and manufacturing could be categorized in two main groups. The first one includes companies having own capacity such as foundries or mini-fabs. The second group includes so-called fabless companies and design houses. In the following some of the most active companies in Italy are introduced.

STMicroelectronics is a French-Italian multinational electronics and semiconductor manufacturer headquartered in Geneva, Switzerland. It is Europe's largest semiconductor chip maker based on revenue. STM is among the world leaders in a broad range of segments, including semiconductors for industrial applications, inkjet print-heads, MEMS (Micro-Electro-Mechanical Systems), MPEG decoders, smartcard chips, automotive integrated circuits, computer peripherals, and chips for wireless and mobile applications.

Magneti Marelli was founded in 1919 as a joint-venture between Fiat and Ercole Marelli, and was named as *F.I.M.M. - Fabbrica Italiana Magneti Marelli*; the first plant was established in Sesto San Giovanni near Milan, Italy. Magneti Marelli currently deals with intelligent systems for active and passive safety of vehicles, as well as in the power train. The business lines include automotive lighting systems, body control systems, power train control systems, electronic instrument clusters, telematics systems, computers, suspension systems and components, exhaust systems and motorsport, wherein Magneti Marelli develops specific electronic systems for Formula One, Motorcycle Grand Prix and the World Rally Championship.

SITAEL S.p.A. is an Italian medium enterprise able to cover all the processes needed for Design, Development, Production and Qualification of Electronics and Microelectronics System compliant with high safety and reliability standards, offering turn-key highly safe and reliable solutions for Aereospace and Industrial Markets. For more than 10 years, SITAEL Microelectronics Design Center has been pioneering radiation hardening techniques for the design of Integrated Circuits suitable for space environment. SITAEL is able to develop analog, digital and mixed-signal ASICs resistant to significant values of TID and SEE, starting from the selection of the most appropriate technology, up to the

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Largest city	Roma
Language	Italian
Area Total	301,338 km^2
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Currency	Euro (€) (EUR)
Time zone	**(CET UTC +1, CEST +2)**
Internet TLD	.it

application of specific measures at the architecture, schematics and layout level. SITAEL is proud of having developed a key component, the REMS ASIC, in the NASA's Mars Science Laboratory, the "Curiosity" Rover.

Marvell the world leader company in storage, communications and consumer silicon solutions, in 2008 announced the official grand opening of its analog semiconductor design center in Pavia, Italy. The new international center focuses on products for many markets, including cell phones, power management audio and video markets.

Micron, US company recently also in Italy, is focused on memory solutions, including DRAM technologies, NAND Flash, NOR Flash and phase change memory (PCM). The Micron in Italy is also the main venue for the automotive divisions and EMEA Group Embedded Solutions Group (ESG), hosts the functions of business development for the group Wireless Solutions Group (WSG) and an important center of design for the NAND Solutions Group (NSG). Micron supports initiatives aimed at the world of education, with the aim of bringing business and education together.

Italtel today works on the development of multi-service networks VVoIP (Voice and Video over IP) and development of innovative solutions focused on levels of Control Application/Service and Access. To these traditional sectors, have recently added activities' of study and development of innovation in areas such as integrated security and identity management, e-Health technologies for energy management and smart grid, cloud computing.

Centro Ricerche Fiat (CRF), has the mission to develop and transfer innovative products, processes and methodologies in order to improve the competitiveness of the products of the Fiat Group. The CRF research activities imply strategic competences not only in the field of automotive engineering, but also in the fields of manufacturing, advanced materials, ICT and electronics, as well as a wide range of state-of-the-art laboratories and extensive test facilities, including EMC chambers and a dynamic driving simulator with immersive virtual reality. CRF participates with a leading role in the European “Green Car Initiative” and “Factories of the Future”, the Public Private Partnerships conceived by the European Commission.

III. ACADEMIA (*Universities preparing EDA and Chip Design specialists*)

Since the bachelor degree the students, are gradually driven towards more complex and efficient methods of designing embedded systems. Examples are the courses of Automatic Design of Electronic Circuits, and Design of Integrated Electronic Systems at the bachelor and Master degree of Electronic Engineering at the Politecnico di Bari, University of Pavia, University of Bologna, Politecnico di Torino and Milano and other important Italian Universities. Often the final thesis is the design of an IC where CAD tools are widely used. The tape out are often provided by EUROPRACTICE or CMP.

IV. EUROPEAN GOVERNMENT PROGRAMS (*EDA and Chip Design industy development support*)

In Italy the EDA activities have always been included within projects on design and testing of electronic circuits and systems, in the context of national research programs (i.e. PRIN, FIRB, FAR, FIRST) financed by Ministero dell’Università e della Ricerca Scientifica, MIUR. In Europe, Horizon 2020 program has a strong focus on developing European industrial capabilities in *Key Enabling Technologies* (KETs) with dedicated support for ICT, nanotechnologies, advanced materials, biotechnology, advanced manufacturing and processing, and space. The JTI ENIAC (http://www.eniac.eu) is a sustainable public-private partnership that, thanks to public funding, aims to increase private investment in the field of nanoelectronics in Europe. It also allows the synergy of resources and funds of the Community Framework Programme, national program of R & D, inter-governmental initiatives (i.e. EUREKA) and industries, universities and research institutes in Europe. The founding members of the JU are the European Commission, the Member States or Associated States (including Italy), and the non-profit industry association (ANEAS). ENIAC will have a duration of ten years (2008-2017). In the context of the JTI ENIAC, the theme of design and design automation have had considerable space. In almost all the call, made in the last 6 years, the topic of Design Methodologies had a reserved space, so there have been several projects on EDA that have been funded (MODERN http://www.eniac-modern.org/, END http://www.eniac-end.org/,...).

References

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[4] Report for Selected Countries and Subjects". Imf.org. 16 April 2013. Retrieved 17 April 2013.

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Daniela De Venuto received the master degree in Electronic Engineering and the PhD degree from the Politecnico di Bari, Italy. Since 2003 she is professor at the Politecnico di Bari teaching courses in Design of Integrated Electronic Circuits. She is member of National Institute of Nuclear Physics (INFN). She has been involved in several international collaborations and European projects. In 2000 she was at EPFL, Switzerland working on Hall sensor interface circuits in FD SOI technology and in 2008 on a potentiostat based IC for electrochemical biosensor. Since 2002 she is Visiting Scholar at the University of Washington, Seattle (USA) and 2003-2005 has been Visiting Professor at the Lancaster University (UK). Between 2003-2007 she has been involved in two national projects on “Micro-fabricated sensors for DNA detection/ recognition”. During her sabbatical leave 2008-2009 at NXP semiconductors (IMEC Leuven, Belgium and at HighTechCampus in Eindhoven, NL), she worked on the design of a low power RFID multi-sensor system for perishable goods monitoring. In 2012-2013 she has been visiting faculty at UC Berkeley working on RFID reader for Brain Machine Interface. She is author of more than 130 papers in major international Journals and conference proceedings. She is member of the Microelectronic Journal (Elsevier) Editorial Board and she is guest editor of IEEE Trans. on CAD and IEEE Sensors Journal. In 2005 De Venuto started the IEEE IWASI. Her research interest includes design of analogue and mixed-circuit ICs and sensor interfaces. She is ISQED fellow 2010.